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HOLLAND'S VOCATIONAL MODELS:
A STUDY OF WORK GROUPS AND
NEED SATISFACTION

DISSERTATION

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for Degree Doctor of Philosophy in the Graduate
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By

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* * * * *

The Ohio State University
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Chapter I

Introduction

The concern with vocational selection and occupational membership had its formal beginning in the writing of Parsons (1909). This writer, who is usually referred to as the father of Trait and Factor theory, which before World War II had been called the Matching Men and Jobs approach, was primarily concerned with the relationship of an individual's personal characteristics to his selection of an occupation. Therefore, he considered the following logic as the most important facet of the vocational process: because individuals differ in their aptitudes, interests, and personalities and because occupations require varying amounts and kinds of these traits and factors, different individuals choose to enter different occupations. To Parsons (1909), vocational selection meant a three-step process: "(1) a clear understanding of himself , his aptitudes, abilities, interests, ambitions, resources, limitations, and their causes; (2) a knowledge of the requirements and conditions of success, advantages and disadvantages, compensation, opportunities, and prospects in different lines of work; and (3) true reasoning on the relations of these groups of facts." In short, Parsons, formulated a conceptual model of the individual's relationship to occupations based upon the assumption that adjustment to the world of work is a function of the agreement between the individual's capacities and characteristics, on the one hand, and the demands of the

occupation, on the other (Crites, 1969). The trait and factor model of vocational selection emphasizes the observable characteristics of the individual, but does not allow for the many inferred states or conditions which prompt an individual to behave as he does.

With Elton Mayo and the Hawthorne studies (1933) and Roethlisberger and Dickson's classical summary of the Hawthorne studies (1939), a second trend marked the development of vocational psychology and has been called the Psychodynamics of Vocational Behavior point of view (Crites, 1969). According to English and English's (1958) Dictionary of Psychological and Psychoanalytic Terms, "psychodynamic" refers to "any psychological system that strives for explanation of behavior in terms of motives or drives" or that describes "a psychological process that is changing or is causing change." Psychodynamic theories of vocational selection and their respective proponents include: (1) psychoanalytic (Brill, 1949; Meadow, 1955; Bordin, Nochmann, and Segal, 1963); (2) need (Roe, 1956; 1957; Super and Bachrach, 1957;) and (3) self (Super, 1951; Super, Starishevsky, Matlin, and Jordaan, 1963; and Tiedeman and O'Hara, 1963). Each of the theories of vocational selection listed in the previous statement can be classified as "psychodynamic" by the definitions of the term. Each of them proposes that the most significant factor in the making of a vocational choice is a motivational or process variable.

To its critics, the Matching Men and Jobs approach symbolized a philosophical, as well as practiced emphasis on fitting the "round peg

in the round hole, the square peg in the square hole." In point of fact, the individual compares his capabilities and dispositions with those demanded by occupations and selects the one he "matches" best. In contrast, the Psychodynamics of Vocational Behavior point of view represented to its detractors a concern for motivational or process variables without job analysis. In a sense, both these criticisms were justified. The Matching Men and Jobs approach had been too concerned both with individual differences and the analysis of occupations. Its concept of "best fit" between personality characteristics and occupational dispositions was an over-simplified model of vocational behavior. On the other hand, the Psychodynamics of Vocational Behavior point of view had disregarded occupational analysis. Forgotten too quickly was the fact the workers of a few occupational groups have certain distinctive traits and factors that are associated with occupational membership, vocational selection, and vocational motivation.

Thesis and antithesis led to synthesis. The two dominant vocational trends -- trait and factor theory and the Psychodynamics of Vocational Behavior point of view--have blended into a third: the developmental theories of vocational choice. Developmental explanations of vocational choice propose that the decisions involved in the selection of an occupation are made at a number of different points in the individual's life and that they constitute a continuous process which starts in early childhood and ends in early adulthood. Some of

these developmental theories originated in empirical research. Others represent an adaptation of broad psychological theories to vocational behavior. John Holland's theory of career development (Holland, 1959; Holland, 1966b; Osipow, 1968) best exemplifies a marriage between the data--and theory--language levels; and therefore, Holland's model of vocational behavior is a most notable example of a functional theory (Crites, 1969). The functional type of theory encourages the most intimate and continuing interaction of data and conceptualization. Both kinds of activity, empirical and conceptual, are emphasized, and they are given essentially equal status (Marx, 1963). Holland's theory of career development will be analyzed, so that its assertions about vocational behavior might be identified and therefore, set the theoretical background for the present study.

Holland's theory of career development proposes an interaction model of vocational behavior that is applicable both to personality types and occupational environments. His constructs postulate an interaction between personality and environment. This basic tenet of Holland's theory of vocational choice is stated clearly in the following series of propositions (Holland, 1966a):

1. In our culture, most persons can be categorized as one of six types--Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic.
2. There are six kinds of environments: Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic.

3. People search for environments and vocations that will permit them to exercise their skills and abilities, to express their attitudes and values, to take on agreeable problems and roles, and to avoid disagreeable ones.
4. A person's behavior can be explained by the interaction of his personality pattern and his environment.

The six personality types and six corresponding environments have been defined operationally in terms of Holland's (1965) Vocational Preference Inventory (VPI), Astin and Holland's (1961; Astin, 1963) Environmental Assessment Technique, and other procedures, so that the complex relationships between the two variables might be studied empirically.

Holland (1966a; 1968) has thus proposed a theory of vocational selection which posits six personality orientations (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic), presumably covering the domain of personality related to vocational selection, and six matching vocational environments, describing the various kinds of occupational environments that may exist. Each model orientation is a cluster of characteristic adaptive behaviors (coping mechanisms), psychological needs and motives, self-concepts, life history, vocational and educational goals, preferred occupational roles, aptitudes, and intelligence (Holland, 1966a). Holland's (1966a) descriptive statements for each model orientation are listed

below:

6

1. Realistic - The realistic person copes with his physical and social environment by selecting goals and tasks requiring physical strength, motor coordination, and mechanical skill, avoiding tasks that demand verbal skill, artistic expression, and abstract reasoning. He perceives himself as masculine, aggressive, unsociable, materialistic, and insensitive; and prefers such occupations as airplane mechanic, surveyor, and engineer. In short, Osipow (1970) asserts that, with a little imagination, one may easily observe that the realistic personality is one which is masculine, oriented toward concrete events and stimuli, and devoted to practical affairs.

2. Intellectual - The intellectual person problem solves and makes decisions by manipulation of ideas, i.e., thinking through rather than acting out. He sees himself as rational, abstract, asocial, critical, curious, and perceptive; and prefers occupational environments that include chemist, computer programmer, geologist, and physicist. Osipow (1970) suggests that the intellectual individual's life style exemplifies an emphasis on the life of the mind and a detached, scholarly, logical approach to problem solving. Further, one might say the intellectual deals with interpersonal events in a similar detached and distant manner.

3. Social - The social person prefers to solve his problems through feelings and interpersonal manipulation of others. This person tends to be sociable, responsible, nurturant, and humanistic.

The social person's life style--supportive involvement with people is contrasted with the intellectual person's; and therefore, he searches for vocational environments that include teacher, therapist, and minister.

4. Conventional - The conventional individual evidences a dominant concern for rules and regulations, self-control, and conformity. Since this person presents a somewhat stereotypic life style, he prefers "the establishment" and social acceptability above all else (Osipow, 1970). This individual tends to be sociable, reticent, persevering, and lacks originality and spontaneity. As a result, preferences for occupational environments include: bank teller, financial analyst, and statistician.

5. Enterprising - The enterprising person is characterized by his verbal skills that are typically used for selling, dominating, and leading; and furthermore, differs from the conventional person in his greater need for ambiguous social tasks, power, status, and leadership opportunities. The behavioral repertoire of an enterprising individual emphasized the exploitation of both his environment and his associates for personal gain. He assumes an aggressive posture behaviorally to accomplish these ends (Osipow, 1970). The enterprising individual's preferences for occupational environments include: business executive, manufacturer's representative, and traveling salesman.

6. Artistic - The artistic person deals with his physical and social environment by using his feelings, emotions, and ima-

gination to create artistic products. He perceives himself as nonconforming, original, and asocial a la the intellectual person; but differs from that type in that he has a greater need for individualistic expression, has less ego strength, is more feminine than masculine, and evidences little self-control. The artistic person's life style accents an obvious preoccupation with his aesthetic environment. Further, he uses linguistic, artistic, or musical media as a means of self expression and social interchange, depending on his particular mode of talent (Osipow, 1970). Therefore, the artistic person prefers the following occupational environments: author, cartoonist, musician, and poet.

Simply stated, Holland's theory proposes that people will be most attracted to and satisfied with vocations and their task demands that are congruent with their personality type.

Clearly, these six types are rarely presented in a pure form. Most people possess aspects of all six, but Holland suggests that each individual behaves in a manner that reflects one, two, or a "mix" of these styles much more strongly than the others, thereby defining the individual's singular orientation to life. Even more important, Holland has introduced the idea that a man who is not clearly characterized by a vocational style will vacillate and exhibit vocational indecision. According to the theory, one who is blocked from pursuing an occupation consistent with his modal personality style by training or ability deficits will either

pursue a career related to his next strongest style or enter an occupation at a lower occupational level in the environment related to his major style (Osipow, 1970).

The level of occupational activity is determined by two factors: (1) the individual's estimate of his intelligence: and (2) his level of self-evaluation, which is based upon "one's status needs, and perception of level of competence and potential competence, and the self-estimate of one's worth with respect to others" (Holland, 1959).

Holland has also introduced three other concepts associated with his interaction model of vocational behavior: (1) consistent-inconsistent interactions, (2) congruent-incongruent interactions, and (3) homogeneous-heterogeneous interactions. The concepts of consistent and inconsistent are defined in terms of the similarity (intercorrelation) of the primary and secondary personality types or environmental models. For example: the Social and Enterprising types are correlated .36 and therefore are consistent with each other, but the Conventional and Artistic types, which correlated -.09, are inconsistent. Similarly, interactions between personality and environment may be congruent or incongruent, depending upon whether they belong to the same type and model or not. Thus, if an Intellectual individual is in an Intellectual environment, the interaction would be congruent, but if he were in an Enterprising environment, the interaction would most likely be incongruent. Finally,

Holland uses the concepts of homogeneity and heterogeneity to describe personality-environmental interactions. the greater the magnitude of the difference between the highest and lowest scores for a type or model, the greater the homogeneity of the personality or environment (Crites, 1969). It follows from the possible combination of these personality-type and environmental-model interactions that consistent, congruent, and homogeneous pairings of the individual and his environment are most conducive to (1) more stable vocational choice, (2) greater vocational achievement, (3) higher academic achievement, (4) better maintenance of personal stability, and (5) greater satisfaction (Holland, 1966a).

Implicit in the foregoing summary of Holland's theory of vocational choice are some of the problems and phenomena that need further investigation and are associated with general theories of vocational choice. What Holland's theory gains in comprehensiveness by being so general, however, it loses in the cohesiveness of its propositions. It is a loosely integrated aggregate of assumptions, concepts, and hypotheses, which are seldom logically related to each other, except in an intuitive way. Holland calls his theory "heuristic" in the sense that it implicitly suggests possible relationships among variables, but they do not explicitly state what they are.

It is evident that Holland's theory of vocational selection posits six personality types (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic), that cover the domain of personality related to vocational selection, and six matching vocational environments, that describe the various kinds of occupational environments extant. Despite Holland's unequivocal statement of these constructs, no single study has shown that these relationships exist in the world of work, for a representative and differentiated sample of workers. Certainly, no study has presented conclusive evidence on the relationship of Holland's personality-environment interaction model of vocational behavior to both the perceived opportunity to satisfy needs and the actual satisfaction of needs, although Holland (1966a) asserts that consistent, congruent, and homogeneous pairings of the individual and his environment lead to greater satisfaction in the world of work.

The present study investigates the concurrent validity of Holland's theory of vocational selection by administering the Vocational Preference Inventory (V.P.I.) to samples of workers well-established in occupational environments comparable to Holland's six vocational environments. This investigation is presented as a study of concurrent validity because vocational work groups, who have been previously identified as representative of each of Holland's six personality orientations, will take the Vocational Preference In-

ventory (V.P.I.) to see if the V.P.I. distributes them in a comparable fashion according to their interests. The main purpose of this study, therefore, will consider the question as to whether these six personal orientation models evidence concurrent validity for occupational groups whose members are well-established in the world of work. Furthermore, the present study will attempt to investigate whether higher order needs, as defined by Maslow (1954), are actually better satisfied with consistent, congruent, and homogeneous pairings.

Before a more detailed statement of the problem is presented, a review is necessary of empirical literature bearing on the problem of the validity of Holland's model of vocational behavior and vocational interests in relation to vocational satisfaction. Although there is an abundance of such research, discussion will be limited to the most critical studies.

Chapter II

Review of Literature

Before a review of empirical literature is presented, a word about the Vocational Preference Inventory (VPI; Holland, 1965) the most commonly used instrument to assess personality in accordance with Holland's theory of vocational selection, seems appropriate. This instrument consists of a list of 160 occupational titles to which the respondent is to indicate those that he thinks that he would like and those he would not like. The rationale underlying this approach is that in responding to the job titles people project aspects of their personality organization, partly based on occupational stereotypes, partly based on their own experiences and personal style. On the basis of the pattern of likes and dislikes, the VPI allows the classification of individuals into personality types consistent with Holland's theory. Among the eleven scales that emerge from Holland's instrument are included the six vocational personality types described earlier as well as five non-vocational scales: self-control (high scores indicate over-control; low scores impulsiveness and a tendency to "act out"); status (high scores are indicative of vocational choices with high prestige ranking); masculinity (high scores indicate frequent choice of masculine occupational roles); infrequency (high scores indicate

typical vocational preferences and self-deprecating and culturally deviant attitudes); and acquiescence, this last indicating the tendency to yield to outside opinion and social desirability. Although the VPI has numerous shortcomings, for instance, the inappropriateness of the occupational titles for women, a lack of useful norms and percentile scores for the scales, and the somewhat circular construction of the instrument, it has been used in the great majority of research done on Holland's theory, although at times other approaches have been used to assign individuals to certain personality types (Osipow, 1970).

Holland and other investigators have conducted a number of studies related to the theory and its constructs. These studies have generally used one of four empirical approaches: (1) the investigation of the relationship between personal orientation as measured by the Vocational Preference Inventory (VPI; Holland, 1965) and other inventories and educational choice (Holland, 1960, 1962, 1963a; Wall, Osipow, and Ashby, 1967); (2) assessment of the range of personal orientation of a variety of educational, vocational, and hospitalized groups (Fairweather, Simon, Gebhard, Weingarten, Holland, Sanders, Stone, and Reahl, 1960; Holland, 1958); (3) investigation of the relationship between VPI scale scores and self-ratings on self-description on traits which the various scales are assumed to measure (Holland, 1962, 1963b, 1964);

and (4) investigation of the associations and relationships of scale scores with various external criteria (Astin, 1963; Astin and Holland, 1961; Forsyth and Fairweather, 1961; Holland, 1958, 1962; Lopez, 1962; Osipow, Ashby and Wall, 1966). In general, the results of these studies lend support to the meanings attributed to the scales. The purpose of this chapter, therefore, is to review the research of both Holland and those investigators cited above, as well as related research projects (Folsom, 1968; Holland, 1970; Osipow, 1970; Walsh and Lacey, 1969, 1970; Schutz and Blocher, 1961; and Stockin, 1964) whose findings assess and support the constructs of Holland's theory of vocational behavior.

Holland's investigative study of his theory of vocational selection is very comprehensive. Holland's theory of vocational selection has been explored in a series of longitudinal and cross-sectional studies with large samples of National Merit program finalists (N's range from about 700 to 1500). His research methodology has been characteristically longitudinal and has included these studies: (1) 1- and 2-year follow-ups of vocational choice and its associated variables (Holland, 1962); (2) a 4-year prediction of stability in vocational choice (Holland, 1963a); and (3) a 1-year assessment of change in major field of study (Holland and Nichols, 1964); The four cross-sectional studies concern those correlates that are related to Holland's six personal orientations and are identified in the following list: (1) vocational images

(Holland, 1963c); (2) self-descriptions (Holland, 1963b); (3) coping behaviors and competencies (Holland, 1963d); and (4) vocational daydreams (Holland, 1963e).

A comprehensive summary of Holland's major findings, based upon both longitudinal data and cross-sectional data, presents an insoluble problem because Holland's series of studies are so extensive and cover such a wide range of variables. But some summary statements can be set forth. First, Holland's empirical findings indicate that Holland's six personal-vocational orientations (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic) systematically differed in relation to a host of personal, family, social, and achievement correlates, some of which are: vocational choice, educational aspirations, family background, patterns of academic and nonacademic achievement, hobbies and extracurricular activities, inventoried personality characteristics, self-ratings of traits and skills, and identification with famous people. Second, results on Holland's hypothesis that level of vocational choice is a function of an individual's estimate of his capabilities were superficial and unsatisfactory for two reasons: (1) the vocational choice levels of the high-aptitude National Merit scholars gravitated to the upper extreme of the occupational hierarchy; and (2) with the substitution of college major field as a measure of vocational choice, occupational level was not really considered as a focal issue. Third, convincing, cumulative evidence demonstrates that congruency and consistency in personality orientation-envirom-

metal model interactions leads to certain potent and predictable outcomes: stability in choice of college major field and vocational goal, vocational and academic achievement, personal stability, and perhaps creative performance. Finally, Holland has established operational evidence for his definitions of personality types. In fact, he obtained substantially the same results, whether he used his Vocational Preference Inventory (VPI) or selected scales from the Strong Vocational Interest Blank (SVIB) (Crites, 1969).

In his search for significant relationships between the constructs for the six personal orientation scales (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic) and scales measuring similar constructs, Holland and his collaborators employed a potent variety of tests, inventories, and questionnaires. Primary determination of the six model orientations' construct validity has been derived from intercorrelations of the Vocational Preference Inventory (VPI) with the following inventories and scales, some well-established and other created by the National Merit Scholarship Corporation: California Psychological Inventory, Cattell Sixteen Personality Factor Questionnaire, Minnesota Multiphasic Personality Inventory, The Edwards Personal Preference Schedule, the Gough Differential Reaction Schedule, the Ghiselli Self-Description Inventory, the Creative Activities Scale, and the Parental Attitude Research Instrument (Holland, 1962, 1965). Holland's (1960) study of the relationship between the personal orientation scales of the VPI and Cattell's

16PF is representative of the intercorrelational research designs described earlier.

To sharpen the constructs that each scale is assumed to assess, the VPI scales were intercorrelated (Pearson product-moment correlations) with the Cattell Sixteen Personality Factor Questionnaire. These intercorrelations generally provide positive evidence for the construct validity of the scales and their rationale. Forty-seven percent of the correlations obtained between these instruments were significant for a large sample of National Merit Scholars (N=1177). A summary of the outstanding relationships follows. The Realistic scale is significantly associated with unsociability (A), minimal interest in intellectual endeavors (B), emotional stability (C), masculinity (I), extraversion (M). The Intellectual Scale is associated with unsociability (A), masculinity (I), radicalism (Q), self-sufficiency (Q2), and high self-sentiment (Q3). The Social scale is associated with sociability (A), enthusiasm (F), super ego-strength (G), adventurousness (H), conservatism (Q), and dependency (Q2). The Conventional Scale is associated with conformity (G), masculinity (I), extraversion (M), conservatism (Q), and dependency (Q2). The Enterprising scale is associated with sociability (A), dominance (E), cheerfulness (surgency) (F), adventurousness (H), conservatism (Q), dependency (Q2), and impulsiveness (Q3). The Artistic scale is associated with femininity (I), immaturity (C), and introversion (M). The evidence replicates

many of the relationships found between personality variables and occupational classes obtained in a classification of occupations in terms of personality and intelligence. The data seem to suggest that preferences for occupational titles are significantly related to a number of personality variables.

In his most recent work (Holland, et al., 1970 in press) Holland and several associates present data for a large number of occupations based on four digit codes. These results were subsequently subjected to a factor analysis which located the six vocational scales of the VPI in a three dimensional space. The results of the factor analysis mathematically verified the hexagonal model Holland has postulated for his vocational classification. According to the hexagon, the personality categories may be psychologically arranged in the following order; realistic, intellectual, artistic, social, enterprising, and conventional. Because of the hexagonal arrangement, the conventional is adjacent to realistic. As is the case with Anne Roe's (Roe, 1957) occupational classification system, adjacent categories are presumed to be psychologically more closely related to one another than distant categories. A subject exhibiting a profile code in which the order was not reasonably consistent with the hexagonal model might be expected to exhibit an unstable career. Thus, a profile of R-S-A-C-E-I would belong to a walking paradox who might look forward to considerable vocational discomfort (Osipow, 1970).

The weight of the evidence which Holland has gathered in support of his theory of vocational choice is indeed impressive. There is little doubt that systematic (statistically significant) relationships exist between the personality types and choice phenomena, whether these are educational or vocational, and between the stability of these behaviors over time and personality-environmental agreement (Crites, 1969). Although Holland's investigations of construct validity are extensive and have sharpened the constructs of each scale, other researchers have reported findings that support Holland's theory of vocational selection. Further review of research will be limited to the most important of those studies that assess and extend the construct validity of Holland's theory.

Schutz and Blocher's (1961) study tested Holland's prediction that there is a relationship between choice and self-evaluation; more specifically, they were testing the assumption that the SVIB's Occupational Level score is a valid index of the self-evaluation construct. For a sample 15 135 male high school seniors, they obtained a significant Pearson product-moment correlation of .34 between self and ideal-self congruency as measured by Schutz and Blocher's Descriptive Check List and SVIB Occupational Level scores. These researchers concluded, with some caution, that SVIB Occupational Level scores may be used to indicate the self-evaluation portion of the level hierarchy in Holland's theory (Osipow, 1968).

Stockin (1964) also investigated an aspect of the level hierarchy in Holland's theory: the relationship between a person's

intelligence and self-evaluation and level of occupational choices. Stockin used IQ scores as an index of intelligence and summed scores on three scales (Sims Social Status Scale, Hieronymus' Attitude Toward Education Scale and Socio-Economic Expectation Scale) as an evaluation index. With these measures he attempted to predict the occupational levels to which the subjects would aspire. He then tested his predictions by comparing them to each subject's position on Roe's occupational classification system (1954). That intelligence does influence self-evaluation and level of choice was established in this investigation, but Stockin also found that intelligence does not account for all the variance in level of choice. The summary statement of his results follows: "When IQ ranks only are used to predict occupational level, only 57 'hits' are obtained; using intelligence plus self-evaluation, 82 correct predictions occur or an increase of 25 hits (15 percent greater accuracy)" (Stockin, 1964). These two investigative efforts of different aspects of the level hierarchy report findings consistent with Holland's theory of vocational selection.

Further validation of the constructs used in Holland's theory has been investigated with respect to environmental inputs. The constructs for the six vocational scales of the VPI (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic) were used by Astin and Holland (1961) to assess college environments. Their study provided evidence that it was possible to predict what students say about their college merely by performing a

census of major fields at a college by assuming that choice of major field is equivalent to choice of vocation. In a later study, Astin (1963) reported similar findings. Further, a factor analysis of empirical criteria for assessing post-hospital, neuro-psychiatric patient adjustment by Forsyth and Fairweather (1961) resulted in findings that support the constructs in the VPI.

A more direct study of environmental inputs in relation to Holland's theory of vocational choice was conducted by Folsom (1968). A sample of 1003 male and female college students were administered the College Student Questionnaires, Part I and then, was grouped under the six personality types proposed by Holland. Following this procedure, the personality types' mean scores on the seven scales of the College Student Questionnaire were analyzed to determine whether or not the six personality types evidenced significant differences on the CSQ scales. The results were significant on all but the Family Social Status scale. Further, with the exception of the Enterprising subjects, students within each personality category scored in ways which were consistent with Holland's descriptions of those types. These findings again indicate a consistent relationship between the personal orientations as measured by the VPI and the CSQ scales.

Unlike Folsom's use of a sample of college students, Lopez (1962) examined the validity of the six personal orientations in a work environment for a sample of 124 supervisors and subordinates.

In this study, a correlational matrix was generated among Management Questionnaire scales (Job Satisfaction Scales), Scales of the Holland Vocational Preference Inventory, and the Alternative Choice Evaluation Inventory Scales (Supervisor Ratings). Lopez reported that job satisfaction was significantly correlated with these four vocational scales of the VPI: Realistic, Intellectual, Social, and Enterprising; supervisory ratings with these VPI scales: Realistic, Intellectual, Social, and Conventional. Therefore, both of these studies (Folsom, 1968; Lopez, 1962) lend support to the construct validity of Holland's personal orientation VPI scales.

Similarly, a comprehensive study by Osipow, Ashby, and Wall (1966) provides evidence for the other major part of Holland's theory: the relationship between personality types and field of vocational choice. Their research tests four hypotheses derived from the theory. The first hypotheses--that subjects would express occupational preferences consistent with their major personal orientation--is an important prediction related to construct validity. Procedurally, Osipow et al, required a sample of college freshmen to rank six personality descriptions that matched Holland's six personal orientations and to rate the degree to which each description fit them. This procedure resulted in both a measure of the order of the Ss' identification with each type and a measure of the strength of that identification. Information about the occupational preferences of each student was available. It was,

therefore, possible to test the first prediction, that Ss' occupational preferences are consistent with the major personal orientation, by comparing the frequency with which students' occupational preferences were in occupational environments consistent with the major personal orientation. The results concerning this hypothesis supported Holland's theory. Some inversions were observed in the data, but to no greater degree than in Holland's own work (Osipow, 1968).

Comparisons of the subjects by major personality orientation and SVIB group scores revealed consistency between the SVIB scores and assignment to personality categories. For example, Ss in the Realistic category earned their highest scores, and higher scores than any other personality group, on SVIB groups II and III (science-engineering and practical, respectively), which is exactly what the theoretical statements would lead one to expect. In terms of the degree to which the vocational preferences, when assigned to categories equivalent to those of Holland's theory fell into appropriate SVIB groups, the evidence is even stronger. From the results, it would appear that considerable construct validity exists between the personal orientations, SVIB scores, and occupational preferences (Wall, Osipow, and Ashby, 1967).

In another study, Osipow and Ashby (1968) tallied the frequency of combinations of high-point codes as compared to educational preferences. Their findings are summarized in this table:

Educational PreferenceMost Common VPI Code

R	I-R
I	I-R
S	S-E
C	C-E
E	E-C
A	A-S
Undecided	I-R

With one exception, Realistic, the students' educational preferences matched their personality models (Osipow and Ashby, 1968).

Osipow's most recent study (1970) investigated the relationship of clergymen's actual work roles to their VPI codes. Consistent with Holland's theory, it is to be expected that clergymen of different personality types would seek different kinds of job tasks within their chosen profession, as well as to actually engage in different kinds of task functions. In testing this hypothesis, two instruments were used: (1) the VPI and (2) a work role checklist that consisted of a list of tasks one might engage in as a clergyman. The tasks included were the administrator, the preacher, the counselor, the scholar, the evangelist, the social reformer, the teacher, the artist, and the musician. The results reveal little convincing relationship between work role and personality type. Thus, a substantial proportion of the clergy studied report jobs which emphasize tasks having little relationship to their personality type. Two opposing inferences are possible: first, that personality is not related to career; the second, that there is much frustration in the vocational lives of these men. The first inference is more parsimonious, the second is

probably more realistic (Osipow, 1970).

Two further studies bear relation to Holland's theory of vocational selection. In one, Walsh and Lacey (1969) sought to assess the role of the educational environment in personal and vocational development. The purpose of the study was to determine if college student, male seniors assigned to one of Holland's personality types (using college major as the criterion) perceived themselves as having changed in a direction consistent with the profile of that type during the college years. Students in three of the colleges, those with Realistic, Intellectual, and Artistic environmental press, reported perceived change in themselves over the years they spent in college. This change, furthermore, was in a direction consistent with the press of their college and associated with the personality type described by Holland. In a similar study with women college students, Walsh and Lacey (1970) found results which resembled those for men. The findings of this study indicate that students in two college major groups (the sciences and music education) perceived themselves to have changed in a direction consistent with the profile of the respective personality orientation (Intellectual and Artistic). Also, the business education group (Social Conventional) perceived themselves as changing in a direction consistent with the profile of the Conventional orientation. In general, the findings support the notion of a developmental coactive relationship between the individual and his environment. The findings

of this study and the previous study indicate that students tend to report change in a direction consistent with their dominant personality orientation (s) expressed via their college major choice (Walsh and Lacey, 1970).

Summary of Research Findings on Holland's Theory

This literature section has dealt with a review of important research studies that have presented empirical evidence in support of Holland's theory of vocational choice. The theoretical consequences of these research findings have sharpened the constructs that each scale of Holland's Vocational Preference Inventory (VPI) is assumed to assess. The practical consequences of these data, on the other hand, have demonstrated the potential utility of Holland's theory in counseling and, perhaps, more pragmatically, as an appropriate framework for conducting career development research. Stated briefly, Holland and the other investigators have further validated and practically applied his theory of vocational selection with respect to the classification of occupations, the identification of environmental inputs, the interaction of personality orientations with occupational environments, and the validation of the constructs used in the theory.

Studies Which Employ the Maslow Need Hierarchy

The present study uses Maslow's need hierarchy as a continuum of worker needs. It therefore seems appropriate both to review briefly Maslow's motivational model and to cite recent investigations

that have utilized this framework in studying employee needs.

The motivation of people to utilize their abilities is termed a self-actualization need by Maslow (1943,1954). According to his hierarchial theory of motivation, there should be substantial individual differences in the strength of this need, and these differences should be positively related to the extent to which lower order needs like those for food and water, safety, and acceptance by others have been satisfied. When such lower order needs have been satisfied, higher order needs will emerge; when they have not been satisfied, higher order needs will remain inactive. If this hypothesis is correct, we should find that the effects on job satisfaction of the extent to which the job permitted the use of skills would vary inversely with the intensity of other deprivations experienced by the worker. If a worker was inadequately clothed or fed, in a dangerous or threatening situation, or rejected by others the opportunity to utilize his skills or abilities would be predicted to be much less important to him than if lower order needs were satisfied (Vroom, 1964). The major contribution to the research on Maslow's model in an industrial setting has been by Porter. He and his collaborators have published a number of research studies which are of sufficient importance that a brief summary of each will be presented.

In the first study Porter (1961) developed a questionnaire measure designed to tap into five different motivational need classes

(security, social, esteem, autonomy, and self-actualization) that were derived from Maslow's model; and then, administered it to a sample of 64 bottom-level managers (foremen) and 75 middle-level managers from three different companies. Porter's findings demonstrate that higher order needs of esteem, autonomy, and self-actualization tend to be viewed as more important by upper-management personnel. He also reports that satisfaction of esteem, autonomy, and self-actualization is related to level of management. Satisfaction of security and social needs, however, are not so related. Self-actualization and autonomy needs seem to be the least satisfied needs at all levels of management.

The second study (Porter, 1962a) was a much more comprehensive survey because the questionnaire was distributed to a nationwide sample of 6000 managers and executives. A total of 1916 usable returns were obtained. Analysis of the data resulted in three significant findings: (1) the respondents seem to feel that there should be more opportunity for these needs to be fulfilled than actually existed; (2) the vertical level of position within management had a strong relationship to the degree of perceived satisfaction of the three high order needs; and (3) the needs of self-actualization and autonomy were consistently regarded as the least fulfilled needs at all levels of management.

Porter's (1963a) third study is a follow-up of the previous one; he examined the same data in relation to need importance.

He found that higher level managers placed more emphasis upon self-actualization and autonomy needs than did lower level managers. No significant differences were found due to managerial levels for the other needs.

All the above studies examined either need fulfillment or need importance as a function of a person's vertical location in an organization. In his fourth study Porter (1963b) looked at these two motivational constructs as a function of horizontal differences among managerial positions, viz., line versus staff jobs. He divided his managers into three groups: line managers, combined line and staff managers, and staff managers (Blum and Naylor, 1968). Porter reported these results: (1) line managers perceived greater need fulfillment than did staff managers; (2) largest need fulfillment differences occurred in the need for esteem and for self-actualization; (3) line and staff managers did not differ on the importance they attached to each type of need except for the autonomy need, which staff managers found more important, and (4) differences due to horizontal organizational structure are smaller than those due to vertical organizational structure.

In the last study, Porter (1963c) examined need fulfillment and need importance as a function of the size of the organization to which a manager belonged. Here he found that at the lower levels of management smaller company managers were more satisfied (had

greater perceived need fulfillment) than were large company managers. However, just the reverse was found to be true at higher levels of management! Here Porter found that managers in large companies were more satisfied than small company managers. Size of company was found to have no bearing upon perceived need importance.

Porter's research studies have systematically applied Maslow's needs model to industrial management and have demonstrated its usefulness as a framework for assessing employee satisfaction. In point of fact, Maslow's model could easily be used to tap employee satisfaction in other work environments, i.e., research, educational, and religious.

Beer's (1966) study tested hypotheses concerning relationships between leadership and need satisfaction (as defined by Maslow); these hypotheses were generally confirmed. Higher order need satisfaction (esteem, autonomy, and self-actualization) was positively related to the supervisory roles of Consideration and Freedom of Action; while satisfaction of security needs was positively related to Initiating Structure. The pattern of higher order need satisfaction was not the same for Freedom of Action and Consideration. Satisfaction of all higher order needs would require a supervisor who displays both types of leadership behavior. The leadership styles which were positively related to higher order need satisfaction were not positively related to motivation. Initiating Structure had the highest corre-

lations with the dimensions of motivation, but it was negatively correlated with perceived opportunity to satisfy higher order needs.

Summary of Research on Maslow

In the preceding section studies that employed Maslow's motivational model were reviewed. From the studies cited above, a pattern of relationships emerges despite the fact that they were performed in different settings, and the researchers used different measuring instruments. The work of both Porter and Beer has applied the Maslow's motivational need model as a frame of reference for furthering our understanding of industrial motivation, satisfaction, and patterns of need. Their results lend substantial support to the validity of Maslow's need hierarchy.

General Summary

It has long been hypothesized that vocational interests are related to vocational satisfaction. In his classic volume on the Strong Vocational Interest Blank (SVIB), Strong (1943) wrote that: "The criteria of a vocational interest test should be whether or not the person will be satisfied in the career to which it directs him, other factors than interest being disregarded." Holland's theory of vocational selection and its assessment instrument, the Vocational Preference Inventory, present a framework for evaluating vocational interests; Maslow's need model a framework for evaluating both employee needs and satisfaction. Although Sarbin and Anderson (1942) and Jacobs and Traxler (1954) have tested the interest-

satisfaction hypothesis respectively with the Strong Vocational Interest Blank (SVIB) and the Kuder Preference Record-Vocational (KPR-V), no research has presented conclusive evidence for Holland's theory of vocational choice on the relationship of Vocational interests to specific need satisfactions and actual employee satisfaction. Further, previous research on the interest-satisfaction hypothesis has reported low positive correlations between these variables. Crites (1969) indicates that poorly constructed measures of satisfaction had reduced the magnitude of the relationship between interests and satisfaction. The preceding literature review suggests that the untested interest-satisfaction hypothesis with respect to Holland's theory of vocational selection is one of its conceptual shortcomings. Therefore, this investigation attempts to test the interest-satisfaction hypothesis for Holland's theory and employs well-constructed measures of perceived and actual satisfaction.

Chapter III

Methodology

Sample

The sample for this study consisted of a total of 230 male workers in seven different occupational environments. Subjects represented each of Holland's six personal orientations and were taken on a voluntary basis both by the experimenter and by liaison people within departments or organizations that have participated in this study. The total sample was subdivided into six groups that match Holland's model of vocational selection: (1) Realistic - project engineers (N=29); (2) Intellectual - research chemists (N=31) and computer programmers (N=29); (3) Social - high school teachers (N=28); (4) Conventional - actuaries (N=29); (5) Enterprising - bank executives (N=30) and insurance company executives (N=30); and (6) Artistic - college English professors and music teachers (N=24). The division of the total sample into six groups was for the purpose of analyzing the VPI's potency for distributing these vocational work groups in a comparable way according to their inventories interests. The sample is exclusively male because the occupational titles of the Vocational Preference Inventory are more appropriate for men than for women.

The sample was drawn from five separate geographical locations: Columbus, Ohio; Cleveland, Ohio; Syracuse, New York; New York City; and New Jersey. It was intended that 395 workers participate in this study. However, only 250 of these questionnaires were returned. Of these, 230 were sufficiently complete to be used in the study.

Instruments

The "General Information Questionnaire" (Appendix A) was used to gather important biographical information; subjects were required to respond to questions concerning sex, age, and length of work experience. These items were included for two purposes: (1) to attempt to guarantee homogeneity of samples across seven occupational environments; and (2) to provide descriptive information about the samples used in the study. Also, two items concerning current job title and college major were included. These data were used to assess the congruency between academic major and high-point VPI code; and between current occupational title and high-point VPI code.

A Preference Inventory (Appendix A) developed by Beer (1966) measured needs on the Maslow need hierarchy. The scale is composed of five subscales (Esteem, Autonomy, Social, Security, and Self-Actualization), each measuring one need in the Maslow hierarchy and each containing six items.

Beer's Preference Inventory contains six sets of statements that describe various aspects of a job. Items in each set represent the five different need categories, but they are homogenous in

terms of estimated degree of importance to workers. Subjects were asked to rank items in each set according to their importance to them. Subscale total scores were computed by adding the ranks assigned to the items in each need category.

A ranking procedure was used on this scale to insure meaningful variability in each of the need dimensions. Further, Maslow's theory assumes a prepotency of needs, and therefore from a theoretical perspective this procedure was appropriate (Beer, 1966).

Reliabilities for Beer's Preference Inventory, computed by Kuder-Richardson Formula 8, are reported in Table 1. These were computed on the sample of clerical workers used in Beer's (1966) study. The intercorrelations of the five Preference Inventory subscales are also presented in Table 1. By and large these subscales are fairly independent. It should be remembered that subjects were forced to rank items in each set. This is responsible for the negative correlations that appear in Table 1. It is possible that a technique which does not force subjects to rank items would result in completely orthogonal subscales. In any case the magnitude of these correlations should not be taken as a final indication of the relationships between these a priori factors. However, it is interesting to note that the forced relationships are in the expected direction with few exceptions. The lowest need and the highest need level have the highest negative correlation and so on. A notable exception is the negative correlation between the Esteem and Autonomy subscales. Generally, it would appear that workers who are forced to

arrange needs in a hierarchy do tend to arrange them in the way Maslow predicts they would (Beer, 1966).

A Vocational Description Inventory (Appendix A) measured the extent to which each worker felt that six patterns of traits and behaviors (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic) matching Holland's six vocational models reflected his behavior. For example, the Realistic vocational description read as follows:

"This person is masculine, physically strong, unsociable, aggressive; has good motor coordination and skill; lacks verbal and interpersonal skills; Prefers concrete to abstract problems; conceives of himself as being aggressive and masculine and as having conventional political and economic values."

Each subject was instructed to read and to rank these descriptive statements to conform to the order in which he felt they described him. Therefore, this questionnaire provided a means of determining the workers' preference for the six vocational dimensions of interest in this study. These ratings assessed the congruency between vocational preferences and VPI high-point codes.

Two types of satisfaction measures were used in this study: (1) the perceived opportunity to satisfy needs, and (2) the actual satisfaction of needs.

Perceived opportunity to satisfy Maslow needs was measured by the Job Inventory (Appendix A). This questionnaire is basically the same as the Preference Inventory which was developed to measure

TABLE 1

Intercorrelations and Reliabilities of Five Preference Inventory Subscales Measuring Maslow Needs*

Subscales	1	Subscales				Mean	Standard Deviation	Reliability**
		2	3	4	5			
		r	r	r	r			
1. Security		-.19	-.27	-.16	-.37	21.7	4.2	.71
2. Social			.39	.07	-.29	19.5	4.1	.75
3. Esteem				-.43	.02	20.0	4.5	.67
4. Autonomy					-.34	16.9	4.2	.74
5. Self-Actualization						11.9	4.0	.74

* Low scores mean a higher level of need.

** Kuder-Richardson reliabilities (KR-8) were computed on a sample of 127 clerical employees used as subjects in Beer's study.

employee needs. The wording of the items was changed to reflect the situation on the job rather than the abstract need. Workers were asked to rank items in each set according to the degree to which they reflected the job situation. The total score for each need category is the sum of the ranks assigned to items in that category.

Reliabilities of the Job Inventory subscales were computed by means of Kuder-Richardson Formula 8 and are reported in Table 2. Intercorrelations among the subscales are also reported in Table 2.

The pattern of correlation is similar to that of the Preference Inventory subscales, but the correlations are generally higher. Thus, the perceived satisfaction dimensions are not independent. It should be recalled that workers had to rank items, and that this resulted in the lack of independence between certain need satisfaction dimensions. The magnitude of the correlations, therefore, should not be generalized outside the immediate bounds of this study. Another procedure that does not force ranking might result in a different set of relationships (Beer, 1966).

Again it is interesting to note that when subjects were forced to rank the needs in terms of satisfaction, the resulting pattern of correlations is what would have been predicted. For example, perceived opportunity to satisfy the highest level need show the highest negative correlation and so on.

A measure of actual satisfaction of needs and expectations is obtained by subtracting the need and expectation scores (Preference

Inventory) from the scores representing perceived opportunity for their satisfaction (Job Inventory). This gave a difference score which represents a need deficiency on satisfaction.

The value of such difference scores as measures of satisfaction is obvious. Perceived satisfaction measures are open to intentional and unintentional bias. The worker may perceive himself to be satisfied with certain aspects of the job because of recent events, but a need deficiency may still be present that does not show up at the time. The difficulty in faking an actual satisfaction score is also clear, since the subject would have to know that such a score will be computed (Beer, 1966).

The correlation matrix for the need satisfaction dimensions is presented in Table 3. The actual satisfaction dimensions are considerably more independent than the dimensions of perceived opportunity for satisfaction.

Finally, John Holland's Vocational Preference Inventory (Sixth Revision) was used in this study and has been described in full earlier. Holland's instrument includes the six vocational personality orientation scales (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic) and five nonvocational scales: self-control, status, masculinity, infrequency, and acquiescence. In this study the VPI fulfilled two methodological purposes: (1) it is an inventory to assess the personal orientation models in Holland's theory of vocational choice; and (2) it is also an interest inventory,

TABLE 2

Intercorrelations and Reliabilities of Five Job Inventory Subscales*

Subscales	1	Subscales				Mean	Standard Deviation	Reliability**
		2	3	4	5			
		r	r	r	r			
1. Security		.11	-.34	-.21	-.51	19.9	4.4	.65
2. Social			-.43	-.13	-.52	17.9	4.9	.77
3. Esteem				-.30	-.08	20.4	4.3	.68
4. Autonomy					-.21	15.2	4.0	.67
5. Self-Actualization						16.5	5.4	.78

* A low score means a greater perceived opportunity to satisfy this need.

** Kuder-Richardson reliabilities (KR-8) were computed on a sample of 127 clerical employees used as subjects in Beer's study.

since its content is occupational, and since some scales correspond to the dimensions commonly measured by interest inventories.

Procedure

The experimental settings for this investigation were seven occupational environments in which the subjects worked: (1) a large insurance company, (2) the regional sales office of a pharmaceutical company, (3) the research division of a rubber company, (4) the main office of a consulting engineering company, (5) the home office of an international banking firm, (6) a musical instruction company, and (7) a large educational institution. From each of these occupational environments certain work groups whose occupational titles were most representative of each of Holland's six vocational models were selected for this study. Test administration typically occurred during either slack periods or in a worker's spare time. Formal testing sessions were not regularly scheduled because the occupational environments would not support it. A testing session was approximately forty minutes long.

The questionnaires (Appendix A) were grouped into a package. Workers in each occupational environment received them from the experimenter or a liaison person appointed by him. The package contained an instruction sheet informing each subject about the study. It was explained to all subjects that the study concerned certain (but unspecified) questions related to the problems of occupational selection and job satisfaction, and that the data collected were for

TABLE 3

Intercorrelations Among Need Satisfaction Dimensions*

Subscales	1	2	<u>Dimensions</u>		5	Mean	Standard Deviations
			3	4			
		r	r	r	r		
1. Security		.25	-.12	-.28	-.35	51.0	7.8
2. Social			-.24	-.19	-.55	51.7	4.3
3. Esteem				-.16	-.03	49.7	3.9
4. Autonomy					-.17	51.4	4.6
5. Self-Actualization						45.4	6.0

*Satisfaction scores were obtained by subtracting Preference Inventory scores from Job Inventory scores and adding a constant of 50 (Beer, 1966).

research purposes. Subjects were assured that there would be no permanent record of their performance on any of the instruments. Also, workers were informed that the investigation was being performed in cooperation with The Ohio State University. Further, each subject was not required to place his name, or company name on the questionnaire. Upon completion each employee placed his questionnaires in an envelope and sent them to the liaison person; at this point, the liaison person placed all the returned questionnaires in a large envelope and sent them to the experimenter. These procedures guaranteed to all workers that their responses would be strictly anonymous, and the results of the study would not be used against them.

Hypotheses and Statistical Tests

The hypotheses tested were:

1. There are no significant differences between the mean scores of the occupational groups on the eleven scales of the VPI.
 - 1.1 There are no significant differences between the mean scores of the occupational groups on the homogeneity index of the VPI.
2. There are no significant mean differences among the occupational groups with respect to pattern of employee needs.
3. There are no significant mean differences among the occupational groups with respect to perceived opportunity to satisfy needs on the job.
4. There are no significant mean differences among the occupational groups with respect to actual satisfaction of needs.
5. The Social scale of the Vocational Preference Inventory, whose F ratio is the largest of all the variables and is significant at the .01 level, will enable us to predict

an individual's vocational group membership; this variable will increase prediction above a chance level.

6. The Social scale of the VPI and the Social scale of the Preference Inventory (F ratio is the second highest and significant at the .01 level) will increase prediction above a chance level.
7. The Social scale of the VPI , the Social scale of the Preference Inventory, and the Artistic scale of the VPI (F ratio is the third highest and significant at the .01 level) will improve prediction.
8. The Social and Artistic scales of the VPI, the Social scale of the Preference Inventory, and the Social scale of the Job Inventory will improve prediction.

Hypotheses 1 through 4 will be analyzed by analysis of variance for unequal Ns.

For hypotheses 5 through 8 discriminatory analysis (Rao, 1965) will be used to predict individuals into vocational groups, using these four scales with the highest F ratios as the predictor variables: the Social scale of the VPI, the Social scale of the Preference Inventory, the Artistic scale of the VPI, and the Social scale of the Job Inventory.

Chapter IV

Results and Discussion

Results

Hypothesis 1 predicted there are no significant differences between the mean scores of the eight occupational groups (Engineers, Chemists, High School Teachers, Actuaries, Bank Executives, College Professors, Computer Programmers, and Insurance Executives) on the eleven scales of the Vocational Preference Inventory. Table 4 reports the means and standard deviations of the scores for the eight occupational groups on the eleven scales of the VPI and the homogeneity index. Analysis of variance for unequal Ns was used to test this hypothesis. Table 5 presents the results of the analysis of variance of the scores for each VPI scale and the homogeneity index.

The test for the main effect of groups was found to be significant on the Intellectual scale ($p < .01$), the Social scale ($p < .01$), the Conventional scale ($p < .01$), the Enterprising scale ($p < .01$), the Artistic scale ($p < .01$), the Masculinity scale ($p < .01$), and the Status scale ($p < .01$). Hypothesis 1, however, was supported for the remaining four variables: the Realistic scale, the Self-Control scale, the Infrequency scale, and the Acquiescence scale.

To take a closer look at these data and determine individual

group significance, the Tukey (b) test (Winer, 1962, p. 87) was used. Table 6 presents the results of the Tukey (b) test for these seven scales (Intellectual, Social, Conventional, Enterprising, Artistic, Masculinity, and Status) and the eight occupational groups.

The first comparison analyzed the differences between the eight groups on the Intellectual scale. When all possible combinations of groups were analyzed on this scale, Chemists were found to be significantly different from College English/Music Professors, Actuaries, Engineers, Computer Programmers, Insurance Executives, High School Teachers, and Bank Executives ($p < .01$). The Chemist group had the highest mean score and the Bank Executives group had the lowest mean score.

The second comparison concerned itself with an analysis of all possible combinations of groups on the Social scale. This analysis found High School Teachers to be significantly different from College English/Music Professors, Bank Executives, Actuaries, Insurance Executives, Computer Programmers, Chemists, and Engineers ($p < .01$). Also, College English/Music Professors were significantly different from Computer Programmers and Chemists ($p < .01$), and Engineers ($p < .01$). On the Social scale the High School Teachers group had the highest mean score; the Engineers group the lowest mean score.

All possible combinations of groups were analyzed for the Conventional scale. In this analysis Actuaries were found significantly different from Computer Programmers, High School Teachers, College English/Music Professors, and Engineers ($p < .01$). Here, the Actuaries had the highest mean score; the Engineers group the lowest mean score.

TABLE 4

Means and Standard Deviations for the Eight Occupational
Groups On The Twelve Scales Of The Vocational Preference Inventory

	Engineers (N=29)		Chemists (N=31)		High School Teachers (N=28)		Actuaries (N=29)	
Scale	M	SD	M	SD	M	SD	M	SD
Realistic	4.7931	3.4161	5.0323	4.2307	5.2857	4.4709	3.3448	3.3517
Intellectual	5.9310	4.0790	10.3871	3.9470	5.3571	4.1474	6.4483	4.3555
Social	1.8276	1.8721	2.1290	2.0288	8.4643	3.0488	3.7586	3.8420
Conventional	2.0000	1.7728	2.9032	3.4288	2.2143	2.3311	5.0000	3.7225
Enterprising	3.8621	2.4745	3.9355	3.2035	4.5000	3.2942	5.9655	3.1564
Artistic	3.6207	4.0569	5.2581	4.7256	7.2857	3.6092	4.5862	4.6331
Self-Control	8.7241	3.6144	8.7742	3.5186	8.3571	3.8702	8.5517	3.9784
Masculinity	9.1379	2.4308	8.1290	2.6425	6.0000	2.1602	7.4138	2.4278
Status	6.8276	2.5921	7.1290	3.3040	7.5714	3.0481	8.6207	3.4991
Infrequency	3.4138	2.6527	3.5484	3.0533	5.3214	3.1862	3.9310	2.4919
Acquiescence	9.7931	4.0916	10.8065	6.1721	12.3929	5.2376	11.0690	3.7206
Homogeneity	7.5862	3.0180	9.6452	3.3321	9.3571	2.5417	8.9310	2.5204

(continued on page 49)

TABLE 4
(continued)

	Bank Executives (N=30)		College Professors (N=24)		Computer Programmers (N=29)		Insurance Executives (N=30)	
Scale	M	SD	M	SD	M	SD	M	SD
Realistic	3.0667	3.1065	3.5417	3.8671	4.1034	3.4882	3.8667	3.1594
Intellectual	4.667	4.0712	7.1667	4.5461	5.7931	3.9314	5.4000	4.3279
Social	3.9000	3.8627	5.2083	3.7064	2.2759	2.9507	3.1000	3.5753
Conventional	3.1000	2.5643	1.2917	2.2933	2.5517	2.7332	3.3333	2.8446
Enterprising	5.7000	3.0189	3.1667	3.2925	3.8621	3.3671	5.0333	3.3268
Artistic	5.6000	3.7747	9.8333	3.2123	4.2414	3.8234	3.8667	4.2809
Self-Control	8.4333	3.9452	8.1250	3.6868	8.1034	4.2033	8.1000	3.7541
Masculinity	8.1667	2.2756	6.2917	2.2550	7.7586	2.5587	7.1000	3.0098
Status	9.5000	2.7637	8.1250	3.3662	6.4483	3.2797	7.5667	3.3185
Infrequency	4.5000	2.7885	3.9583	3.0142	5.7241	11.2214	3.7667	2.7125
Acquiescence	11.4333	4.7755	12.5000	4.8184	9.8276	4.3595	11.0667	4.9266
Homogeneity	7.7333	2.5587	10.0417	2.6781	8.2759	2.8648	7.4667	3.2561

TABLE 5

Summary Of The Analysis Of Variance Of The Scores
On The Twelve Scales Of The Vocational Preference Inventory
For The Eight Occupational Groups

50

SOURCE	Between Groups MS	Within Groups MS	F
Scale:			
Realistic	19.6512	13.3872	1.4679
Intellectual	96.3663	17.3908	5.5412*
Social	134.0369	10.1308	13.2306*
Conventional	33.7295	7.7969	4.3260*
Enterprising	27.1243	9.9249	2.7329*
Artistic	113.3383	16.5531	6.8469*
Self-Control	2.1692	14.6494	.1480
Masculinity	29.7174	6.2121	4.7837*
Status	29.2343	9.9638	2.9340*
Infrequency	11.1311	8.2029	1.3569
Acquiescence	28.0179	23.2769	1.2036
Homogeneity	28.1235	8.2545	3.4070*

* Significant .01 level

TABLE 6

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Intellectual Scale Of the VPI

Scale: VPI Intellectual	Chemists	College Professors	Actuaries	Engineers	Computer Programmers	Insurance Executives	High School Teachers	Bank Executives
Means:	10.3871	7.1667	6.4483	5.9310	5.7931	5.4000	5.3571	4.6667
Chem.		3.2204**	3.9388*	4.4561*	4.5940*	4.9871*	5.0300*	5.7204*
Coll. Prof.			.7184	1.2357	1.3736	1.7667	1.8096	2.5000
Act.				.5173	.6552	1.0483	1.0912	1.7816
Eng.					.1379	.5310	.5739	1.2643
Comp. Prog.						.3931	.4360	1.1264
Ins. Exec.							.0429	.7333
H.S.T.								.6904
Bk. Exec.								

* Significant .01 level

**Significant .05 level

TABLE 6

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Social Scale Of The VPI

Scale: VPI Intellectual	High School Teachers	College Professors	Bank Executives	SOURCE Actuaries	Insurance Executives	Computer Programmers	Chemists	Engineers
Means:	8.4643	5.2083	3.9000	3.7586	3.1000	2.2759	2.1290	1.8276
H.S.T.		3.2560*	4.5643*	4.7057*	5.3643*	6.1884*	6.3353*	6.6367*
Coll. Prof.			1.3083	1.4497	2.1083	2.9324**	3.7093**	3.3807*
Bank Exec.				.1414	.8000	1.6241	1.7710	2.0724
Act.					.6586	1.4827	1.6296	1.9310
Ins. Exec.						.8241	.9710	1.2724
Comp. Prog.							.1469	.4483
Chem.								.3014
Eng.								

TABLE 6

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Conventional Scale Of The VPI

Scale: VPI Conventional	SOURCE							
	Actuaries	Insurance Executives	Bank Executives	Chemists	Computer Programmers	High School Teachers	College Professors	Engineers
Means:	5.0000	3.3333	3.1000	2.9032	2.5517	2.2143	1.2917	1.0000
Act.		1.6667	1.9000	2.0968	2.4483*	2.7857*	3.7083*	4.000*
Ins. Exec.			.2333	.4301	.7816	1.1190	2.0416	2.3333
Bk. Exec.				.1968	.5483	.8857	1.8083	2.1000
Chem.					.3515	.6889	1.6115	1.9032
Comp. Prog.						.3374	1.2600	1.5517
H.S.T.							.9226	1.2143
College Prof.								.2917
Eng.								

TABLE 6

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Enterprising Scale Of The VPI

Scale: VPI Enterprising	SOURCE							
	Actuaries	Bank Executives	Insurance Executives	High School Teachers	Chemists	Computer Programmers	Engineers	College Professors
Means:	5.9655	5.7000	5.0333	4.5000	3.9355	3.8621	3.8621	3.1667
Act.		.2655	.9322	1.4655	2.0300	2.1034	2.1034	2.7988**
Bank Exec.			.6667	1.2000	1.7645	1.8379	1.8379	2.5333
Ins. Exec.				.5333	1.0978	1.1712	1.1712	1.8666
H.S.T.					.5645	.6379	.6379	1.3333
Chem.						.0734	.0734	.7688
Comp. Prog.							.0000	.6954
Eng.								.6954
Coll. Prof.								

TABLE 6

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Artistic Scale Of The VPI

Scale: VPI Artistic	SOURCE							
	College Professors	High School Teachers	Bank Executives	Chemists	Actuaries	Computer Programmers	Insurance Executives	Engineers
Means:	9.8333	7.2857	5.6000	5.2581	4.5862	4.2414	3.8667	3.6207
Coll. Prof.		2.5476	4.2333*	4.5752*	5.2471*	5.5919*	5.9666*	6.2126*
H.S.T.			1.6857	2.0276	2.6995	3.0443	3.4190	3.6650**
Bank Exec.				.3419	1.0138	1.3586	1.7333	1.9793
Chem.					.6719	1.0167	1.3914	1.6374
Act.						.3448	.7195	.9655
Comp.Prog.							.3747	.6207
Ins. Exec.								.2460
Eng.								

TABLE 6

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Masculinity Scale Of The VPI

Scale: VPI Masculinity	SOURCE							
	Engineers	Bank Executives	Chemists	Computer Programmers	Actuaries	Insurance Executives	College Professors	High School Teachers
Means:	9.1379	8.1667	8.1290	7.7586	7.4138	7.1000	6.2917	6.0000
Eng.		.9712	1.0089	1.3793	1.7241	2.0379**	2.8462*	3.1379*
Bank Exec.			.0377	.4081	.7529	1.0667	1.8750	2.1667**
Chem.				.3704	.7152	1.0290	1.8373	2.1290**
Comp. Prog.					.3448	.6586	1.4669	1.7586
Act.						.3138	1.1221	1.4138
Ins. Exec.							.8083	1.1000
Coll. Prof.								.2917
H.S.T.								

TABLE 6

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Status Scale of The VPI

Scale: VPI Status	Bank Executives	Actuaries	College Professors	High School Teachers	Insurance Executives	Engineers	Computer Programmers	Chemists
Means:	9.5000	8.6207	8.1250	7.5714	7.5667	6.8276	6.4483	3.5484
Bk. Exec.		.8793	1.3750	1.9286	1.9333	2.6724	3.0517**	5.9516*
Act.			.4957	1.0493	1.0540	1.7931	2.1724	5.0723*
Coll. Prof.				.5536	.5583	1.2974	1.6767	4.5766*
H.S.T.					.0047	.7438	1.1231	4.0230*
Ins. Exec.						.7391	1.1184	4.0183*
Eng.							.3793	3.2792*
Comp. Prog.								2.8999*
Chem.								

The fourth comparison analyzed the differences between the eight groups on the Enterprising scale. After all possible combinations of groups were compared on this scale, Actuaries were found significantly different from College English/Music Professors ($p < .05$). In this comparison the Actuaries had the highest mean score; the College English/Music Professors the lowest mean score.

The fifth comparison concerned itself with an analysis of all possible combinations of groups for the Artistic scale. This analysis found College English/Music Professors significantly different from Bank Executives, Chemists, Actuaries, Computer Programmers, Insurance Executives, and Engineers ($p < .01$). High School Teachers also differed significantly from the Engineers ($p < .05$). On the Artistic scale College English/Music Professors had the highest mean score; Engineers the lowest mean score.

Sixth, all possible combinations of groups were analyzed on the Masculinity scale. Engineers differed significantly from Insurance Executives ($p < .05$), College English/Music Professors ($p < .01$), and High School Teachers ($p < .01$). Further, High School Teachers were significantly different from Bank Executives and Chemists ($p < .05$). In this analysis the Engineers group had the highest observed mean score; the High School Teachers group the lowest mean score.

The final comparison analyzed the differences between the eight groups on the Status scale. In this analysis Chemists differed significantly from the remaining occupational groups ($p < .01$).

Also, Computer Programmers differed significantly from Bank Executives ($p < .05$). On the Status scale the Bank Executives group had the highest mean score; the Chemists group the lowest mean score.

Hypothesis 1.1 predicted there are no significant mean differences between the mean scores of the eight occupational groups on the Homogeneity index of the Vocational Preference Inventory. Table 4 reports the means and standard deviations of the scores for the eight occupational groups on the Homogeneity index. Analysis of variance for unequal Ns tested this hypothesis. Table 5 shows the results of the analysis of variance of the scores for the Homogeneity index.

The data did not support Hypothesis 1.1. The test for the main effect of groups was found to be significant on the homogeneity index ($p < .01$).

To determine individual group significance, the Tukey (b) test was used. Table 7 presents the results of the Tukey (b) test for the Homogeneity index and the eight occupational groups. After all possible combinations of groups were analyzed, College English/Music Professors differed significantly from Insurance Executives ($p < .01$). Further, the College Professors group had the highest mean score; the Insurance Executives group the lowest mean score.

This study utilized Maslow's need hierarchy as a framework in measuring the pattern of employee needs, perceived opportunity to satisfy these needs on the job, and actual satisfaction.

TABLE 7

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups on The Homogeneity Scale of The VPI

Scale: VPI Homogeneity	College Professors	Chemists	High School Teachers	Actuaries	Computer Programmers	Bank Executives	Engineers	Insurance Executives
Means:	10.0417	9.6452	9.3571	8.9310	8.2759	7.7333	7.5862	7.4667
Coll. Prof.		.3965	.6846	1.1107	1.7658	2.3084	2.4555	2.5760*
Chem.			.2881	.7142	1.3693	1.9119	2.0590	2.1780
H.S.T.				.4261	1.0812	1.6238	1.7709	1.8904
Act.					.6551	1.1977	1.3448	1.4643
Comp. Prog.						.5426	.6897	.8092
Bank Exec							.1471	.2666
Eng.								.1195
Ins. Exec.								

*Significant .01 level

Hypotheses 2, 3, and 4 concern these three dimensions:

2. There are no significant mean differences among the occupational groups with respect to pattern of employee needs. This hypothesis was tested on each scale of the Preference Inventory.
3. There are no significant mean differences among the occupational groups with respect to perceived opportunity to satisfy needs on the job. This hypothesis was tested on each scale of the Job Inventory.
4. There are no significant mean differences among the occupational groups with respect to actual satisfaction of needs. This hypothesis was tested on each scale of the Actual Satisfaction Scale.

Analysis of variance for unequal N s was used to test the three hypotheses. Table 8 reports the means and standard deviations of the scores for the eight occupational groups on the Preference Inventory, Job Inventory, and Actual Satisfaction scale. Table 9 presents the results of the analysis of variance of the scores for each scale.

On the Preference Inventory the test for the main effect of groups was significant on the Esteem scale ($p < .01$), the Social scale ($p < .01$), the Self-Actualization scale ($p < .01$), and the Security scale ($p < .01$). On the Job Inventory the test for the main effect of groups was significant on the Esteem scale ($p < .01$), the Autonomy scale ($p < .05$), the Social scale ($p < .01$), the Self-Actualization scale ($p < .01$), and the Security scale ($p < .01$). On the Actual Satisfaction scale, the test for the main effect of groups was found to be significant on the Esteem scale ($p < .05$) and the Autonomy scale ($p < .05$).

TABLE 8

Means And Standard Deviations For The Eight Occupational
Groups On The Preference Inventory, Job Inventory, And Actual Satisfaction Scale

	Engineers (N=29)		Chemists (N=31)		High School Teachers (N=28)		Actuaries (N=29)	
	M	SD	M	SD	M	SD	M	SD
<u>Scale</u>								
<u>Preference Inventory</u>								
Esteem	17.8965	3.8298	17.7742	3.1060	21.8929	3.0592	19.4828	3.5114
Autonomy	12.7241	3.1724	11.8710	3.3040	12.3214	3.7024	12.8621	3.4302
Social	22.0690	2.6717	22.6129	3.2729	17.5000	3.7168	21.6897	3.2194
Self-Actualization	10.1379	3.1817	11.2258	3.3834	14.3571	3.1295	9.4138	2.3531
Security	27.1034	1.5200	26.1613	2.7580	23.9286	4.3113	26.5517	2.0457
<u>Job Inventory</u>								
Esteem	17.5172	4.3311	19.5161	3.9570	21.1429	3.9131	20.3448	3.1879
Autonomy	12.5172	4.2730	10.0323	3.8252	13.0714	4.8145	11.3793	4.0037
Social	20.8621	3.8704	18.6774	4.5999	15.6429	3.3357	21.1034	3.6873
Self-Actualization	12.4483	5.4352	15.6774	5.7873	16.4286	4.1760	12.0345	4.4600
Security	26.9655	2.7837	26.1935	4.7779	23.7143	4.4792	25.1379	3.7295
<u>Actual Satisfaction</u>								
Esteem	49.6207	3.4269	51.7742	4.3719	49.6071	2.8329	50.8621	3.2703
Autonomy	49.7931	3.2665	48.1613	3.5693	50.7500	4.5267	48.8621	3.5226
Social	48.7931	3.4988	47.7097	6.1492	48.1429	4.2139	49.7586	2.6814
Self-Actualization	52.3103	4.3020	54.1290	5.8750	51.6429	4.1385	52.7586	4.2900
Security	49.8621	2.9365	50.2903	3.6073	50.0000	3.1623	49.0690	3.9182

(continued on page 63)

TABLE 8
(continued)

	Bank Executives (N=30)		College Professors (N=24)		Computer Programmers (N=29)		Insurance Executives (N=30)	
	M	SD	M	SD	M	SD	M	SD
<u>Scale</u>								
<u>Preference Inventory</u>								
Esteem	18.2667	3.0843	20.0417	2.6454	18.9655	3.7176	18.1000	2.9048
Autonomy	12.3000	2.6149	11.7917	3.3360	12.1034	3.2221	12.8000	3.9252
Social	21.9000	2.4544	18.8750	2.9973	22.3793	3.5498	21.9333	3.8768
Self-Actualization	10.7667	3.5881	12.9167	3.4379	10.8276	3.1517	12.1333	4.6441
Security	26.7667	1.7943	26.3750	3.0045	25.7241	2.6712	25.0667	3.9473
<u>Job Inventory</u>								
Esteem	18.3667	3.2746	19.2083	2.8889	17.6207	4.6400	19.1000	3.3973
Autonomy	11.0000	2.9711	10.6250	2.9900	11.2069	2.9926	10.5333	3.3603
Social	21.0333	2.6972	18.7917	3.8219	20.3793	2.8336	19.4667	4.7903
Self-Actualization	13.5667	5.3349	14.9583	5.6065	13.4828	4.7255	16.1667	7.4421
Security	26.0333	2.9300	26.4167	3.1473	27.3448	2.7029	24.7333	4.8276
<u>Actual Satisfaction</u>								
Esteem	50.1000	3.6327	49.1667	2.8387	48.6207	4.0480	51.0000	3.3733
Autonomy	48.7000	3.3544	48.8333	3.0881	49.1034	3.0977	47.7333	3.3107
Social	49.1333	2.7759	50.1667	3.0024	48.0000	4.1833	47.5333	5.0227
Self-Actualization	52.8000	5.8980	52.0417	5.1116	52.7241	5.0631	54.0000	7.0074
Security	49.2667	2.6644	50.0417	2.5956	51.6207	3.0049	49.7333	4.3226

TABLE 9

Summary Of The Analysis Of Variance Of The Scores
On The Preference Inventory, Job Inventory, and Actual
Satisfaction Scale For The Eight Occupational Groups

Source	Between Groups MS	Within Groups MS	F
Scale:			
Preference Inventory			
Esteem	55.6369	10.6599	5.2192*
Autonomy	4.8805	11.2638	.4332
Social	96.4191	10.6055	9.0914
Self-Actualization	71.2986	11.6897	6.0992*
Security	30.5809	8.3989	3.6410*
Job Inventory			
Esteem	45.6635	14.1144	3.2352*
Autonomy	30.3282	13.8051	2.1968**
Social	95.8239	14.2907	6.7053*
Self-Actualization	83.4109	29.9075	2.7889*
Security	41.8223	14.3701	2.9103*
Actual Satisfaction			
Esteem	32.2240	12.5010	2.5777*
Autonomy	25.4262	12.2244	2.0799**
Social	26.0562	17.1627	1.5181
Self-Actualization	22.2776	28.3016	.7871
Security	17.5278	11.2036	1.5644

*Significant .01 level

**Significant .05 level

Hypotheses 2, 3, and 4 were supported for these four variables: 65

the Autonomy scale of the Preference Inventory, the Social, Self-Actualization, and Security scales of the Actual Satisfaction scale.

Again, the Tukey (b) test was used to both evaluate more closely these data and determine individual group significance. Table 10 reports the results of the Tukey (b) test for these eleven scales (Esteem, Social, Self-Actualization, and Security-Preference Inventory; Esteem, Autonomy, Social, Self-Actualization, and Security-Job Inventory; Esteem and Autonomy-Actual Satisfaction scale) and the eight occupational groups.

The first comparison analyzed the differences between the eight groups on the Esteem scale of the Preference Inventory. High School Teachers differed significantly from Computer Programmers ($p < .05$), Bank Executives, Insurance Executives, and Engineers ($p < .01$). The High School Teachers group had the highest mean score; the Chemists group the lowest mean score.

The second comparison concerned an analysis of all possible combinations of groups on the Social scale of the Preference Inventory. This analysis found High School Teachers significantly different from Chemists, Computer Programmers, Engineers, Insurance Executives, Bank Executives, and Actuaries ($p < .01$). In addition, College English/Music Professors differed from Chemists, Computer Programmers, and Engineers ($p < .01$); and from Insurance Executives, Bank Executives, and Actuaries ($p < .05$). On this scale the Chemists group had the highest mean score; the High School Teachers the lowest mean score.

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Esteem Scale Of The Preference Inventory

Scale: Preference Inventory Esteem	SOURCE							
	High School Teachers	College Professors	Actuaries	Computer Programmers	Bank Executives	Insurance Executives	Engineers	Chemists
Means:	21.8929	20.0417	19.4828	18.9655	18.2667	18.1000	17.8965	17.7742
H.S.T.		1.8512	2.4101	2.9274**	3.6262*	3.7929*	3.9964*	4.1187
Coll. Prof.			.5589	1.0762	1.7750	1.9417	2.1452	2.2675
Act.				.5173	1.2161	1.3828	1.5863	1.7086
Comp. Prog.					.6988	.8655	1.0690	1.1913
Bank Exec.						.1667	.3702	.4925
Ins. Exec.							.2035	.3258
Eng.								.1223
Chem.								

* Significant .01 level

** Significant .05 level

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Social Scale Of The Preference Inventory

Scale: Preference Inventory	Chemists	Computer Programmers	Engineers	SOURCE Insurance Executives	Bank Executives	Actuaries	College Professors	High School Teachers
Means:	22.6129	22.3793	22.0690	21.9333	21.9000	21.6897	18.8750	17.5000
Chem.		.2336	.5500	.6796	.7129	.9232	3.7379*	5.1129*
Comp. Prog.			.3103	.4460	.4793	.6896	3.5043*	4.8793*
Eng.				.1357	.1690	.3793	3.1940*	4.5690*
Ins. Exec.					.0333	.2436	3.0583**	4.4333*
Bank Exec.						.2103	3.0250**	4.4000*
Act.							2.8147**	4.1897*
Coll. Prof.								1.3750
H.S.T.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Self-Actualization Scale Of The Preference Inventory

Scale: Preference Inventory Self-Actualization	SOURCE							
	High School Teachers	College Professors	Insurance Executives	Chemists	Computer Programmers	Bank Executives	Engineers	Actuaries
Means:	14.3571	12.9167	12.1333	11.2258	10.8276	10.7667	10.1379	9.4138
H.S.T.		1.4404	2.2238	3.1313	3.5295*	3.5904*	4.2192*	4.9433*
Coll. Prof.			.7834	1.6909	2.0900	2.1500	2.7788	3.5029*
Ins. Exec.				.9075	1.3057	1.3666	1.9954	2.7195
Chem.					.3982	.4591	1.0879	1.8120
Comp. Prog.						.0609	.6897	1.4138
Bank Exec.							.6288	1.3529
Eng.								.7241
Act.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Security Scale Of The Preference Inventory

Scale: Preference Inventory Security	SOURCE							
	Engineers	Bank Executives	Actuaries	College Professors	Chemists	Computer Programmers	Insurance Executives	High School Teachers
Means:	27.1034	26.7667	26.5517	26.3750	26.1613	25.7241	25.0667	23.9286
Eng.		.3367	.5517	.7284	.9421	1.3793	1.9467	3.1748*
Bank Exec.			.2150	.3917	.6054	1.0426	1.7000	2.8381**
Act.				.1767	.3904	.8276	1.4850	2.6231**
Coll. Prof.					.2137	.6509	1.3083	2.4464**
Chem.						.4372	1.0946	2.2327
Comp. Prog.							.6574	1.7955
Ins. Exec.								1.1381
H.S.T.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Esteem Scale Of The Job Inventory

Scale: Job Inventory Esteem	High School Teachers	Actuaries	Chemists	College Professors	Insurance Executives	Bank Executives	Computer Programmers	Engineers
Means:	21.1429	20.3448	19.5161	19.2083	19.1000	18.3667	17.6207	17.5172
H.S.T.		.7981	1.6268	1.9346	2.0429	2.7762	3.5222**	3.6257**
Act.			.8287	1.1365	1.2448	1.9781	2.7241	2.8276
Chem.				.3078	.4161	1.1494	1.8954	1.9989
Coll. Prof.					.1083	.8416	1.5876	1.6911
Ins. Exec.						.7333	1.4793	1.5828
Bank Exec.							.7460	.8495
Comp Prog.								.1035
Eng.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Autonomy Scale Of The Job Inventory

Scale: Job Inventory Autonomy	SOURCE							
	High School Teachers	Engineers	Actuaries	Computer Programmers	Bank Executives	College Professors	Insurance Executives	Chemists
Means:	13.0714	12.5172	11.3793	11.2069	11.0000	10.6250	10.5333	10.0323
H.S.T.		.5542	1.6921	1.8645	2.0714	2.4464	2.5381	3.0391
Eng.			1.1379	1.3103	1.5172	1.8922	1.9839	2.4849
Act.				.1724	.3793	.7543	.8460	1.3470
Comp. Prog.					.2069	.5819	.6736	1.1746
Bank Exec.						.3750	.4667	.9677
Coll. Prof.							.0917	.5927
Ins. Exec.								.5010
Chem.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Social Scale Of The Job Inventory

Scale: Job Inventory Social	SOURCE							
	Actuaries	Bank Executives	Engineers	Computer Programmers	Insurance Executives	College Professors	Chemists	High School Teachers
Means:	21.1034	21.0333	20.8621	20.3793	19.4667	18.7917	18.6774	15.6429
Act.		.0701	.2413	.7241	1.6367	2.3117	2.4260	5.4605*
Bank Exec.			.1712	.6540	1.5666	2.2416	2.3559	5.3904*
Eng.				.4828	1.3954	2.0704	2.1847	5.2192*
Comp. Prog.					.9126	1.5876	1.7019	4.7364*
Ins. Exec.						.6750	.7893	3.8238*
Coll. Prof.							.1143	3.1488
Chem.								3.0345
H.S.T.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Self-Actualization Scale Of The Job Inventory

Scale: Job Inventory Self- Actualization	SOURCE							
	High School Teachers	Insurance Executives	Chemists	College Professors	Bank Executives	Computer Programmers	Engineers	Actuaries
Means:	16.4286	16.1667	15.6774	14.9583	13.5667	13.4828	12.4483	12.0345
H.S.T.		.2619	.7512	1.4703	2.8619*	2.9458*	3.9803*	4.3941*
Ins. Exec.			.4893	1.2129	2.6000*	2.6839*	3.7184*	4.1322*
Chem.				.7191	2.1107*	2.1946*	3.2291*	3.6429*
Coll. Prof.					1.39116	1.4755**	2.5100*	2.9328*
Bank Exec.						.0839	1.1184	1.5322
Comp. Prog.							1.0354	1.4483**
Eng.								.4138
Act.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Security Scale Of The Job Inventory

Scale: Job Inventory Security	SOURCE							
	Computer Programmer	Engineers	College Professors	Chemists	Bank Executives	Actuaries	Insurance Executives	High School Teachers
Means:	27.3448	26.9655	26.4167	26.1935	26.0333	25.1379	24.7333	23.7143
Comp. Prog.		.3793	.9281	1.1513	1.3115	2.2069	2.6115	3.6305**
Eng.			.5488	.7720	.9322	1.8276	2.2322	3.2512**
Coll. Prof.				.2232	.3834	1.2788	1.6834	2.7024
Chem.					.1602	1.0556	1.4602	2.4792
Bank Exec.						.8954	1.3000	2.3190
Act.							.4046	1.4236
Ins.Exec.								1.0190
H.S.T.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Esteem Scale Of The Actual Satisfaction Scale

Scale: Actual Satisfaction Esteem	Chemists	Insurance Executives	Actuaries	Bank Executives	Engineers	High School Teachers	College Professors	Computer Programmers
Means:	51.7742	51.0000	50.8621	50.1000	49.6207	49.6071	49.1667	48.6207
Chem.		.7742	.9121	1.6742	2.1535	2.1671	2.6075	3.1535
Ins. Exec.			.1379	.9000	1.3793	1.3929	1.8333	2.3793
Act.				.7621	1.2414	1.2550	1.6954	2.2414
Bank Exec.					.4793	.4929	.9333	1.4793
Eng.						.0136	.4540	1.0000
H.S.T.							.4404	.9864
Coll. Prof.								.5460
Comp. Prog.								

TABLE 10

Ranked Order Difference Matrix Between
The Mean Scores For The Eight Occupational
Groups On The Autonomy Scale Of The Actual Satisfaction Scale

Scale: Actual Satisfaction Autonomy	SOURCE							
	High School Teachers	Engineers	Computer Programmers	Actuaries	College Professors	Bank Executives	Chemists	Insurance Executives
Means:	50.7500	49.7931	49.1034	48.8621	48.8333	48.7333	48.7000	48.1613
H.S.T.		.9569	1.6466	1.8879	1.9167	2.0167	2.0500	2.5887
Eng.			.6897	.9310	.9598	1.0598	1.0931	1.6318
Comp. Prog.				.2413	.2701	.3701	.4034	.9421
Act.					.0288	.1288	.1621	.7008
Coll. Prof.						.1000	.1333	.6720
Bank Exec.							.0333	.5720
Chem.								.5387
Ins. Exec.								

For the third comparison all possible combinations of groups were⁷⁷ analyzed on the Self-Actualization scale of the Preference Inventory. In this analysis High School Teachers were found to be significantly different from Computer Programmers, Bank Executives, Engineers, and Actuaries ($p < .01$). Also, College English/Music Professors differed significantly from the Actuaries ($p < .01$). On the Self-Actualization scale the High School Teachers group had the highest mean score; the Actuaries group the lowest mean score.

Fourth, all combinations of groups were analyzed for the Security scale of the Preference Inventory. High School Teachers differed significantly from Bank Executives, Actuaries, and College English/Music Professors ($p < .05$); and from Engineers ($p < .01$). In this analysis the Engineers group had the highest mean scale score; the High School Teachers group the lowest mean scale score.

The fifth comparison concerned an analysis of all combinations of groups for the Esteem scale of the Job Inventory. This analysis found High School Teachers differed significantly from Computer Programmers and Engineers ($p < .05$). On the Esteem scale the High School Teachers group had the highest mean scale score: the Engineers the lowest mean scale score.

Sixth, all combinations of groups were analyzed for the Autonomy scale of the Job Inventory but no significant differences ($p < .05$) were found. The High School Teachers group had the highest mean scale score; the Chemists group had the lowest mean scale score.

The seventh comparison analyzed all combinations of groups for the Social scale of the Job Inventory. This analysis found High School Teachers differed significantly from Actuaries, Bank Executives, Engineers, Computer Programmers, and Insurance Executives ($p < .01$). The Actuaries group had the highest mean scale score; the High School Teachers group the lowest mean scale score.

The eighth comparison concerned an analysis of all possible combinations of groups for the Self-Actualization scale of the Job Inventory. This analysis found Bank Executives differed significantly from High School Teachers, Insurance Executives, and Chemists ($p < .01$). Computer programmers differed from High School Teachers, Insurance Executives, and Chemists ($p < .01$); and from Bank Executives ($p < .05$). Engineers were significantly different from High School Teachers, Insurance Executives, Chemists, and College English/Music Professors ($p < .01$). Finally, Actuaries differed significantly from High School Teachers, Insurance Executives, Chemists, and College English/Music Professors ($p < .01$); and from Engineers ($p < .05$). On this scale the High School Teachers group had the highest mean scale score; the Actuaries the lowest mean scale score.

The ninth comparison analyzed all combinations of groups for the Security scale of the Job Inventory. In this analysis the High School Teachers differed significantly from Computer Programmers and Engineers ($p < .05$). On the Security scale the Computer Programmers group had the highest mean scale score; the High School Teachers group had the lowest mean scale score.

The tenth comparison concerned an analysis of all combinations of groups for the Esteem scale of the Actual Satisfaction scale, but no significant differences ($p < .05$) were found. On the Esteem scale the Chemists group had the highest mean scale score; the Computer programmers group had the lowest mean scale score.

The eleventh and final analysis for all combinations of groups was made for the Autonomy scale of the Actual Satisfaction scale, but no significant differences ($p < .05$) were found. On the Autonomy scale the High School Teachers group had the highest mean scale score; the Insurance Executives the lowest mean scale score.

After the analysis of variances were performed, a discriminatory analysis was made on the scores using those factors with the highest F ratios that had indicated significant differences among the eight occupational groups. Those factors were the Social and Artistic Scales of the VPI, the Social scale of the Preference Inventory, and the Social scale of the Job Inventory. Nunnally (1967) indicates that discriminatory analysis is utilized when groups of persons are defined a priori, i.e., different vocational groups, and the purpose of the analysis is to distinguish the groups from one another on the basis of their score profiles.

Nunnally (1967) also states that there are three related problems in discriminatory analysis: (1) determining whether or not differences in score profiles for two or more groups are statistically significant, (2) maximizing the discrimination among groups by combining the variables in some manner, and (3) establishing rules for the placement of new in-

dividuals into one of the groups. If the VPI, Preference Inventory, and Job Inventory are employed for predicting individual members into their actual vocational group, all three problems are pertinent to this investigation.

Selectively choosing those factors of the three inventories that had significant differences for use in the discriminatory analysis solved the first problem in Nunnally's definition.

Fulcomer's (1970) program solved problems two and three, provided that the scores are normally distributed. This computer program maximizes the probability of correct classification and minimizes the probability of error. Decision rule is based on likelihood ratios of Bayes' Theorem. An individual is placed into the group for which is discriminant score is highest or, he is placed in the group from which he is most likely to have arisen (Rao, 1965, p. 488). For example, in this study eight occupational groups were tested with the VPI, Preference Inventory, and the Job Inventory. Further, hypotheses 5, 6, 7, and 8 were constructed using the four most significant variables from all three inventories; each of these hypotheses predicted successful placement of individuals into their actual vocational group above a chance level. The problem, therefore, became one of utilizing those factors which showed significant differences among groups and through discriminatory analysis attempt to predict each individual into his actual group. Table 11 reports that .3565 percent of those individuals tested were correctly predicted through a quadratic discriminatory analysis. These results evidence support for hypotheses 5, 6, 7, and 8.

In addition to the quadratic discriminant score (unequal covariance matrices) Fulcomer's (1970) program computes a second discriminant score: a linear discriminant score (equal covariance matrices). Table 6 reports the predictions by both methods for the various factor combinations. Further, Table 11 evidences the differences in predictive ability of both the linear and quadratic methods of discriminatory analysis with the addition of factors. When the first factor-the Social scale of the VPI - is used alone, the linear discriminatory analysis predicts more individuals into their actual group than does the quadratic method. However, when the remaining three factors are added to the first factor, the quadratic discriminatory analysis is far more successful than the linear method.

After both the analysis of variance and the discriminatory analysis, the final comparison that was made examined the VPI high point codes of the eight occupational groups in relation to their academic majors. Table 12 illustrates the distribution of academic major and VPI high point code. There are many correct predictions, but close analysis reveals that these predictions are largely accounted for in the intellectual category. In addition, there were 40 ties, i.e., two or more VPI vocational scales had the same raw score. Since there are more inaccurate predictions than correct, no statistical analysis is needed to reveal the obvious lack of system in the pattern. In Table 12 there are 76 correct predictions, 114 inaccurate predictions, and 40 ties or 33% agreement between academic major and VPI high point code.

TABLE 11

Results Using A Discriminatory
Analysis Program For Four Factor Combinations

<u>Factors Used</u>	<u>Quadratic Discriminatory Analysis</u>		<u>Linear Discriminatory Analysis</u>	
	<u>Correctly Predicted*</u>	<u>Relative Frequency</u>	<u>Correctly Predicted*</u>	<u>Relative Frequency</u>
Social (VPI)	52	.2260	55	.2391
Soc (VPI), Soc (PI)	63	.2739	63	.2739
Soc (VPI), Soc (PI)	67	.2913	64	.2782
Art (VPI)				
Soc (VPI), Soc (PI)	82	.3565	68	.2957
Art (VPI), Soc (JI)				

*Individuals successfully predicted into their actual vocational group.

TABLE 12

Comparison Between Academic
Major And VPI High Point Code
For Eight Occupational Groups

		Academic Major						Total
		R	I	S	C	E	A	
High Point Code	R	5	5	1	1	5	2	19
	I	13	35	3	3	11	7	72
	S	--	3	6	3	5	4	21
	C	1	2	-	1	2	1	7
	E	5	2	-	6	12	2	27
	A	6	3	-	4	14	17	34
Total		30	50	10	18	49	33	190

One further comparison analyzing the relationship between VPI high point code and rankings on the Vocational Description Inventory was not carried out. Nearly all the subjects' responses were unacceptable and could not be recorded for statistical analysis.

DISCUSSION

The major concern of this study was to investigate the concurrent validity of Holland's theory of vocational selection by administering the Vocational Preference Inventory (V.P.I.) to eight samples of workers currently established in occupational environments comparable to Holland's six vocational environments. This study was also concerned with an occupational group's pattern of needs, perceived opportunity to satisfy these needs on the job, and actual job satisfaction in relation to vocational interests. In general, the results were mixed, but predominantly positive. The following discussion will treat the results of the various hypotheses investigated in this experiment.

Five vocational scales of the Vocational Preference Inventory (Intellectual, Social, Conventional, Enterprising, and Artistic) and two of its nonvocational scales (Masculinity and Status) successfully differentiated each of the eight occupational groups.

The Chemists group peaked on the Intellectual scale. Examination of individual group differences indicates that their mean scale score was significantly different from those of the remaining occupational groups. These data fit with Holland's description of the Intellectual vocational model. On the Social scale both the High School Teachers group-- as predicted by Holland's theory-- and the College English/

Music Professors group were most efficiently differentiated from the other seven groups. Further, Holland's (1966a) implicit ranking of the six vocational models on the social variable suggest that the Social and Artistic vocational models would group at the upper end; the Intellectual and Realistic models at the lower end. The data of this study support the Social model. On the Conventional scale the Actuaries group differed from four vocational groups (Computer Programmers, High School Teachers, College English/Music Professors, and Engineers), and, therefore, these results are consistent with Holland's Conventional vocational model. The Enterprising scale of the VPI significantly differentiated Actuaries from College English/Music Professors. However, these data did not differentiate Bank Executives--the appropriate vocational group according to Holland's theory--from the remaining groups. On the Artistic scale both the College English/Music Professors group--consistent with Holland's Artistic vocational model--and the High School Teachers group were differentiated respectively from the other occupational groups and from the Engineers group.

On the Masculinity scale Engineers differed from three occupational groups (Insurance Executives, College English/Music Professors, and High School Teachers); High School Teachers from Bank Executives and Chemists. Holland's theory of vocational selection suggests that the Realistic, Enterprising, and Intellectual vocational models would have higher scores on the masculinity variable than the Artistic and Social vocational models. Again, the empirical results evidence support for differentiation of the vocational models with respect to the masculinity variable.

On the Status scale both Chemists and Computer Programmers were most efficiently and respectively differentiated from the remaining occupational groups and from Business Executives. Holland's description of the Enterprising vocational model (Bank Executives) indicates that "desiring high status" is an important component of the Enterprising person's self-concept. For the Intellectual vocational model low priority is attached to status concerns. The data indicate Bank Executives had the highest mean scale score and Computer Programmers and Chemists (Intellectual vocational model) the lowest mean scale score. Therefore, the empirical results both for the Enterprising and Artistic models on the Status scale are consistent with the theoretical formulations for each type.

In summary, these data evidence support for Holland's theory of vocational selection. With the exception of the Realistic vocational scale, the five remaining vocational scales distributed eight vocational work groups, previously identified as representative of each of Holland's six vocational-personality models, in a comparable fashion according to their interests. Also, the empirical results on two nonvocational scales (Masculinity and Status) further support Holland's vocational models. Therefore, these data from both the vocational and nonvocational scales offer substantial support for the concurrent validity of Holland's Vocational Preference Inventory, as well as for the validity of Holland's theory.

In a similar analysis the results on the homogeneity index indicate that College English/Music Professors have the highest mean

scale score and the Insurance Executives the lowest score. These data mean that the VPI profiles of Insurance Executives are somewhat flatter than those of the other groups. Low homogeneity scores indicate less discrete interests than those of the high scoring group, College English/Music Professors. For the low scoring group the finding with respect to homogeneity suggests that professional involvement may dilute the initial purity of vocational interest. For the high scoring groups, College English/Music Professors and Chemists, the homogeneity findings may suggest that their professional development has involved one, perhaps two, primary work role(s).

The next sections will focus on a discussion of results related to patterns of employee needs, perceived opportunity to satisfy these needs on the job, and actual satisfaction.

On the Esteem scale of the Preference Inventory (employee needs) Computer Programmers, Bank Executives, Insurance Executives, and Engineers gave esteem needs a high rank; on the other hand, High School Teachers ranked esteem needs low. In this study esteem needs had been defined as the desire for reputation or prestige, respect or esteem from other people, status, dominance, recognition, attention, importance or appreciation; a desire for esteem from others. This pattern of needs is most associated with Holland's Enterprising model (Bank and Insurance Executives) and Realistic model (Engineers) and least associated with the Intellectual model (Computer Programmers). The Computer Programmers may have responded more to the recognition and attention component of esteem needs than the status and dominance

component. On the Social scale both College English/Music Professors and High School Teachers were most efficiently differentiated from the remaining occupational groups; both groups ranked social needs higher than the other groups. These results for the High School Teachers group (Social model) are most consistent with Holland's description of that vocational-personality orientation; the findings with respect to the College English/Music Professors group are not consistent with Holland's Artistic vocational model. The latter result suggests the possibility that social needs-- a desire for association-- is a more important motivational component for college professors than for the solitary artistic vocations of either an author or a composer. On the Self-Actualization scale, which attempted to measure the desire to realize one's own potential and the passion for personal growth and self-development, four occupational groups (Computer Programmers, Bank Executives, Engineers, and Actuaries) produced the highest rankings and differentiated themselves from the lowest ranking groups, High School Teachers and College English/Music Professors. On the Security scale, presumed to measure the desire for a predictable, structured, and reliable environment, High School Teachers ranked this need higher in comparison to the other occupational groups. These results fit with Holland's description of the Social person as one who "diminishes stress and anxiety by choosing vocations where the social roles are well-defined", i.e., teacher-student. These data obtained from the Preference Inventory further supported Holland's vocational models. The following report of results on the Job Inventory supplement those

on the Preference Inventory and deepen our understanding of the vocational models.

On the Esteem scale both Computer Programmers and Engineers report perceived opportunities to satisfy esteem needs on the job; their higher rankings differentiated them from High School Teachers. The same differences resulted on the Esteem scale of the Preference Inventory; however, only two of the four occupational groups previously differentiated with respect to pattern of needs evidenced significant differences. No individual group differences were found on the Autonomy scale, although the Chemists group had the highest ranking on this scale. This finding, though not significant, is consistent with Holland's Intellectual model because this vocational model emphasized independence and freedom i.e., autonomy needs. Just as on the Preference Inventory, High School Teachers had the highest ranking on the Social scale and differentiated them from five occupational groups. Again, these empirical results fit with both Holland's Social model and results on the Social scale of the Preference Inventory. A number of significant differences are evident on the Self-Actualization scale. In general, four occupational groups (Bank Executives, Computer Programmers, Engineers, and Actuaries) report high rankings and differentiate them from the other groups. These results, together with results on the Self-Actualization scale of the Preference Inventory, form a consistent pattern. In a similar fashion, the High School Teachers group had the highest ranking on the Security scale of the Job Inventory, as

well as on the Security scale of the Preference Inventory. Again, these results form a consistent pattern across measuring instruments and fit with Holland's Social vocational model.

For the Actual Satisfaction scale no individual group differences were found on the Esteem scale, although the Chemists group had the highest score on this scale. The previous statement is also true for the Autonomy scale, although the High School Teachers group had the highest score on this scale.

Hypotheses concerning relationships between eight occupational groups and need satisfaction (as defined by Maslow) were generally confirmed. Higher order need satisfaction (esteem and self-actualization) was related respectively to Holland's Enterprising and Realistic models; and the Realistic, Intellectual, Conventional, and Enterprising models. Lower order need satisfaction (security and social) was related respectively to the Social model; and the Artistic and Social models.

Discussion Summary

Briefly, the main outcome of these results evidences convincing support for the concurrent validity of Holland's theory of vocational selection, using the Vocational Preference Inventory as the primary measuring instrument to distribute the eight vocational groups. Further, three measures of need satisfaction (as defined by Maslow) supported and differentiated Holland's six vocational models. From the empirical

findings on both the Vocational Preference Inventory and the measures of need satisfaction it may be concluded that Holland's theory of vocational selection has demonstrated some evidence of concurrent validity.

Statistical tests like those described above, finding that the average scale scores for two or more groups are significantly different, does not solve a major problem: the placement of new individuals into one of the groups. The quadratic discriminatory analysis matrix for four factors (Table 13) illustrates that the quadratic discriminatory analysis successfully predicted 82 individuals out of 230 from the scores on these factors: the Social and Artistic scales of the VPI, the Social scale of the Preference Inventory, and the Social scale of the Job Inventory. These results reveal a percentage of .3565 correct. If individuals had been assigned to their occupational groups by chance, 31 individuals would have been correctly predicted for a percentage of .1348 correct. Use of these four factors indicates that an individual may be classified three times better than if chance alone were used. Although these results are optimistic, it must be remembered that these four factors are correctly predicting an individual into his actual group approximately 36 percent.

Discriminatory analysis was used in this study for two purposes: (1) to illustrate the predictive ability of the most significant variables; and (2) to demonstrate that the placement problem--assignment of new individuals into one of the occupational groups--merits further investigation.

TABLE 13

Quadratic Discriminatory Analysis With Four Factors

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	Total
1	20.0000*	2.0000	3.0000	1.0000	0.	0.	2.0000	0.	28.0000
2	6.0000	10.0000*	1.0000	2.0000	0.	0.	0.	5.0000	24.0000
3	1.0000	2.0000	13.0000*	2.0000	0.	2.0000	1.0000	9.0000	30.0000
4	1.0000	4.0000	5.0000	3.0000*	1.0000	1.0000	1.0000	13.0000	29.0000
5	1.0000	4.0000	2.0000	1.0000	4.0000*	2.0000	5.0000	11.0000	30.0000
6	1.0000	1.0000	6.0000	2.0000	2.0000	6.0000*	3.0000	8.0000	29.0000
7	1.0000	2.0000	1.0000	2.0000	2.0000	3.0000	11.0000*	9.0000	31.0000
8	0.	3.0000	3.0000	1.0000	1.0000	3.0000	3.0000	15.0000*	29.0000
Total	31.0000	28.0000	34.0000	14.0000	10.0000	17.0000	26.0000	70.0000	230.0000

*Predicted into actual group

Chi Square Test on Quad. Disc. Chi-Sq. = 196.060

Degrees of Freedom = 49.000

Associated Probability = 0.00

Chapter V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

SUMMARY

This study was designed to investigate the concurrent validity of Holland's theory of vocational selection by administering the Vocational Preference Inventory (VPI) to samples of workers well-established in occupational milieus that match Holland's six vocational environments. Previous research had demonstrated the validity of Holland's theory, but these studies had been primarily conducted with restricted samples. Holland's theoretical statements concerning the nature of vocational selection presented a framework for evaluating vocational interests and suggested that Holland's six vocational models might conceivably exist in the world of work for a representative and differentiated sample of workers. Further, this study presented evidence on the relationship of Holland's six models of vocational behavior to need satisfaction (as defined by Maslow).

To investigate both vocational selection and the relationship between vocational selection and need satisfaction a total of 230 male workers from seven different occupational environments were used as subjects. All subjects were homogeneous with respect to age, education, and length of work experience.

To each worker the following instruments were administered:

(1) a brief "General Information Questionnaire" that included questions about age, education, job title, and job tenure; (2) a Preference Inventory that assessed an employee's pattern of needs; (3) a Vocational Description Inventory whose statements about patterns of traits and behavior correspond directly to Holland's description of the six vocational models; (4) a Job Inventory that measured perceived opportunity to satisfy needs on the job; and (5) John Holland's Vocational Preference Inventory (Sixth Revision).

Eight experimental groups composed the sample. Each occupational group was compared on the eleven scales of the VPI, the homogeneity index, and the five satisfaction scales (Esteem, Autonomy, Social, Self-Actualization, and Security) of the Preference Inventory, Job Inventory, and Actual Satisfaction scale.

CONCLUSION

Within the framework of the limitations of this study (described in a following section) some conclusions seem warranted. Five vocational scales of the VPI (Intellectual, Social, Conventional, Enterprising, and Artistic) differentiated eight occupational groups that match each of Holland's vocational-personality models according to their interests. Furthermore, with the exception of the Enterprising scale, each occupational group peaked on the vocational scale of the VPI congruent with Holland's vocational model: (1) the Chemists group on the Intellectual scale; (2) the High School Teachers group on the

Social scale; (3) the Actuaries group on the Conventional scale, and (4) the College English/Music Professors on the Artistic scale.

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On the Masculinity scale Engineers, Bank Executives, and Chemists had the highest mean scale scores. These results support Holland's ranking of the vocational model with respect to the masculinity variable; for Holland predicts that the Realistic (Engineers), Enterprising (Bank Executives), and Intellectual (Chemists) vocational models would achieve higher scores on the Masculinity scale.

Chemists' and Computer Programmers' low mean scale scores on the Status scale efficiently differentiated them from the remaining occupational groups. Business Executives had the highest mean scale score. These results are congruent with Holland's descriptions of both the Intellectual and Enterprising models.

In a similar analysis, hypothesized relationships concerning Holland's vocational-personality models and need satisfaction were supported and offer additional empirical evidence for the validity of the models. Esteem and self-actualization, higher order need satisfaction, were associated respectively with the Enterprising and Realistic models; and the Realistic, Intellectual, Conventional, and Enterprising models. Security and social needs, typically defined as lower order satisfaction, were related respectively to the Social model; and the Artistic and Social models.

In summary, these empirical results derived from both the Vocational Preference Inventory and the three need satisfaction measures convincingly support the concurrent validity of Holland's theory of vocational

selection. It may be concluded that the Vocational Preference Inventory has distributed vocational groups according to their interests, but has been less successful in assigning an individual to his appropriate vocational group, as the results of the discriminatory analysis would suggest. Finally, it may be concluded that certain kinds of need satisfaction are related to Holland's vocational models.

LIMITATIONS

There are some rather obvious limitations of the present study, principally that it is not longitudinal in nature. As a result, no inferences can be made about the development of the vocational models for each occupational group.

The nature of the sample limits generalization from this study to non-college workers established in occupations congruent with Holland's six vocational models.

Third, the eight experimental groups compose a small sample of 230 subjects and represent a small segment of each of their respective groups. Therefore, generalizations should be made with caution.

Finally, the findings of this study obviously need to be replicated with other similar populations of workers, as well as with non-college vocational populations, to truly assess their meaningfulness.

IMPLICATIONS

The most significant implication of this study for career development research is that it indicates the relevance of Holland's theory of vocational selection to an older group of workers at executive and professional levels. This investigation has studied Holland's six vocational models and one set of correlates: patterns of need satisfaction; in effect, this study has widened the data base on which to judge Holland's vocational theory. It also suggests new avenues for research on the vocational selection process.

Future studies concerning Holland's theory of vocational selection might profitably investigate the six vocational models, utilizing such personality syndromes as aggressiveness, passivity, authoritarianism, and compulsivity. These models may also be studied with respect to decision making, risk taking skills, and the achievement motive.

Other potential research problems generated by this study are the possible relationships between the six vocational models and such occupational correlates as organizational identification, job stress, and job mobility.

If Holland's theory of vocational selection develops into a more comprehensive theory of career development, its investigators must systematically uncover new relationships between the six vocational models and such relevant world of work variables as need satisfaction in this study, differential patterns of job satisfaction, and occupational mobility.

APPENDIX A

Career Development Studies

Work and jobs mean different things to different people and at different times. With these questionnaires we hope to come to an understanding of your ideas and your feelings about the job on which you are currently employed. The information obtained from these questionnaires will be combined with other similar information at Ohio State and will be used to advance what we know about various kinds of occupations.

There are several questionnaires. They are to be answered in the order they appear and can be completed in about forty minutes. The questionnaires may be filled out by each individual person in his spare time and slack periods, and need not be filled out all at once. When all the questionnaires have been completed, each person is to put them in the brown envelope and return them to the person who contacted you.

The survey does not require that you put your name on these questionnaires. In fact it will be preferred if you don't. The questionnaires will then be sent to Ohio State University, there the information will be placed on IBM cards, along with other similar information from other sources, and analyzed in terms of averages.

Some of the questionnaires may appear to be the same in format and content. However, no two questionnaires are identical and the directions for each are different. For this reason please read the directions carefully as you come to each new questionnaire.

Since these questionnaires constitute part of the research necessary for the completion of a doctoral dissertation, your cooperation and help is greatly appreciated and most important for the success of this project. Please complete and return the questionnaire as soon as possible. The value of this study depends on the return of all questionnaires.

We think you will find this a different and interesting kind of questionnaire, and you may want to know how the study turns out. If you would circle the appropriate letter on the following page, a report of the results will be sent to you. It is one way for us to say, "Thank you very much."

Thank you,

(signed) David Lacey
David Lacey
Ohio State University

General Information

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Please fill in all the information requested below. Your answers to the questions and all other information you give us will be held in strictest confidence.

1. Circle one: a. Male b. Female
2. How old were you on your last birthday? Please circle the appropriate letter.

a. less than 20	e. 35-39	i. 55-59
b. 20-24	f. 40-44	j. 60-65
c. 25-29	g. 45-49	k. 65 and over
d. 30-34	h. 50-54	
3. Circle the letter representing the number of years schooling you completed:

a. Grade School	c. Trade or Business School, or Some College
b. High School	d. College
	e. Graduate or Professional School
4. If you attended college, what was your college major? _____
5. What is your present job called? _____
6. How long have you been in your present job? Circle the correct letter.

a. Less than 1 year	d. 6 to 10 years
b. 1 to 2 years	e. more than 10 years
c. 3 to 5 years	
7. How long have you been with this company?

a. less than 1 year	d. 6 to 10 years
b. 1 to 2 years	e. more than 10 years
c. 3 to 5 years	
8. What would you call your usual occupation, profession, trade or line of work? _____
9. How many years have you been in this line of work?

a. less than 1 year	e. 11 to 15 years	i. more than 30 years
b. 1 to 2 years	f. 16 to 20 years	
c. 3 to 5 years	g. 21 to 25 years	
d. 6 to 10 years	h. 26 to 30 years	
10. Circle the one that applies.

a. I would like to receive an overall report of the results of this study.
b. I would not like to receive an overall report of the results of this study.

Please go on and start with the first questionnaire.

Part A - Preference Inventory

(Note: There is another questionnaire that uses similar items but has different directions. Therefore, read these directions carefully.)

(Note: There is another questionnaire that uses similar items but has different directions. Therefore, read these directions carefully.)

Purpose of Inventory:

Below you will find six sets of statements that describe various aspects of a job. These job factors are of differing importance to different people. The purpose of this inventory is to determine the relative importance to you of each of the five statements in each set. Although some items in the various sets may be similar they express different aspects of the job and are necessary to a complete description of what is important to you in a job. This is not a test of ability or consistency in making answers. Its only purpose is to make it possible for you to rank each set of items in terms of their importance to you.

DIRECTIONS:

- a. READ all the statements in each set carefully.
- b. THINK about how important each statement is to you.
- c. RANK the statements in order of their importance to you. Do this by placing a "1" next to the statement that is most important to you, a "2" next to the statement that is second most important to you and so on through number "5" which would be the statement of least importance to you.
- d. RANK ALL STATEMENTS in a set even when it is difficult.

Example:

<u>2</u>	The opportunity in my job to work together with other people.
<u>4</u>	Having sufficient authority for the job expected of me.
<u>5</u>	Having knowledge of company plans that affect me and my job.
<u>1</u>	Credit given me by my superiors for doing a good job.
<u>3</u>	The opportunity to utilize all of my abilities on the job.

RANK the statements in each set in order of their importance to you.

Set 1

___	The status that my job gives me.
___	Relative freedom from supervision.
___	Being told what I am supposed to do and how I am to do it.
___	The opportunity to develop my full potential on the job.
___	The opportunity to develop close friendships in my job.

Set 2

___	The opportunity in my job to give help to other people.
___	NOT having to make decisions on my job.
___	The opportunity to come up with my own solutions to problems connected with my work.
___	The opportunity for personal growth and development in my job.
___	The importance of my job title.

Set 3

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- ___ The chance to go as high as I want to go at work.
- ___ Receiving adequate information about plans and policies that influence my work.
- ___ Freedom to express my opinion and suggestions to superiors.
- ___ Being liked by others in the department.
- ___ The feeling that my job is regarded as important.

Set 4

- ___ Freedom to use my own judgment in my work.
- ___ Getting as far ahead as my abilities allow.
- ___ Having other workers at my level recognize the importance of my work.
- ___ An opportunity in my job to show my liking and friendship for others.
- ___ Working under a man who will take over and do the job for me when I get into a jam.

Set 5

- ___ Freedom to make decisions about my work.
- ___ The opportunity to participate in after-work activities such as picnics, bowling leagues, etc.
- ___ A routine job where I always know what is expected of me.
- ___ The prestige and regard my job receives from others outside the company.
- ___ The opportunity to advance in responsibility as far as I am able to.

Set 6

- ___ A sense of belonging to my work group.
- ___ A definite set of rules and procedures that I can follow in doing my job.
- ___ NOT having my work interfered with by my supervisor.
- ___ Credit given me by the company for doing good work.
- ___ The feeling of self-fulfillment from being able to use my own unique capacities and realizing my potential in my job.

Please go on and start with the second
questionnaire

Part B - Vocational - Description Inventory

Purpose of this Inventory:

This inventory contains one set of six statements. Each statement describes a pattern of traits and behavior that a person may display in his life. Clearly, these vocational types are rarely found in a pure form; most people possess aspects of all six. All the statements are probably true of your behavior to some extent but not to the same degree. The purpose of this inventory is to determine the rank-order of these vocational descriptions. To do this you will have to rank the descriptions in the order in which you feel these descriptions reflect your behavior.

Directions:

102

- a. READ all the statements carefully.
- b. THINK about how truly the statement describes your over-all pattern of behavior.
- c. RANK the statements in the order in which you feel they describe your behavior. Do this by placing a "1" next to the statement which most describes your behavior, a "2" next to the statement the second most descriptive, and so on through the number "6" which would be the least descriptive of your behavior.
- d. RANK ALL STATEMENTS in Set 1 even when this is difficult.

Set 1

- This person is masculine, physically strong, unsociable, aggressive; has good motor coordination and skill; lacks verbal and interpersonal skills; prefers concrete to abstract problems; conceives of himself as being aggressive and masculine and as having conventional political and economic values.
- This person is task-oriented, nonconforming, asocial; prefers to think through rather than act out problems; needs to understand; enjoys ambiguous work tasks; has unconventional values and attitudes.
- This person is sociable, responsible, feminine, humanistic, religious; needs attention; has verbal and interpersonal skills; avoids intellectual problem solving, physical activity, and highly ordered activities; prefers to solve problems through feelings and interpersonal manipulation of others.
- This person prefers structured verbal and numerical activities and subordinate roles; is conforming; avoids ambiguous situations and problems involving interpersonal relationships and physical skills; is effective at well-structured tasks; identifies with power; values material possessions and status.
- This person has verbal skills for selling, dominating, leading; conceives of himself as a strong, masculine leader; avoids well-defined language or work situations requiring long periods of intellectual effort; is conforming; prefers ambiguous social tasks and has a great concern with power, status, and leadership; is orally aggressive.
- This person avoids problems that are highly structured or require gross physical skills; is nonconforming and asocial; has a need for individualistic expression, has less ego strength, is more feminine, and suffers more frequently from emotional disturbances; prefers dealing with environmental problems through self-expression in artistic media.

Please go on and start the
third questionnaire

Part C - Job Inventory

(Note: There is another questionnaire that uses similar items but has different directions. Therefore, read these directions carefully.)

Purpose of the Inventory:

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This inventory contains six sets of statements. Each describes five things that you can get from your job. ALL the statements are probably true of your job to some extent but not to the same degree. The purpose of this inventory is to determine the rank-order in which you are getting these things on the job. To do this you will have to rank the statements in the order in which they reflect things that you are truly getting from your job.

Although some of the items in the sets are similar they express different aspects of the job and are necessary to the complete description of what you are getting from your job. This is not a test of ability or consistency in making answers. Its only purpose is to make it possible for you to rank each set of items in the order in which they reflect what you are getting from your job.

Directions:

- a. READ all the statements in each set carefully.
- b. THINK about how truly the statement reflects what you are getting from your job.
- c. RANK the statements in the order in which you are getting the things described by the statements. Do this by placing a "1" next to the thing you are getting most on the job, a "2" next to the thing you are getting second most on the job, and so on through the number "5" which would be the thing you are getting least on the job.
- d. RANK ALL THE STATEMENTS in a set even when this is difficult.

Example:

<u>5</u>	There is an opportunity to utilize all of my abilities on the job.
<u>3</u>	I have sufficient authority for the job expected of me.
<u>1</u>	Credit is given me by my superior for doing a good job.
<u>4</u>	I have knowledge of company plans that affect me and my job.
<u>2</u>	I have the opportunity in my job to work together with other people.

RANK the statements in the order in which they reflect things you are getting from your job.

Set 1

- ___ There is freedom to express my opinions and suggestions to my supervisor.
- ___ I am liked by others in the department.
- ___ I receive adequate information about plans and policies that influence my work.
- ___ There is a chance to go as far as I want to go at work.
- ___ I have the feeling that my job is regarded as important.

Set 2

- ___ There is an opportunity to advance in responsibility as far as I am able to.
- ___ There is freedom to make decisions about my work.
- ___ The job I have is routine and I always know what is expected of me.
- ___ My job has prestige and receives regard from others outside of the company
- ___ There is an opportunity to participate in after-work activities such as picnics, bowling leagues, etc.

Set 3

104

- _____ There is freedom to use my own judgment.
- _____ There is an opportunity in my job to show my liking and friendship for others.
- _____ Others working at my level recognize the importance of my work.
- _____ There is an opportunity to get as far ahead as my abilities will allow.
- _____ I work under a man who will take over and do the job for me when I get into a jam.

Set 4

- _____ There is an opportunity to develop my full potential on the job.
- _____ I am told what I am supposed to do and how I am to do it.
- _____ There is relative freedom from supervision.
- _____ My job gives me status.
- _____ There is an opportunity to develop close friendships in my job.

Set 5

- _____ There is a definite set of rules and procedures that I can follow in doing my job.
- _____ I don't have my work interfered with by my supervisor.
- _____ I receive credit by the company for doing good work.
- _____ I have the feeling of self-fulfillment from being able to use my own unique capabilities and realizing my potential in my job.
- _____ I have a sense of belonging to my work group.

Set 6

- _____ I do not have to make decisions on my job.
- _____ There is an opportunity to come up with my own solutions to problems connected with my work.
- _____ There is an opportunity for personal growth and development in my job.
- _____ My job has an important title.
- _____ There is an opportunity in my job to give help to other people.

Please go on and start the last questionnaire. After you complete this questionnaire, you are finished, Thank you very much for your cooperation.

THE VOCATIONAL PREFERENCE INVENTORY

Developed by John L. Holland, Ph.D.

105

This is an inventory of your feelings and attitudes about many kinds of work. Fill out your answer sheet by following the directions given below:

1. Show on your answer sheet the occupations which interest or appeal to you by blackening Y for "Yes."
 2. Show the occupations which you dislike or find uninteresting by blackening N for "No."
 3. Make no marks when you are undecided about an occupation
-

1. Aviator	31. Power Station Operator
2. Private Investigator	32. Astronomer
3. YMCA Secretary	33. Juvenile Delinquency Expert
4. Detective	34. Budget Reviewer
5. Post Office Clerk	35. Stock & Bond Salesman
6. Route Salesman	36. Musician
7. Electronic Technician	37. Prize Fighter
8. Humorist	38. Diplomat
9. Photographer	39. Experimental Laboratory Engineer
10. Interplanetary Scientist	40. Crane Operator
11. Airplane Mechanic	41. Master Plumber
12. Meteorologist	42. Aeronautical Design Engineer
13. Foreign Missionary	43. Speech Therapist
14. Bookkeeper	44. Traffic Manager
15. Speculator	45. Manufacturer's Representative
16. Poet	46. Author
17. Deep Sea Diver	47. Fireman
18. Newspaper Editor	48. Army General
19. Nursery School Teacher	49. Interior Decorator
20. Lawyer	50. Novelist
21. Fish and Wildlife Specialist	51. Power Shovel Operator
22. Biologist	52. Anthropologist
23. High School Teacher	53. Marriage Counselor
24. Quality Control Expert	54. Statistician
25. Buyer	55. Television Producer
26. Symphony Conductor	56. Commercial Artist
27. Wrecker (Building)	57. Wild Animal Trainer
28. Narcotics Inspector	58. U. N. Official
29. Elementary School Teacher	59. Sculptor
30. School Principal	60. Automobile Mechanic

61. Surveyor	111. Tool Designer	106
62. Zoologist	112. Geologist	
63. Physical Education Teacher	113. Asst. City School Superintendent	
64. Court Stenographer	114. Financial Analyst	
65. Hotel Manager	115. Real Estate Salesman	
66. Free-Lance Writer	116. Composer	
67. Stunt Man (Motion Picture)	117. Mountain Climber	
68. Criminal Lawyer	118. Congressional Investigator	
69. Professional Athlete	119. Portrait Artist	
70. Carpenter	120. Machinist	
71. Construction Inspector	121. Locomotive Engineer	
72. Chemist	122. Botanist	
73. Playground Director	123. Personal Counselor	
74. Bank Teller	124. Cost Estimator	
75. Business Executive	125. Industrial Relations Consultant	
76. Musical Arranger	126. Stage Director	
77. Jockey	127. Explorer	
78. Ventriloquist	128. Supreme Court Judge	
79. Army Officer	129. Draftsman	
80. Banker	130. Judge	
81. Radio Operator	131. Photoengraver	
82. Independent Research Scientist	132. Scientific Research Worker	
83. Clinical Psychologist	133. Psychiatric Case Worker	
84. Tax Expert	134. Pay Roll Clerk	
85. Restaurant Worker	135. Sports Promoter	
86. Art Dealer	136. Playwright	
87. Motorcycle Driver	137. Test Pilot	
88. Police Judge	138. Criminologist	
89. Referee (Sporting Events)	139. Children's Clothing Designer	
90. Truck Gardener	140. Truck Driver	
91. Filling Station Attendant	141. Electrician	
92. Writer of Scientific or Technical Articles	142. Physicist	
93. Social Science Teacher	143. Vocational Counselor	
94. Inventory Controller	144. Bank Examiner	
95. Master of Ceremonies	145. Political Campaign Manager	
96. Dramatic Coach	146. Cartoonist	
97. Blaster (Dynamiter)	147. Racing Car Driver	
98. Mind Reader	148. Book Censor	
99. English Teacher	149. Social Worker	
100. Tree Surgeon	150. Locksmith	
101. Tree Surgeon	151. Funeral Director	
102. Editor of a Scientific Journal	152. Counter-Intelligence Man	
103. Director of Welfare Agency	153. Architect	
104. IBM Equipment Operator	154. Shipping & Receiving Clerk	
105. Traveling Salesman	155. Criminal Psychologist	
106. Concert Singer	156. Insurance Clerk	
107. F.B.I. Agent	157. Barber	
108. Prosecuting Attorney	158. Bill Collector	
109. Factory Foreman	159. Ward Attendant	
110. College Professor	160. Masseur	

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