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The Ohio State University, Ph.D., 1976
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OCCUPATIONAL LEVEL, SEX AND THE CONCURRENT VALIDITY
OF HOLLAND'S THEORY IN A SAMPLE OF
EMPLOYED ADULTS

DISSEPTION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
Arnold R. Spokane, B.A., M.S. Ed.

* * * * *

The Ohio State University
1976

Reading Committee:

W. Bruce Walsh, Ph.D.
Samuel H. Osipow, Ph.D.
Robert E. Campbell, Ph.D.

Approved by

W. Bruce Walsh
Adviser
Department of Psychology
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And finally, to Shelly, whose constant loving and listening make my life and work so much richer, go my thanks and love.
VITA


1970 . . . . . . . B.A., Ohio University, Athens, Ohio

1970-1971 . . . . Teaching Assistant, Department of Psychology, The University of Kentucky, Lexington, Kentucky

1971-1972 . . . . Program Advisor, The University of Kentucky

1972 . . . . . . . M.S. Ed., The University of Kentucky

1972-1973 . . . . Psychology Trainee, V.A. Neuropsychiatric Hospital, Chillicothe, Ohio

1973-1974 . . . . Teaching Associate, Department of Psychology, The Ohio State University, Columbus, Ohio

1975-1975 . . . . Counseling Intern, Student Counseling Service, Iowa State University, Ames, Iowa

1975-1976 . . . . Advanced Counseling Intern, Counseling and Consultation Service, The Ohio State University, Columbus, Ohio

PUBLICATIONS


FIELDS OF STUDY

Major Field: Counseling Psychology

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CHAPTER I

INTRODUCTION

As coined by Frank Parsons in 1908, the expression "Vocational Guidance" meant assisting young people in planning and carrying out their working careers, with primary emphasis upon Choosing a Vocation, the title of Parson's first book (Brewer, 1942). Since these early beginnings Counseling Psychologists have continued to focus intensively on vocational choice. Holland (1973) has titled his most recent book Making Vocational Choices.

As researchers, we have dealt almost exclusively with issues of vocational selection or choice in our writings, with heavy concentration on college populations. As Osipow (1973) has suggested, there is a major distinction to be made between vocational selection preference, and attainment. He points to Vroom's (1964) illustration that vocational preference is the answer to the question, "What career would you like to follow?" Vocational selection implies a choice or behavioral entity in which the client commits to and accepts the consequence of a choice, and vocational attainment which denotes the actual occupation an individual holds. This distinction is central in the career development field and it seems that we have all but taken it for granted, both in the populations on whom we conduct research, and the settings in which
we work. It would seem that the majority of our emphasis in the field of career development has been on vocational preference. This trend is easily seen from an examination of extant literature.

In reviewing the theories of vocational choice it is interesting to note the research that validates the theories, and the populations on which the research was performed. The formulations of the developmental theory of Ginzberg, Ginsburg, Axelrad and Herma (1951) were derived from interviews with talented adolescent boys and girls. The need theory of Ann Roe (1956, 1957) stems from her research on eminent scientists. The psychoanalytic theory of Bordin, Nachman and Segal has its basis in three studies dealing with seven professional occupations. Holland (1959, 1966a, 1973) has substantiated his theory with research on large groups of students participating in the National Merit Scholarship Program—generally these are college bound students. Holland has also performed research with college students. With the exception of Super (1957) whose research has been conducted on a mixed college/non-college bound sample, research has been conducted with a talented segment of the work force or potential work force (Horton, 1975).

In his discussion of the vocational theories, Osipow (1968) reviewed research stimulated by or relevant to the vocational theories. Fishburne (1973) classified the research reviewed, according to the subjects utilized, into the following groups: 1) adolescent, 2) college graduates in the world of work, and 5) unspecified. According to Fishburne, Osipow (1968) cited sixty-two pieces of research of which twenty-two were conducted using adolescent subjects, twenty using
college subjects, twelve using college graduates in the world of work, one using non-college graduates in the world of work, and five were reviewed for which the subject groups were unspecified. Six of the works of research reviewed using adolescent subjects were accomplished by Holland and his associates using National Merit Scholarship Finalists, an elite college bound group. For the remaining research reviewed which used adolescent groups it was not possible, from the review, to determine the nature of the subject samples (potential college vs. potential non-college). It is striking to note, however, that 60 percent of the research for whom subjects could be identified was conducted using a college student or college student in the world of work sample. At most 29 percent, 17 pieces of research, could potentially be identified as working with samples containing some non-college bound students or non-college attending workers. Thus, it seems clear in the main that most research in our field has investigated vocational preference or choice, and only rarely vocational attainment.

There may be many reasons for a concentration on vocational preference as opposed to selection or attainment; among them:

1. The majority of counseling psychologists are employed in college and university settings (Samler, 1964; Peterson and Featherstone, 1967), and have traditionally concerned themselves with college student populations (college students are concerned with preference and selection).
2. Research samples of freshmen and sophomore college students are cheap, convenient and plentiful. Samples of employed adults and non-college samples are difficult to recruit, mistrustful of research, and may be expensive if not unavailable.

3. The belief that career development may be more important and appropriate at higher occupational levels (Roe and Klos, 1969) coupled with the belief that this group has more options and choices at than lower levels.

Recently, studies of employed adults have become more numerous (Osipov, 1970; Lacey, 1971; Caffey and Walsh, 1974). This seems to be a promising research direction; but is replete with problems and pitfalls such as increased number of relevant variables affecting career development, i.e., financial incentives, environmental variables, etc.).

This preoccupation with college student populations could be viewed as appropriate given the settings in which counseling psychologists work. It can also be viewed as unfortunate given the fact that in general, only 1/5 of the work is employed in jobs requiring a college degree (Roe, 1956). In her classification of occupations, Roe cites data on the kinds of workers in the work force by decades.

From Table 1, it can be seen that from 1910 to 1950 the percentage of workers in professional and managerial positions has decreased from 27.4 to 23.8 but remains relatively stable at around 25 percent with some decline in recent years. The bulk of expansion in the work
TABLE 1
PERCENTAGE OF WORKERS IN THE WORK FORCE BY DECADE

<table>
<thead>
<tr>
<th></th>
<th>1910</th>
<th>1920</th>
<th>1930</th>
<th>1940</th>
<th>1950</th>
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<tbody>
<tr>
<td>Professional persons</td>
<td>4.4</td>
<td>5.0</td>
<td>6.1</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Proprietors, managers</td>
<td>23.0</td>
<td>22.3</td>
<td>19.9</td>
<td>17.8</td>
<td>16.3</td>
</tr>
<tr>
<td>and officials</td>
<td></td>
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<tr>
<td>Clerks and kindred</td>
<td>10.2</td>
<td>13.8</td>
<td>16.3</td>
<td>17.2</td>
<td>20.2</td>
</tr>
<tr>
<td>workers</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Skilled workers and</td>
<td>11.7</td>
<td>13.5</td>
<td>12.9</td>
<td>11.7</td>
<td>13.8</td>
</tr>
<tr>
<td>foreman</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service skilled workers</td>
<td>14.7</td>
<td>16.1</td>
<td>16.4</td>
<td>21.0</td>
<td>22.4</td>
</tr>
<tr>
<td>Unskilled workers</td>
<td>36.0</td>
<td>29.4</td>
<td>28.4</td>
<td>25.9</td>
<td>19.8</td>
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force occurs at lower occupational levels. These are precisely the populations which we have studied the least, and about which we know the least.

As has been pointed out elsewhere (Osipow, 1973), one of the initial criticisms of John Holland's theory and research was the select population which it investigated. While this has been rectified to some extent (Osipow, Ashby and Wall, 1966; Holland, 1973), only recently have attempts been made to extend Holland's formulations to a working population (see Table 2) and while evidence for Holland's level formulation exists (Schutz and Blocker, 1961; Stockin, 1964; Fortner, 1970; Hughes, 1971). It receives only scant attention theoretically.

While there is little evidence or controversy surrounding the occupational level variable, considerable argument centers around the
sex bias and sex fairness of traditional measurement inventories (Diamond, 1975). None of these studies have been empirical in nature (Holland, 1975), and the complex issues of item and scale construction, and norming (Harmon, 1975; Johansson, 1975) are now being addressed.

A series of empirical and theoretical arguments has resulted in confusing and contradictory statements regarding sex bias and norming. On the one hand, it is argued that there is no clear evidence of sex bias in traditional inventories, even though there are documented male-female response differences (Holland, 1975). There is evidence that when raw scores are used as recommended by Holland (1974), only minimal sex differences are evidenced (Walsh, Horton and Gaffey, submitted). Holland suggests that outcomes using raw score data are the same for men and women in terms of broadening career options (Zenner and Schenule, 1972), and that attempts to reduce sex bias may reduce validity (Gottfredson and Holland, 1974; Holland, 1975). He further adds that to ignore socialization differences between men and women is to do a disservice to test recipients.

On the other hand it is argued that men and women are different, and that standardized score data will produce results more in line with theoretical predictions than will raw score data (Prediger and Hanson, 1976), and that rather than producing sex-balanced scales as suggested by Holland (1975), the development of bias free items and scales is needed (Raymon, 1976), thus avoiding the controversy without sacrificing validity.

What seems clear and relevant to this study is that men and women seem to respond differently to interest inventories. While the results of the Walsh data suggest few differences between men and women in the same occupation (Walsh, Horton and Gaffey, submitted) the homogeneous
nature of the Holland inventories, and lack of criterion referenced data has precluded investigations of employed adults with respect to sex differences. Thus, differences between employed men and women still remain unclear. In view of the aforementioned importance of concepts of occupational level, and sex differences, a good deal more emphasis could be placed on these concepts in Holland's theory. An overview of the theory is provided here followed by an introduction to the present study.

John Holland's theory (1959, 1966, 1973) of career choice suggests that vocational behavior is a function of the interaction of personality and environment. Essentially this interaction involves the hereditary predispositions of each person toward specific activities, interests, competencies, and the cultural, social, economic and personal forces which surround him. Out of this experience an individual develops a hierarchy of habitual or preferred methods of dealing with his environment. In his latest reformulation of his theory Holland states the following assumptions upon which his theory is built.

1. In our culture, most persons can be categorized as one of six types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

2. There are six kinds of environments which can be classified as: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

3. People search for environments that will let them exercise their skills, and abilities, express their attitudes and values, and take on agreeable problems and roles.
4. A person's behavior is determined by an interaction between his personality and the characteristics of his environment.

Thus, Holland has characterized people along the dimensions of six personality types (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) such that these types were reflective of specific personality styles. The assumption is that people express their identity through vocational activity and that this identity reflects an individual's history of interaction between himself and his environment. Thus, each type is a cluster of characteristic adaptive behaviors, psychological needs and motives, self-concepts, life history, vocational and educational goals, preferred occupational roles, aptitudes, and intelligence (Holland, 1973). Parallel to each of these types, Holland classified occupational environments into six congruent models. Realistic personality would be described as one who prefers the systematic manipulation of tools, machines and animals rather than more social or therapeutic activities. They are often mechanically or athletically inclined and value concrete things or tangible personal characteristics such as money, power, and status. Because of these preferences the realistic person is apt to show himself as frank, self-effacing, stable and materialistic. Like the Conventional type he is conforming and persistent, but unlike the Social type he is more masculine and social. Given these characteristics he is usually disposed to choose such occupations as dental technician, industrial arts teacher, radio operator, mechanical engineer, or industrial engineering technician.
The Realistic environment would have corresponding characteristics:

1. **Realistic.** It is characterized by the explicit physical, concrete tasks with which it confronts its inhabitants. Effective solutions often require mechanical ingenuity and skill, persistence, and physical movement from place to place, often outdoors. The Realistic environment demands only minimal interpersonal skills, because most of the tasks it sets can be accomplished by superficial and casual relationships that frequently require only stereotyped conversations. Tasks frequently call for simple sets of action. The explicit quality of the environmental demands make "success" and "failure" almost immediately obvious (Holland, 1966).

The remaining personality types would be described as follows:

2. **Investigative.** The Investigative person demonstrates a preference for activities that entail the observational, symbolic, systematic and creative investigation of the physical, biological and cultural phenomena in order to understand and control such phenomena, and an aversion to persuasive, social and repetitive activities. Personalities of this
type would be more likely to excel in scientific and mathematical competencies and to be deficient in persuasive skills. They perceive themselves as scholarly, intellectually self-confident, cautious and reserved. Like the Artistic type they are introspective, but unlike the Enterprising type they are usually independent and passive. They tend to choose occupations such as physician, internist, mathematics teacher, dentist and psychologist.

3. **Artistic.** Individuals classified as artists are more often led to a preference for ambiguous, free and unsystemized activities that entail the manipulation of physical, verbal or human materials to create art forms or products, and to an aversion of explicit, systematic and ordered activities. Their competencies, lying in the areas of language, art, music, drama and writing, pre-dispose them to choose occupations such as English teacher, drama teacher, musician, actress, and architect. They characterize themselves by such adjectives as original, complicated, independent and imaginative. Like the Social type they see themselves as feminine and idealistic, but unlike the Realistic type they are impractical and non-conforming.
4. **Social.** Due to the interaction of heredity and early environment factors, the Social type prefers to manipulate others and to inform, train, develop, cure, and enlighten. They are usually adept at interpersonal and educational skills but deficient in manual and technical competencies. He values social and ethical activities and perceives himself as liking to help others, and as being understanding, kind, cooperative, and generous. Unlike the previous types he is usually lacking in mechanical and scientific abilities. These characteristics orient them toward occupations such as social worker, minister, sociologist, home economist and librarian.

5. **Enterprising.** People of this type usually have the necessary verbal skills for selling, dominating and leading. These behavioral tendencies lead in turn to the acquisition of leadership, interpersonal and persuasive competencies to the detriment of scientific, observational and symbolic skills. Valuing political and economic achievement, they perceive themselves as aggressive, popular, self-confident, sociable and having mathematical and scientific ability. Like the Artistic type, they are impulsive, but unlike them, they
are impulsive, but unlike them, they are dependent and acquisitive. Most similar to those resembling the Social type, they are talkative and sociable. Such individuals are thereby predisposed toward occupations as banker, economist, lawyer, nursing supervisor, and industrial engineer.

6. Conventional. The hereditary factors and early experiences of the Conventional person lead to a preference for activities that entail the explicit, ordered, and systematic manipulation of data, such as keeping records, filing materials, reproducing materials and organizing written and numerical data. Valuing business and economic achievement, he is most unlike the Artistic type person in his aversion to free, exploratory or unsystematized activities. He is most apt to show himself as conforming, inflexible, prudish, self-controlled, practical and inhibited. Having usually developed competencies in clerical and computational areas, the conventional type person is more likely to choose such occupations as credit manager, business teacher, bookkeeper, receptionist and secretary.

These personality orientations have been operationally defined by the Vocational Preference Inventory (VPI) (Holland, 1965), The Self-
Directed Search (SDS) (Holland, 1972), and Sets I and II of the Strong Data (Hansen and Johansson, 1972).

The classification system employed by Holland does not provide an exact fit for each of the six types, rather Holland views each type as a global characteristic, which is existent to some degree in every individual. Thus, while no one individual characterizes any one type in its pure form, he/she is likely to possess a combination of traits from all six types with the traits of one or two being most dominant or pronounced in his/her personality (Holland, 1973). This hierarchy Holland refers to as an individual's subtype or profile, and he classifies the pattern of scores such that the first score is most characteristic of the individual, the second score is the second most characteristic, and so on. Thus, any person or environment can be represented by a six-point code with the three highest letters conveying the most information (Holland, 1973), such that an individual will tend to reach out to the environments which correspond most closely with his particular mix.

Moreover, the theory incorporates the concept that within each generic type there exists a hierarchy of levels. These levels would be reflective of an individual's intelligence and self-evaluation. Thus, each type is composed of a variety of jobs requiring varying amounts of education and skill.
Having focused upon the characteristics of each personality type in isolation from the others, Holland introduces further concepts to explain the nature of their interaction: (1) consistent and inconsistent, (2) congruent and incongruent, and (3) the degree of differentiation. The concepts of consistent-inconsistent are defined by the two high point codes exhibited by a person or environment. In elaborating on the characteristics descriptive of each type, one notes some commonalities among types. As a result, within a person or environment some pairs of types are more closely related than others. For example, Realistic-Investigative have more in common than Conventional-Artistic. In an attempt to describe the relative relatedness of types, Holland and his associates devised a hexagonal model such that "the relationship among types, or the psychological resemblance among types is inversely proportioned to their distance from each other." The shorter the distance between any two types the greater their similarity while the longer the distance the greater the incompatibility (c.f. Figure 1) (Holland, 1973).
This hexagonal model serves three purposes: (1) it defines the degree of consistency in a person's personality pattern, (2) it defines the consistency within an environment, and (3) it describes the consistency between the person and environment.

Differentiation\(^1\) refers to the degree of clarity of a person's or environment's profile code. Some persons or environments are more clearly defined than others. For instance, a person may closely resemble a single type and show little resemblance to other types, so, too, an environment. In contrast, a person who resembles many types or an environment that has no clearly dominant characteristics would be labeled undifferentiated or poorly defined.

The term congruence measures the degree of fit between a specific person and his environment. Different types require different environments. For instance, a Social type person requires a Social environment because such an environment provides the opportunities and rewards a Social type needs. Incongruence occurs when a person lives in an environment that provides opportunities and rewards foreign to his preferences and abilities, for instance an Artistic type person in a Conventional environment.

There are many combinations of consistency, differentiation, and congruence among persons and environments. However, Holland theorizes that these characteristics are most conducive to (1) the predictability of vocational choice, (2) the stability of vocational choice, (3) greater vocational achievement, (4) greater satisfaction

\(^1\)In his earlier work Holland referred to this as homogeneity.
with one's choice after it is made, (5) longer job tenure, (6) greater vocational achievement, and (7) higher academic achievement.

The weight of research thus far supports the assumption that the Holland framework is applicable to employed adults (Osipow, 1970; Werner, 1969; Lacey, 1971; Harvey and Winfield, 1974; Caffey and Walsh, 1974; O'Brien and Walsh, 1976; Fishburne and Walsh, 1976; Horton and Walsh, in press) (see Table 2). Thus far, however, while the variable of occupational level has been investigated in single studies either with a college or non-college sample, and additionally with a male or a female sample, there have been few studies to date which compare these samples in a single investigation, within a single occupational type. The results of the studies of sex variables are contradictory with respect to the use of raw scores on the Walsh, Horton and Gaffey, submitted) and the use of standard scores (Prediger and Hanson, 1976) with respect to the sex variable. Additionally, these studies do not account for occupational level differences.

This study is designed with several purposes in mind. First, it is designed to supplement the scant research and theoretical base in the career development of the employed adult population. Second, its purpose is to investigate the concurrent validity of Holland's constructs with employed adults with regard to occupational level and sex, and finally, it is designed to shed some light on the instrumentation in Holland's theory regarding its validity and appropriateness with atypical samples.
In an amusing critique of the scope and growth of the theory of the Psychology of Vocational Choice as described by Holland (1959, 1966, 1973), Hollifield (1969) alludes to the eventual segmenting of society into distinct social forces along the lines of Holland's six personal orientations. In a humorous fashion he fantasizes about a war between the types for control of the world. Ridiculous as this may seem, the popularization of Holland's notions has led a cadre of students and researchers to publish a voluminous number of articles which deal directly with Holland's theory. A conservative estimate yields over 200 studies to date with an increasing number forthcoming.

A comprehensive review of all these studies is clearly beyond the scope of this chapter. It is for that reason that a careful and selective review of research has been chosen instead. Studies have been selected which deal directly with the extension of Holland's instrumentation of the personal types to a wide variety of samples.

This selective review of literature is divided into four sections. Section A reviews studies related to the concurrent and predictive validity of the Vocational Preference Inventory (VPI) and the Self-Directed Search (SDS). Section B examines research on occupational
level in Holland's theory. Section C reviews the literature on working samples and finally, Section D summarizes the review and introduces this study.

A. Validity of the Vocational Preference Inventory (VPI) and the Self-Directed Search (SDS)

Vocational Preference Inventory (VPI)--A number of studies have been conducted by Holland and his associates to assess the validity of the VPI. In a recent monograph on person-environment interaction, Walsh (1973) suggests that studies of the concurrent and predictive validity of the VPI have generally used one of four empirical approaches.


2. Assessment of the range of personal orientation of a variety of social categories and groups (Fairweather et al., 1960; Holland, 1958).

3. Relationship between VPI scale scores and self-ratings or self-descriptions on traits which the various scales are presumed to measure (Baird, 1970, Holland, 1962, 1963b, 1964a, 1968).

4. Associations of VPI scale scores with various external criteria (Astin, 1963; Astin and Holland, 1961; Osipow, Ashby and Wall, 1966).
In addition to the four categories as excerpted from Walsh (1973), a fifth category of recent studies can be included.

5. Sophisticated statistical studies of the factor structure of the VPI, including discriminant analysis studies (Cole and Whitney, 1971; Holland, Cole, Whitney and Richards, 1971; Wakefield and Doughtie, 1973; Discipio, 1974).

In a series of studies investigating the personal orientations and their correlates, Holland and his associates provided modest support for the validity of the types. They were characterized by the use of multiple dependent variables and multiple methods of defining types. The longitudinal studies include: 1) one and two year follow-ups of vocational choice and its associated variables (Holland, 1962); 2) a four year prediction of stability of vocational choice (Holland, 1963a); and a one year assessment of change in major field of study (Holland and Nichols, 1964). The cross-sectional studies concern the following correlates that are related to Holland's six personal orientations: 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 the above mentioned studies, presents a difficult problem because the series of studies are so extensive and cover such a wide variety of variables. These exploratory studies capitalized on almost any readily available data in an attempt to develop the theoretical model, and because of this shot-gun approach large numbers of analyses were
generated of varying degrees of significance. In an effort to collate the principle findings the following summary is offered.

First, the findings indicate that Holland's six personal-vocational orientations (Realistic, Investigative, Artistic, Social, Conventional and Enterprising) systematically differed in relationship to the following correlates: vocational choice, educational aspirations, family background, patterns of academic and non-academic achievement, hobbies and extracurricular activities, inventoried personality characteristics, self ratings of traits and skills and identifications with famous people. Second, the characteristics of a particular type often overlap with those of another type indicating that the formulations of the theory have not been sufficiently developed. Third, congruence and consistency in personality-environment interactions lead to certain predictable outcomes: stability in choice of college major field and vocational goals, vocational and academic achievement, personal stability, and perhaps creative performance. Fourth, the hypothesis that level of vocational choice is a function of an individual's estimate of his abilities and self-awareness was not supported by the research for two reasons: 1) the choice levels of the high-aptitude National Merit Scholars tended to inflate the upper extreme of the career hierarchy and as such were not a representative sample, and 2) with the substitution of college major field as a measure of vocational choice, occupational level was not really considered a focal issue. Fifth, in a comparative analysis of the responses of males and females within samples there tended to be notable sex related differences. For example, in a correlation study between Cattell's 16
Personality Factor Questionnaire (16 PF) and the scales of the VPI, 47 percent of the correlations were significant for the males while only 27 percent were significant for females at the five percent level (probably due to the fact that all the scales of the 16 PF, with the exception of M-F were developed from male samples (Werner, 1969).

2) While females responses on the VPI categorized them as predicted by the theoretical model, their classification showed greater ambiguity than was true of males. 3) Among women stability of vocational choice was characteristic of the Social type but did not characterize any of the other types. 4) In predictive studies results tended to be mixed.

In one study of the concurrent validity of the theory, Holland (1963) was able to identify the vocational choice and college major of 45 percent of the males using high point codes of the VPI while he identified only 36 percent accurately for females. In a longitudinal study, Holland correctly predicted 28 percent of senior year boys' college major from freshman VPI codes and 27 percent of senior year females.

Due to these overall ambiguities in the results for women, Holland (1963c) stated that the theory needs to be extended in order to better account for their patterns of vocational choice and stability. Holland's (1968) longitudinal study on a rather large general sample of college students used the high point VPI code on six occupational scales for men, and eight occupational scales for women from test scores taken during each student's freshmen year. Holland compared these with the student's vocational choice eight months later. The results indicated that: 1) correct predictions for men range from a low of 21.5% for Artistic predictions to a high of 51.4% for Investigative predictions,
2) correct predictions for women range from a low of 0% for Realistic predictions to a high of 81.9% for Social choices. Using the student's expressed vocational choice rather than his VPI code correct predictions for both sexes jumped to between 63.2% to 71.2%.

Wall, Osipow, and Ashby (1967) had male college freshmen rank themselves on personality description fitting Holland's types and found:

Not only do personality types differ in their SVIB group scores, but, in many cases, the personality types have high group scores where they would be expected, and low scores where low scores would be expected. (Holland, 1973)

Folsom (1969) assessed a sample of 1,003 college students, male and female, with the College Student Questionnaire (CSQ) and then compared student types (defined by their choice of major field) on seven scales of the CSQ. Results indicated that the Investigative male differed significantly from the Realistic male on the Liberalism scale of the CSQ, while on the Cultural Sophistication scale the Artistic male differed from all other types with the one exception of the Social type, who along with the Enterprising male differed from Realistic and Conventional males. Artistic females differentiated themselves from Realistic females on the Peer Independence scale, while Realistic females were significantly different from Artistic and Enterprising females on the Cultural Sophistication scale.

Finally, Wakefield and Cunningham (1975) investigated relationships between the VPI and the EPPS. A canonical analysis of the VPI and the EPPS revealed three components in the two instruments that accounted for 39% of their total variance. The authors concluded that
the VPI and EPPS are "related though not duplicative personality measures, consistent with the theoretical views underlying the two instruments.

Thus, convincing evidence exists for the validity of the types as measured by the VPI and relationships of the types to other inventories and educational, vocational choices.

Holland (1973) proposes that just as one may categorize individuals according to six personality types so one may categorize all work environments according to comparable categories. He defines environmental types or models "as the situation or atmosphere created by the people who dominate a given environment" (page 27). For instance, an Artistic environment would be one dominated by Artistic people. The character of an environment is thereby made dependent upon the characteristics of its members. One need simply know what kind of people make up a group in order to infer the kind of climate that the group creates.

In a series of reports Astin and his colleagues have tested the general hypothesis that the environment of an undergraduate institution can be known by the distribution of student types at that institution. To assess such institutional environments Astin and Holland (1961) developed the Environmental Assessment Technique (EAT). Their study provided evidence that it was possible to predict what students would say about their college merely by performing a census of the college's major fields.

In another study using the EAT, Astin (1963) polled students in seventy-six colleges for their perceptions of the college environment and its effect. The findings again substantiated Holland's theoretical
model. In a series of other studies, Astin (1964; 1965a; 1965b) found that: 1) the characteristics of entering freshmen can be predicted from the EAT descriptive codes for a particular college, 2) there exists significant relationships between the popularity and selectivity of an institution and its EAT variables, and 3) the characteristics of instructors representing a field often represent the characteristics one would expect to find demanded by the field in which they teach.

In a critical test of Holland's theory, Osipow, Ashby and Wall (1966) predicted that students would choose occupations in categories consistent with the personality types they selected as most descriptive of themselves. Freshmen subjects were first asked to rank order personality descriptions based on the six Holland types and then to rate each one on the basis of how well it was descriptive of themselves. In this way, two measures were obtained, a measure of the order with which each subject identified with each of the six types, plus a measure of the strength of that identification. Information as to the occupational preferences of each student was also available. In a comparison between the rank order of personality descriptions and vocational choice, results confirm that students choose occupations congruent with their personality type, the one exception in this research being the Conventional type. The subjects were then divided into three groups, those with decided, tentative and undecided college majors. This time a comparison was made between a student's vocational choice and the strength with which he identified with each of the six types. In the decided group the Realistic, Social, Enterprising and Artistic groups rated the personality descriptions different from their
occupational choice. There was no interaction between choice category and personality ratings in the tentative group, and the size of the undeceased group was too small to obtain meaningful results. Osipow et al., concluded that even though a large proportion of students make occupational choice in a manner consistent with Holland's theory, many still do not. Finally, a series of studies dealt with the factor structure of the VPI.

In an explication of his revised occupational classification (Holland et al., 1971) data from samples of two-year college students and employed adults were added to Holland's original data on a four-year sample (Holland, 1966). Using factor analysis to locate the six VPI scales in a three-dimensional space, a hexagonal configuration emerged. Occupations were assigned to categories using the same procedure Holland used in 1966. However, the arrangement of major categories and sub-categories was accomplished according to the hexagonal model. Major categories are arranged in the following sequence: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Sub-categories are arranged so that second code letters follow in clockwise order starting from the major category's code. For example, the arrangement of Realistic-Social (RS), Realistic-Investigative (RI), Realistic-Conventional (RC), Realistic-Enterprising (RE), and Realistic-Artistic (RA) would be RI, RA, RS, RE, RC). Within this hexagonal arrangement, Conventional is adjacent to Realistic. As in the case with Anne Roe's (1956) 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 commitment.

Cole, Whitney and Holland (1971) have mathematically analyzed relationships among the six scales of Holland's VPI, yielding a competencies, life goals, self-ratings, and personality and attitudinal variables. The results were generally positive and supportive of similar investigations on samples of National Merit Scholars. There were, however, some notable conclusions and differences: 1) Comparisons across subtypes such as RI, RS, RC, etc., were significantly different as well as comparisons across generic types, suggesting that people with similar codes have similar characteristics; 2) Contrary to other studies the results for women tended to be higher than for men; 3) The results were both more explicit as well as substantial. Overlapping among types remained although they seemed less pronounced.

In a factor analytic test of Holland's (1971) hexagonal model, Wakefield and Doughtie (1973) administered the VPI to a sample of 373 freshmen and the University of Houston. Pearson Product Moment correlations were calculated for each pair of scale intercorrelations. The authors compared these results with those of Holland et al. (1971) and found that in 45 of 54 comparisons, the results were consistent with Holland's model. The authors conclude:

This finding lends support to his (Holland's) model of vocationally defined personality types and provides evidence that the first six scales of the VPI yield measures that are interrelated in the fashion Holland's model predicts.
A second study (Yom et al., 1975) compared the results of an earlier study (Wakefield and Doughtie, 1973) to the results on a sample of black students and found the results of the factor analysis on black students to be very similar to the results on white students. They conclude that the VPI measures the same variables for both samples.

DiScipio (1974) used principle components analysis to factor the 135 item pool of the VPI. Using the clinically based scales as hypothesized factors, DiScipio found for a sample of 100 men and 200 women under the age of 25, "The a priori scales were factually upheld with differences attributed to the characteristics of the sample and sociopolitical time context during which the test was administered." An eight factor structure was defined, adding a Law and Politics scales with no relation to the scales on the sixth revision of the VPI. The other factors were: public service, teaching, clerical-business and sales, scientific, manual skilled labor, teaching and counseling, physical risk taking and artistic all of which were related to the clinical scales. Results were interpreted as supportive of validity of the VPI.

Self-Directed Search (SDS)--Studies of the validity of the SDS are neither as numerous, nor as comprehensive as those conducted in the VPI. Several recent studies are however, helping to assess its validity. The validity of the SDS is based on Holland's theory of personality types and his notion that the most efficient way to ascertain what occupational choice persons will make is to ask them directly.
Holland (1972) reported reliability coefficients (KR 20) for individual scales of the SDS ranging from .53 to .87 for both men and women. In another study, O'Connell and Sedlacek (1971) provided test-retest reliabilities of summary codes over a seven to ten month period for college freshmen (N=65) of .75 (Pearson), .92 (Spearman Rho), and .87 (average common elements).

A comparison of satisfied and dissatisfied users of the SDS was researched by Collins and Sedlacek (1972). To make this comparison, a Likert item stating: "My summary code occupations seem reasonable for me," was added at the end of the SDS which was completed by 4,631 incoming freshmen at the University of Maryland. Students responded on a five point agree-disagree scale. The study compared all students who responded "strongly agree" (N=485) on the Likert item with all who responded "strongly disagree" (N=343). The results indicated that a greater percentage of those dissatisfied obtained codes with no corresponding occupations listed in the SDS Occupations Finder. Additionally, the satisfied group received more Artistic and Investigative codes whereas the dissatisfied group received more first letter Conventional codes.

Other research on the use of the SDS with Black students was assessed by Kimball, Sedlacek, and Brooks (1973). The study compared the pattern of vocational planning of Black and White students as measured by the SDS and also student satisfaction with the SDS results. The subjects were 143 Black and 141 White students who took the SDS as part of summer orientation at the University of Maryland. Three analyses of Black and White students consisted of: 1) comparing the
first, second, and third choice summary codes, 2) comparing the summary codes again, omitting the section on competencies, 3) comparing the two groups on responses to a Likert item which asked: "My summary code occupations seem reasonable for me." The results of the study indicated that Blacks tend to choose Social occupations whereas Whites choose more Realistic and Investigative occupations. The dropping of the Competencies section made little difference in the obtained summary code. Lastly, there was no difference in satisfaction with SDS results between Blacks and Whites.

Lewis and Sedlacek (1972) conducted research to determine whether the results of the SDS vary according to level of education of those who take the instrument. Two samples of students who took the SDS in 1970 at the University of Maryland were used. The High group represented those students whose fathers had an undergraduate college degree. The Low group represented those students whose fathers had less than a high school education. The High and Low groups were compared in terms of their dream codes. The results indicated that there was no difference between High and Low groups in terms of their daydreams. The Low group obtained more Conventional and fewer Artistic summary codes and on the average obtained summary code occupations that require less education.

The accuracy of self-administration and scoring of Holland's Self Directed Search was assessed by Gelso, Collins, Williams, and Sedlacek (1973). The study investigated the extent that subjects (N=221) committed various types of errors when completing the SDS entirely on their own. The study revealed that: 1) nearly all
subjects made some type of error and approximately half of the subjects made errors which affected their final three letter summary code, 2) nearly one-fifth of the subjects made errors resulting in an incorrect high point code. Further results indicated that subjects' errors in their final summary code were related to: 1) the extent that they were interested in knowing more about occupations or academic majors, and 2) whether subjects felt the occupations suggested by their summary codes seemed reasonable.

The most comprehensive study completed on the effectiveness of the SDS was conducted by Zener and Schnuelle (1972). A complete description of the methodology and results were beyond the scope of this review, but a summary is given. This study tested the effects of three treatments of the SDS on 10th, 11th, and 12th grade high school students (N=1,092). The three treatment groups were: (1) a group that took the regular published version of the SDS, (2) a group that took a version of the SDS which did not contain the self-directed aspects, and (3) a control group that received no treatment. Evaluative criteria used to assess the different treatments included: (1) students' evaluations of the SDS versions, (2) understanding of Holland's theory, (3) number and appropriateness of considered occupations, (4) satisfaction and certainty about vocational plans, (5) need for information about specific jobs and training programs, (6) increased information seeking behavior, (7) knowledge of chosen occupation, and (8) vocational maturity. The results of the study listed by Zener and Schnuelle (1972) include:
1. **Student Evaluation** - The SDS was evaluated as moderately positive and the evaluation was not affected by the self-directed aspect of the SDS.

2. **Understanding of Holland's Theory** - Students taking the regular, published version of the SDS demonstrated a better understanding of Holland's theory than students in either the non-self-directed or control groups.

3. **Number and Appropriateness of Considered Occupations** - Students taking either version of the SDS were considering more occupational alternatives than the control group on the day after the SDS. The difference was still present three weeks later. The occupations listed by the students taking the published version of the SDS were more consistent with their SDS summary codes than were those occupations listed by students taking the non-self-directed version.

4. **Satisfaction and Certainty About Vocational Plans** - Students taking either version of the SDS report feeling more satisfied with their current occupational choice. Students taking the published version report less need to see a counselor immediately.

5. **Need for Information About Specific Jobs and Training Programs** - The control group expressed greater need than the groups taking either version of the SDS.

6. **Information Seeking Behavior - Knowledge of Chosen Occupation - Vocational Maturity** - No effects among three groups (p. 35).

Finally (Holland and Nafziger, 1975), examined the concurrent validity of the SDS, with the finding that the scales of the SDS correlate with the scales of the Kuder, the Thurstone Temperment Schedule, the Bennett, and the Minnesota Paper Form Board in predictable ways across small samples of high school students.

The research on the SDS has been limited primarily because of the newness of the vocational instrument. The research by Zener and Schnuelle (1972), O'Connell and Sedlacek (1971), and Holland (1972) indicated the general reliability, validity, and usefulness of the SDS.
for individuals involved in career planning. The accuracy of self-administration and scoring of the SDS has been assessed by Gelso, Collins, Williams, and Sedlacek (1973). This research has uncovered some limitations and difficulties with the SDS. Further revisions of the SDS may be needed to decrease the number of errors made by users.

B. Occupational Level and Holland's Theory

In the original formulation of his theory Holland (1959) hypothesized that a person's choice of occupation was a function of his personality orientation, but the occupational level to which he aspired was more a function of intelligence and self-evaluation. Holland defined self-evaluation as the relative worth an individual ascribes to himself, measured it by such instruments as the Occupational Level Scale of the SVIB or the Sims Social Status Scale. In a later re-formulation, however, Holland (1973) redefined his concept of occupational level such that the more a person's resemblance to personality pattern ESAICR the greater the expected vocational aspiration and eventual achievement.

Using the original formula very little research had been conducted on college populations. In his 1962 study on National Merit Scholars, Holland tested the level hierarchy formulation by predicting a relationship between the subject college major and the sum total of his score on the VPI Status Scale and SAT math score. Two other studies (Schutz and Blocker, 1961; Stockin, 1964) samples of high school boys were used.
Three studies investigating the level hierarchy (Schutz and Blocker, 1961; Stockin, 1964; and Fortner, 1970) provide good support for the concept of level hierarchy as described by Holland (1973).

The self-evaluation factor of the level hierarchy concept could as Osipow (1973) suggests operationally correspond to the occupational level scale of the Strong Vocational Interest Blank. In order to test this assumption, Schutz and Blocker (1961) used a sample of 135 college bound male high school seniors. They used a self-satisfaction Questionnaire which measured discrepancy between self-description and ideal self-description. They predicted a positive relationship between self-satisfaction index (discrepancy) and occupational level scores on the SVIB. They found a modestly significant correlation (Pearson Product Moment $r = .34$) between self-satisfaction and occupational level. They conclude that SVIB-OL scale may be used with some caution as an index of self-evaluation as indicated in Holland’s formulations of level hierarchy.

In a well-designed test of Holland’s Occupational level formulations Stockin (1964) studied the correlation between intelligence, self-evaluation and level of occupational choice. To operationalize intelligence, Stockin used IQ’s from school records. To obtain self-evaluation scores, he used the Sim’s Social Status Scale and two measures developed by Hieronumus (1951); the Attitude Toward Education Scale (ATE) and the Socioeconomic Expectation Scale (SEE). The resulting self-evaluation indexes were then combined with Ss intelligence scores to produce an index that could be used to predict
occupational level. The Occupational Classification System proposed by Roe (1954) was used to classify SS choices by occupational level. In a clear, direct test of Holland's level concept, Stockin compared his predictions using the index he derived with SS choices as categorized by Roe's system.

Results indicated a positive relationship between predicted level and SS choice, and further that where wrong predictions occurred, many career choices fell within adjacent levels. Stockin points out that:

1. the addition of self-evaluation to intelligence increases accuracy of prediction.

2. Stockin's predictions were really postdictions based on career preferences (Osipow, 1973).

3. Stockin used four levels possibly over-simplifying the actual American occupational structure.

Fortner (1970) has conducted a study of the level hierarchy using a sample of 400 junior and senior high school women. Using IO, the Sim's occupational rating scale as measures of self-evaluation, and Wage Earner's Occupational level to predict level of choice, she found a positive relationship between predicted and actual level of occupational choice.

In a major revision of her personality theory of career choice Roe and Klos (1969) have modified the cylindrical model of occupational field and level. The resulting Conical model depicts the notion that at lower occupational levels, occupations are psychologically more similar than at higher levels (Osipow, 1973). The cone shaped model is illustrated below.
This modification of Roe's theory bears directly on the level hierarchy notion in Holland's work. The practical implication is that at low level jobs, the environment and type of occupation may be of lesser importance (i.e., "a sweeper in a lab does not have psychological experiences very distinctive from a clean up man in an artist's studio, though the scientist and the artist inhabit very different psychological environments" (Osipow, 1973). The implications of such a proposition for a sample of employed adults in any sample are far reaching.

In summary, the results of these studies taken together provide some support for the existence of a level hierarchy. Unlike the Stockin study, however, the addition of self-evaluation in the Fortner (1970) study did not substantially improve accuracy of prediction. This may be attributed in part to the use of a female sample.
Other studies not directly testing the level hierarchy have provided strong support for it (Hughes, 1972), and while Holland (1973) devotes minimal attention to the concept, results from these studies, and other theories suggest considerable importance for this concept in the theory. A related study (Barnett, 1975) suggests that for girls, high level or prestigious occupations may in fact be negatively valued as a result of early social learnings. This is in contrast with boys for whom prestigious occupations are positively valued.

C. Working Samples

Recently, more than 15 studies have appeared in the literature dealing with the validity of Holland's theory with employed adults. These studies can be roughly divided into studies of employed men (Osipow, 1970; Lacey, 1971; Gaffey and Walsh, 1974; Fishburne and Walsh, 1976; Hughes, 1971, 1972; Gilbride, 1973; O'Brien and Walsh, 1976), employed women (Werner, 1969; Harvey and Winfield, 1973; Horton and Walsh, in press); and mixed samples (Morrison and Arnold, 1974). These studies are reviewed here in text and tabular form.

Employed men—One of the pioneering studies of the application and extension of Holland's theory to a working sample, Osipow (1970) explored personality type as defined by the VPI within the occupational environment of religious careers. Osipow asked clergymen and seminary students to respond to the VPI and a work-role checklist; this list contained eight roles which had been identified with one of the following Holland categories: Artistic, Social, Investigative, Enterprising, and Conventional. The roles were administrator, preacher, scholar,
counselor, evangelist, social reformer, teacher, artist, and musician. VPI high point codes of the respondents were then compared to their work role, and on this basis, while there was no relationship between work roles and Holland categories. The most accurate prediction was that practitioners were most likely to have a social orientation which is consistent with Holland's theory.

Lacey (1971) investigated the concurrent validity of Holland's theory for employed college graduates, using the VPI as well as the pattern of needs associated with occupations exemplifying each of Holland's six vocational types. He chose his sample from eight occupational areas representing Holland's six personality orientations, 1) Realistic—project engineers; 2) Investigative—research chemists and computer programmers; 3) Social—high school teachers; 4) Conventional—actuaries; 5) Enterprising—bank executives and insurance company executives; and 6) Artistic—college English professors and music teachers. Each subject took the VPI, and the mean scores of the persons in each of the six categories were computed for all categories. A one-way analysis of variance revealed that five scales (Investigative, Artistic, Social, Enterprising, and Conventional) significantly differentiated the eight occupational groups. The chemist, high school teacher, actuary, college English/music professor groups had the highest mean score in their corresponding personal orientation category; however, engineers and bank and insurance executives did not. Computer programmers who should have scored high on the Investigative scale, as did research chemists, fell behind engineers, actuaries and college
English/music professors. On the nonvocational scales, the masculinity and status scales significantly differentiated the groups and did so in accordance with Holland's theory. Lacey concluded that the vocational scales, except the Realistic, discriminated the eight vocational groups according to Holland's vocational personality models, and that the data evidenced convincing support for the concurrent validity of Holland's theory.

A sample of 400 National Guardsmen were classified using the Holland’s Occupational Classification Booklet (Holland, 1970), and were assigned to one of three levels according to Roe's (1956) Classification. In this study Hughes (1972) tested the hypothesis that employed men possess the personality orientation appropriate to their job. Subjects took the VPI, SVIB, Cattell System Personality Factor (ICPF), a self-rating personality scale. The Quick Word Intelligence Test (QW), the Sims Occupational Rating Scale and a personal information sheet. Results indicated that agreement between personality orientation and employment ranged from 14% to 42%. Results further indicated that Ss did not rate themselves consistent with theoretical predictions with regard to personality. Of the hypotheses tested, the level hypothesis yielded the most positive results. Using additive values of intelligence and self-evaluation, there were 55% correct predictions between predicted and actual level. Thus the results of this study yield little support for the application of Holland's theory in a working population, but the occupational level predictions are clearly supported.
Four recent studies by Walsh and his associates have investigated the concurrent validity of Holland's theory using samples of employed men and women and the VPI and SDS as operational measures (Gaffey and Walsh, 1974; Fishburne and Walsh, 1974; O'Brien and Walsh, in press; and Horton and Walsh, submitted).

Using the SDS and the VPI and the Holland Scales, set I and set II (Campbell and Holland, 1972). Gaffey and Walsh (1974) tested a sample of 153 male workers from eight different occupational environments, and representing each of Holland's six occupational types as defined by their current occupation. Results indicated that five scales of the VPI and the Holland Scales (set I and set II) (Investigative, Social, Conventional, Enterprising and Artistic) and four scales of the SDS successfully differentiated the occupational groups within the framework of Holland's theory. All correlations between same named scales on all four inventories were significant.

The results of this study taken in conjunction with Lacey, 1971 were interpreted as supportive of the concurrent validity of Holland's theory for male workers in different vocational groups. "The evidence strengthens the assumption (Holland, 1973) that types may be assessed by any of the methods used here with about equal results for research and practical purposes" (Gaffey and Walsh, 1974). Some limitations regarding high scale inter-correlations were discussed, and adjusted for in the remainder of the series.
A second study collected data on a more restricted sample to investigate the concurrent validity of Holland's theory for a noncollege-degreed sample of employed men (Fishburne and Walsh, 1976). 126 male workers representing the six Holland environments took the SDS and the VPI. In this study, the majority of the sample had no college education, and none had more than 2 years. Occupations sampled were clearly at a low position in terms of occupational level and educational requirements for the occupation (Holland, 1972). Results of the study indicated that 2 scales of the VPI (Artistic and Conventional) and four scales of the SDS (Investigative, Artistic, Social, and Conventional) successfully differentiated the occupational groups within the context of Holland's theoretical framework. Discussion of the results combined with the results of Gaffey and Walsh (1974) suggested:

1) Further support for the use of Holland's conceptual framework with employed men. 2) The possible superiority of the SDS over the VPI with non-degreed workers. 3) Some implications of the use of the Roe-Klos revision of Ann Roe's theory (Roe and Klos, 1969) as a possible explanation of the low level of support for the VPI with a non-degreed sample. In general, the results of the study were seen as supportive of Holland's theoretical predictions.

O'Brien and Walsh (1976) in another investigation of the concurrent validity of Holland's theory and instrumentation for a working sample used the VPI and the SDS with 121 black male workers who were non-degreed and had completed no more than two years of college. Ss from each of Holland's six occupational environments were collected:
Realistic - maintenance men (n=20); Investigative - x-ray technicians and laboratory technicians (n=16); Artistic - musicians and entertainers (n=16); Social - youth leaders (n=21); Enterprising - salespersons (n=18); and Conventional - inventory clerks (n=30).

An inter-occupational group analysis using multivariate and univariate analysis of variance with post hoc analyses indicated that four of the VPI scales (Realistic, Artistic, Enterprising, and Conventional), and five of the SDS scales (Realistic, Investigative, Artistic, Enterprising and Conventional) identified occupational groups consistent with Holland's theoretical predictions. Additionally the SDS scales more frequently identified specific occupational group differences. In general, the results were seen as supportive of the meaningfulness of Holland's theory for employed non-college degreed black men.

In a final indirect test of occupational level and the validity of Holland's theory with non-professional workers (Morrison and Arnold, 1974), 268 male workers employed at a remote raw materials extracting plant were tested. All Ss were in Realistic Occupations, in four departments of the plant; a) laboratory, b) process, c) extraction, and d) mining. Subjects took a catalogue of Life History Items (Clennon, Albright and Owens, 1966), and it was hypothesized that if realistic subjects are similar in personality to each other, there would be no difference between departments on nine personality traits as measured by the questionnaire. Results were mixed. There were few differences among departments on three traits (non-aesthetic, unsocial, and self-abasing), but on the remaining five traits (concrete, dependent, less
responsible, masculine and intellectual traits), there were clear and consistent differences among departments. The authors conclude that data from non-professional occupations should be used to revise and test Holland's classifications. Results, however, should be interpreted with caution since type equivalence is questionable among departments, and 1st letter code only was used to classify the types.

**Employed women**—If few studies have been conducted on samples of employed males, the situation becomes even worse for samples of employed women. Werner (1969) administered the VPI and the Employed Women's Questionnaire, a self-developed instrument using questions regarding role choice and job satisfaction from Holland's earlier studies (Holland, 1963) to a total of 348 women representing the six personality types described by Holland. These women held jobs as production workers (Realistic), research scientists and technicians (intellectual) teachers (Social), bank employees (Conventional), professional managerial or supervisory persons (Enterprising), and commercial artists, interior decorators and writers (Artistic). A variety of statistical techniques were employed depending on the hypothesis in question. The results showed that while all but 45 of the subjects had VPI profiles congruent with Holland's theoretical hypotheses, effects of homogeneity, consistency, congruence and role choice when analyzed individually upon the achievement and the satisfaction of the participants were not generally significant, with some very moderate and individual exceptions. When taken together, however, they were able to provide confirmation of Holland's constructs regarding employment adjustment.
In a study of the validity of Holland's theory for adult women, Harvey and Winfield (1973) took a sample of 61 women enrolled in an adult testing and guidance program. The mean age of the sample was 40.7 years and they were mixed with regard to educational level, number of years of employment, marital status and socioeconomic status. Ss took the VPI and four criterion tests: The Strong Vocational Interest Blank for women (SVIP-W), the Edwards Personal Preference Schedule (EPPS), The Allport Vernon Lindzey Study of Values (SOV) and the Differential Aptitude Test (DAT).

Pearson Product Moment Correlations were computed for all scales of the VPI and Criterion Tests. Results indicated positive correlations with criterion tests in predicted directions for the Intellectual Conventional and Enterprising types. For the Realistic, Social and Artistic categories, a number of significant relationships was found, but a larger number of expected relationships were not found. The authors interpreted this result as supportive of some of the constructs in Holland's theory for women. The restrictive nature of the sample, and procedures for defining types, however suggest considerable caution in interpreting these results. While this is an informative study, it is far from definitive, and generalizations are tenuous.

A fourth study by Walsh and his associates extended research efforts to college degreeed working women (Horton and Walsh, in press) 179 women workers in occupational environments consistent with Holland's six types took the VPI and the SDS. All Ss had completed at least
four years of college and received a minimum of a bachelors degree. They had been employed an average of 14.3 years. Ss were Realistic - engineers (n=41); Investigative - physicians (n=38); Artistic - architects (n=25); Social - ministers (n=20); Enterprising - lawyers (n=32); and Conventional - certified public accountants (n=23). Results of univariate ANOVA and post hoc analysis indicated that four scales on the VPI (Realistic, Artistic, Social, and Conventional) identified occupational groups (engineers, architects, ministers, and accountants) consistent with Holland's theoretical notions. Additionally, four scales of the SDS (Artistic, Social, Enterprising and Conventional) identified occupational groups (architects, ministers, lawyers, and accountants) consistent with Holland's theoretical thinking (Horton and Walsh, submitted). It is interesting to note that the F magnitudes for the SDS were consistently larger in the expected direction than for the VPI. The results were interpreted by the authors as supportive of the concurrent validity of Holland's theoretical predictions and the use of Holland's instrumentation for college degreed working women.

Finally, two recent studies have compared male and females (Prediger and Hanson, 1976; Walsh, Horton, and Gaffey, submitted). Prediger and Hanson compared 19,939 males and 19,096 females in the same 104 occupations using raw score and standard score methods for computing Holland Codes Data from the Project Talent Study, SVIB, and VPI data. Findings indicate numerous occupations for which the Holland Codes of men and women differ. They indicate that in traditional male occupations women receive S and A codes more frequently than men, and relatively few women receive I, R, and E codes when raw data are
used. The results using standard score data are more in line with Holland's theoretical predictions. The authors seriously question the use of raw score data, and suggest revisions in Holland's instrumentation in terms of standard scores, to maintain theoretical integrity.

Walsh, Horton and Gaffey (submitted) compared 165 males and females in occupations (engineering, medicine, ministry) corresponding to Holland's Realistic, Investigative, and Social occupational environments. Using multivariate analysis of variance, Walsh compared all men and all women and found differences, $F=4.78 \ p < .001$, across the scales. There were also differences between all subjects in the three occupational types $F=9.11 \ p < .001$. No differences were found for men and women within the same occupation, $F=.80$, NS.

A secondary analysis indicated that men and women across groups differed on the Investigative scale of the VPI and the Realistic and Social scales of the SDS, even though men and women within the same occupation were not significantly different (i.e., men vs. women engineers for any scale). The results are seen as nonsupportive of the sex restrictiveness of raw score data from the VPI and the SDS. While the results of the Prediger and Hanson study and the Walsh et al., study differ markedly, the Walsh study examines a working sample as opposed to a college sample.

D. Summary

As Osipow (1973) has pointed out, "with respect to the research testing it, the record of Holland's theory is extremely good" (page 77). As indicated in this review, there is sufficient evidence and precedent
for the validity and use of the VPI in a high school and college population. The SDS is still in its beginning stages, and while it may have some validity, its utility has yet to be convincingly demonstrated. Recent studies of working samples conducted by Walsh and his associates, suggests some validity with working samples. While the data on the level hierarchy is scant, it is convincing in its affirmation of the existence of a level effect that in part is the result of intelligence and self-evaluation. Thus it seems reasonable to cast the results of studies of working samples in the light of occupational level.

It could be concluded from an examination of the investigations of working samples, that those which mix occupational levels, and those which have investigated the lower occupational levels have achieved the poorest results (see Table 2), and further that two variables of reasonable importance in studies of working samples may be sex and occupational level. While it might be hypothesized that racial differences might account for variance in validity of the instruments, most studies to date prove this not to be the case (O'Brien and Walsh, 1976; Wakefield et al., 1975; Yom et al., 1975), even though blacks may tend to make more social responses than whites (Kimball and Sedlacek, 1973). While there is evidence for a structure for women that is similar to that for men (Cole, 1973), there is also evidence for the predictive validity of the VPI and SDS for women (Gottfredson and Holland, 1975). There is also evidence that women respond differently from men with regard to Holland's instrumentation (Gottfredson, in press; Prediger and Hanson, 1976; Walsh, Horton, and Gaffey, submitted), and further that women may tend not to choose prestigious occupations due
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Sample</th>
<th>Occupational Level</th>
<th>Valid SDS Scales</th>
<th>Valid VPI Scales</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osipow, 1970</td>
<td>Clergy</td>
<td>High</td>
<td>N/A</td>
<td>S</td>
<td>Mixed</td>
</tr>
<tr>
<td>Lacey, 1971</td>
<td>Employed Men</td>
<td>High</td>
<td>N/A</td>
<td>ISCEA</td>
<td>Positive</td>
</tr>
<tr>
<td>Werner, 1969</td>
<td>Employed Women</td>
<td>Mixed</td>
<td>N/A</td>
<td>N/A</td>
<td>Positive</td>
</tr>
<tr>
<td>Hughes, 1972</td>
<td>Employed Men</td>
<td>Mixed</td>
<td>N/A</td>
<td>ICE</td>
<td>Mixed</td>
</tr>
<tr>
<td>Harvey and Winfield, 1973</td>
<td>Employed Women</td>
<td>Mixed</td>
<td>N/A</td>
<td>ICE</td>
<td>Mixed</td>
</tr>
<tr>
<td>Gilbride, 1973</td>
<td>Clergy</td>
<td>High</td>
<td>N/A</td>
<td>Mixed</td>
<td>Mixed</td>
</tr>
<tr>
<td>Morrison and Arnold, 1974</td>
<td>Employed Men</td>
<td>Low</td>
<td>N/A</td>
<td>R</td>
<td>Mixed</td>
</tr>
<tr>
<td>Gaffey and Walsh, 1974</td>
<td>Employed Men</td>
<td>Mixed</td>
<td>RISCEA</td>
<td>Mixed</td>
<td>Positive</td>
</tr>
<tr>
<td>O'Brien and Walsh, 1976</td>
<td>Black Employed Men</td>
<td>Low</td>
<td>RIAEC</td>
<td>RAEC</td>
<td>Positive</td>
</tr>
<tr>
<td>Fishburne and Walsh, 1976</td>
<td>Employed Men</td>
<td>Low</td>
<td>IASC</td>
<td>AC</td>
<td>Mixed</td>
</tr>
<tr>
<td>Horton and Walsh, in press</td>
<td>Employed Women</td>
<td>High</td>
<td>ASEC</td>
<td>RASC</td>
<td>Positive</td>
</tr>
</tbody>
</table>
to negative social conditioning (Barnett, 1975; Brown, 1972). Thus information about women with regard to occupational level is sketchy at best, and contradictory at worst.

This study will investigate the variables of occupational level and sex with regard to the concurrent validity of Holland's theory in a working sample.
CHAPTER III

METHODOLOGY

The main purpose of this study was to investigate the relationship between occupational level, sex, and the concurrent validity of two instruments designed to measure Holland's types, in a sample of Enterprise adults.

Sample

Subjects (Ss) were taken voluntarily from occupations with ES Holland codes from the Occupations Finder (Holland, 1972). Ss were either male or female, and in an occupation requiring College Education and listed as level 5 in the Occupations Finder (High occupational level), or an occupation requiring no college education and listed as level 3 in the Occupations Finder.

A total of 84 Ss were tested, with 19 male Insurance Managers (high male) in group I, 23 Male Route Salespersons in Group II (low male), 24 female Insurance Managers in Group III, and 18 female Route Salespersons in Group IV, total N=84. All subjects were drawn from occupations with ES environmental types to insure equivalency of groups. Subjects ranged in age from 21-67, and were employed in the occupation for a minimum of one year (see Appendix A). While the majority of the sample was drawn from Columbus, Ohio, Ss were also drawn from Michigan, Nebraska, New York, Florida, Indiana, Kentucky and other cities in Ohio.
Two hundred and sixteen questionnaires were distributed to volunteer subjects. Of this number, 84 were included in the study. A total of 132 sets of questionnaires were not returned. Forty were retained by the Vice-President of a major insurance company, 7 were returned incomplete, 17 were returned by subjects clearly inappropriate to this sample (i.e., secretaries), 5 were returned by subjects who were not full-time employees, 3 were returned too late to be included in the study.

**Instruments**

All Ss took the Vocational Preference Inventory (VPI) (Holland, 1965), The Self Directed Search (SDS) (Holland, 1970), and a brief Biodata Questionnaire developed for the study (see Appendix A).

The Vocational Preference Inventory (VPI) is a Personality Inventory very intimately tied to vocational interests (Osipow, 1973). The VPI consists of a list of 160 occupational titles. Respondents indicate like or dislike preferences for each of the 160 titles, and indifferent responses are indicated by no response. The VPI has 11 scaled scores: Realistic, Investigative, Artistic, Social, Enterprising, Conventional, Self-Control, Masculinity, Status, Infrequency, and Acquiescence. The first six scales represent operational definitions of the six personal orientations as described in Holland's major theoretical statements (Holland, 1966; 1973). Each of the first six scales consists of fourteen non-overlapping items, as do the Self-Control, Masculinity, and Status scales. The Infrequency scale consists of 20 items, and the Acquiescence scale 30 times.
The VPI was developed with the underlying rationale that people hold occupational stereotypes that they will project onto the occupational titles when responding to the inventory, and further, that these stereotypes are valid and will yield important information about a person's interests and personality as well. The VPI yields six personal orientation scores which when taken together represent that person's pattern of resemblance to each of the hypothesized types.

Reliability data for internal consistency, and test-retest reliability (six weeks and four years) are presented in the VPI manual (Holland, 1965). Data reported on a sample of 6,289 male college freshmen yielded reliability coefficients (Kuder Richardson 21) measuring internal consistency for each of the first six scales: Realistic .85, Investigative .89, Artistic .88, Social .84, Enterprising .83, and Conventional .87. Six weeks test-retest reliabilities for a sample of 17 male and female college seniors were as follows: Realistic .92, Investigative .83, Artistic .98, Social .79, Enterprising .78, Conventional .74. A one year test retest interval yielded coefficients ranging from .41 to .61 for college men and from .21 to .56 for college women.

Concurrent and predictive validity has been demonstrated using four empirical approaches (Walsh, 1973):


2. Concurrent validity studies of the VPI to differentiate various groups (Holland, 1965, O'Brien and Walsh, in press; Fishburne and Walsh, in press; Horton and Walsh, submitted; Lacey, 1971; Caffey and Walsh, 1974).
3. Self-ratings on traits purported to be measured by the VPI scales.

4. Associations of the VPI with various external criteria.

As summarized by Walsh, the results of the validity studies taken together tend to support the interpretations attributed to the scales and lend some support to the rationale underlying the development of the Inventory.

The SDS (Holland, 1970) is a self-administered vocational exploration planning and assessment instrument developed as an extension of the VPI. The SDS consists of two booklets. The first is an assessment booklet, and the second is the Occupations Finder. The respondent answers five separate subsections in the assessment booklet and calculates a three-letter summary code representing the respondent's resemblance to the six personal orientations. In addition to the occupational titles utilized in the VPI, the SDS also measures personal orientation using like and dislike responses to activities, competencies, and ability self-ratings. Three-letter dream codes are also assigned to previous and current occupational daydreams or aspirations. The assessment booklet is accompanied by an Occupations Finder which is used to locate occupational possibilities consistent with the respondent's three-point code type. The component parts or subsections of the SDS are as follows:

**Occupational Daydreams** - An open-ended question asking the respondent to list and code past and present occupational daydreams.

**Activities** - Six scales corresponding to the six personal orientations and consisting of eleven items each, to which the respondent indicates his preferences.
Competencies - Six scales corresponding to the six personal orientations and consisting of eleven items each to which the respondent indicates his skills.

Occupations - Six scales corresponding to the six personal orientations and consisting of fourteen items each, to which the respondent indicates his preference (like, dislike, or no response indicating indifference).

Self-Ratings - Two sets of six scales corresponding to the six personal orientations. On the first set, the respondent rates himself on mechanical, scientific, artistic, teaching, sales and clerical ability. On the second set he rates himself on mechanical skills, mathematic ability, musical ability, friendliness, managerial skill, and office skills (Edwards and Whitney, 1972).

Holland (1970) reports (internal consistency) reliability coefficients (Kuder Richardson 21) ranging from .63 to .84 for males and .53 to .79 for females on the Activities subsection. For the Competencies subsection coefficients ranged from .69 to .83 for males and from .65 to .75 for females. Reliabilities on the Occupations section ranged from .77 to .88 (males) and from .75 to .85 (females). Two test-retest reliability studies on the SDS are reported (Holland, 1970) that indicate coefficients that range from .31 to .87 for a sample of high school males, and from .44 to .78 for high school females for a three to four week interval, and from .60 to .84 for a mixed college sample using a ten month interval.

Procedure

The packets were sent to the subjects or a liaison person in the environments in which they worked. In most cases, a postcard requesting their participation preceded the packet of instruments. Ss were asked to complete the questionnaire in confidence, and were offered a summary of their results if desired. A follow-up letter was sent where possible
and all instruments were coded to avoid confusion. Completed packets were returned in a self-addressed stamped envelope provided.

Hypotheses

Based on theoretical predictions, and previous research on occupational level (Schutz and Blocker, 1961; Stockin, 1964; Fortner, 1970) and on comparisons between men and women (Walsh, Horton and Gaffey, submitted; Cole, 1973; Prediger and Hanson, 1976) and research using samples of employed adults (Osipow, 1970; Lacey, 1971; Gaffey and Walsh, 1973; Fishburne and Walsh, 1976; O'Brien and Walsh, 1976), several expected results can be stated in the form of hypotheses.

Hypothesis #1. There are no group differences attributable to Occupational Level on the Realistic, Investigative, Social, Artistic or Conventional scales of the Vocational Preference Inventory or the Self-Directed Search.

Hypothesis #2. There are no group differences attributable to Sex on the Realistic Investigative, Social, Artistic or Conventional scales of the Vocational Preference Inventory or the Self-Directed Search.

Hypothesis #3. There are no group differences in differentiation scores for the Vocational Preference Inventory or the Self-Directed Search.

Hypothesis #4. Males tend to score higher than females on the masculinity scale of the Vocational Preference Inventory.
Hypothesis #5. High Occupational Level subjects tend to score higher than Low Occupational Level Ss on the Status scale of the Vocational Preference Inventory.

Hypothesis #6. There are no differences between groups attributable to Occupational Level or Sex on the Self-Control, Infrequency or Acquiescence scales.

Hypothesis #7. The same-named scales across both inventories are significantly related for the entire sample.
CHAPTER IV

RESULTS

This chapter is divided into three sections. The first section presents the results and analyses using data from the Vocational Preference Inventory, the second section presents the results of analyses using the Self-Directed Search data, and the last section presents the same named scale comparisons, differentiation and consistency data. Each section will be further subdivided to present information regarding occupational level and sex, the two major variables under investigation.

The Vocational Preference Inventory

Table 3 presents the means and standard deviations for each of the four subject groups on each of the eleven scales of the Vocational Preference Inventory.

Occupational Level. The multivariate analysis of variance (MANOVA) for the main effect of Occupational Level for the eleven scales of the Vocational Preference Inventory was not found to be significant, \( F=1.12, p < .359 \). The univariate analysis between the high and low occupational levels produced only one significant \( F \) for the Masculinity scale at the .05 level (see Table 4), thus supporting the first hypothesis of no differences between high and low occupational levels.
<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Realistic</th>
<th>Investigative</th>
<th>Artistic</th>
<th>Social</th>
<th>Enterprising</th>
<th>Conventional</th>
<th>Self-Control</th>
<th>Masculinity</th>
<th>Femininity</th>
<th>Status</th>
<th>Infrequency</th>
<th>Acquiescence</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>19</td>
<td>Mean</td>
<td>3.11</td>
<td>3.05</td>
<td>4.68</td>
<td>3.32</td>
<td>8.95</td>
<td>2.58</td>
<td>9.16</td>
<td>8.84</td>
<td>9.26</td>
<td>4.89</td>
<td>11.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>3.31</td>
<td>3.73</td>
<td>4.26</td>
<td>3.74</td>
<td>2.27</td>
<td>2.17</td>
<td>3.27</td>
<td>2.27</td>
<td>2.42</td>
<td>2.62</td>
<td>3.83</td>
</tr>
<tr>
<td>II</td>
<td>23</td>
<td>Mean</td>
<td>3.52</td>
<td>3.04</td>
<td>3.39</td>
<td>3.17</td>
<td>6.91</td>
<td>2.43</td>
<td>8.70</td>
<td>8.09</td>
<td>7.70</td>
<td>5.22</td>
<td>9.48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>3.70</td>
<td>4.25</td>
<td>3.58</td>
<td>3.26</td>
<td>2.98</td>
<td>2.19</td>
<td>4.26</td>
<td>2.95</td>
<td>3.07</td>
<td>2.76</td>
<td>4.82</td>
</tr>
<tr>
<td>III</td>
<td>24</td>
<td>Mean</td>
<td>1.33</td>
<td>3.71</td>
<td>4.58</td>
<td>4.25</td>
<td>6.00</td>
<td>4.08</td>
<td>11.71</td>
<td>6.21</td>
<td>9.33</td>
<td>6.96</td>
<td>9.46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>1.52</td>
<td>4.04</td>
<td>4.62</td>
<td>3.65</td>
<td>2.95</td>
<td>2.87</td>
<td>3.26</td>
<td>2.36</td>
<td>1.74</td>
<td>2.51</td>
<td>3.89</td>
</tr>
<tr>
<td>IV</td>
<td>18</td>
<td>Mean</td>
<td>1.56</td>
<td>2.83</td>
<td>4.94</td>
<td>5.39</td>
<td>6.61</td>
<td>4.17</td>
<td>10.56</td>
<td>4.56</td>
<td>9.56</td>
<td>8.50</td>
<td>10.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>2.31</td>
<td>3.99</td>
<td>4.76</td>
<td>3.27</td>
<td>3.87</td>
<td>3.82</td>
<td>2.66</td>
<td>2.23</td>
<td>2.66</td>
<td>3.13</td>
<td>5.97</td>
</tr>
</tbody>
</table>
TABLE 4
Summary of Univariate F Values for the 11 Scales of the Vocational Preference Inventory

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sex</th>
<th>Occupational Level</th>
<th>SXOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>9.46**</td>
<td>.26</td>
<td>.02</td>
</tr>
<tr>
<td>Investigative</td>
<td>.11</td>
<td>.25</td>
<td>.24</td>
</tr>
<tr>
<td>Artistic</td>
<td>.66</td>
<td>.25</td>
<td>.76</td>
</tr>
<tr>
<td>Social</td>
<td>3.88*</td>
<td>.41</td>
<td>.70</td>
</tr>
<tr>
<td>Enterprising</td>
<td>5.58*</td>
<td>1.15</td>
<td>3.90*</td>
</tr>
<tr>
<td>Conventional</td>
<td>7.01**</td>
<td>.00</td>
<td>.03</td>
</tr>
<tr>
<td>Self-Control</td>
<td>9.37**</td>
<td>1.12</td>
<td>.21</td>
</tr>
<tr>
<td>Masculinity</td>
<td>29.01***</td>
<td>4.81*</td>
<td>.67</td>
</tr>
<tr>
<td>Status</td>
<td>3.51</td>
<td>1.51</td>
<td>2.64</td>
</tr>
<tr>
<td>Infrequency</td>
<td>18.08***</td>
<td>2.37</td>
<td>1.02</td>
</tr>
<tr>
<td>Acquiescence</td>
<td>.32</td>
<td>.34</td>
<td>1.90</td>
</tr>
</tbody>
</table>

* p<.05
** p<.01
*** p<.001
However, these findings tend not to support Hypothesis #5. High occupational level subjects tend not to score higher than low occupational level subjects on the Status scale of the VPI.

**Sex.** The multivariate F test for the main effect of sex for the eleven scales of the Vocational Preference Inventory was found to be highly significant, $F=7.00, p<.001$. In the univariate analysis between male and female groups, seven of the eleven tests were significant; two at the .05 level (Social and Enterprising) three at the $p<.01$ level (Realistic, Conventional, and Self-Control) and two at the $p<.001$ level (Masculinity and Infrequency) (see Table 4). These results support Hypothesis #4, but provide no support for Hypothesis #2 and #6.

**Interaction.** The multivariate test for the interaction effect between occupational level and sex, was found to be non-significant, $F=1.8, p<.317$. Only one of the eleven univariate F tests proved significant (Enterprising) $F=3.897, p<.05$. In order to locate more specific differences on significant scales, a secondary analysis was performed using the Tukey(b) test (see Table 5).

**Secondary Analysis.** In the secondary analysis on the Realistic scale the male Route Salespersons scored the highest and were found to be significantly different from the female Insurance Managers, $p<.05$ (see Table 6). On the Enterprising scale, male Insurance Managers scored the highest, and were significantly differentiated from the female Insurance Managers $p<.05$. The interaction effect is not suggested by post hoc comparisons, but examination of the means suggests a tendency
TABLE 5

Summary of the Secondary Tukey(b) Analysis for Significant Vocational Preference Inventory Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>p&lt;.05</th>
<th>p&lt;.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>Low Male - High Female</td>
<td></td>
</tr>
<tr>
<td>Enterprising</td>
<td>High Male - High Female</td>
<td></td>
</tr>
<tr>
<td>Self-Control</td>
<td>Low Male - High Female</td>
<td></td>
</tr>
<tr>
<td>Masculinity</td>
<td>High Male - High Female</td>
<td>High Male - Low Female</td>
</tr>
<tr>
<td></td>
<td>High Male - Low Female</td>
<td>High Male - High Female</td>
</tr>
<tr>
<td></td>
<td>Low Male - High Female</td>
<td>Low Male - Low Male</td>
</tr>
<tr>
<td></td>
<td>Low Male - Low Female</td>
<td>Low Male - Low Female</td>
</tr>
<tr>
<td>Infrequency</td>
<td>High Female - Low Female</td>
<td>High Female - Low Female</td>
</tr>
<tr>
<td></td>
<td>Low Male - Low Female</td>
<td>Low Male - Low Female</td>
</tr>
</tbody>
</table>

for high occupational level subjects to score higher than low occupational level subjects within the male subject groups. On the Self-Control scale, female Insurance Managers scored the highest and their group was significantly (p<.05) differentiated from the male Route Salespersons. Similarly, on the masculinity scale the male Insurance Managers scored the highest (most masculine) and the female Route Salespersons scored the lowest. All possible comparisons for this scale were significant at p<.05 level. At the p<.01 level, Male Insurance Managers, female Insurance Managers, and male Route Salespersons scored higher than female Route Salespersons. The rank order for all group means on each of the eleven VPI scales is presented in Table 6.
TABLE 6

Rank Order of the Mean Scores for the 11 Scales of the Vocational Preference Inventory by Subject Group

<table>
<thead>
<tr>
<th>Group</th>
<th>R</th>
<th>I</th>
<th>A</th>
<th>S</th>
<th>E</th>
<th>C</th>
<th>Self-Control</th>
<th>M-F</th>
<th>Status</th>
<th>Infrequency</th>
<th>Acquiescence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Insurance Managers</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Male Route Salespersons</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Female Insurance Managers</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Female Route Salespersons</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The Self-Directed Search

Table 7 presents the means and standard deviations for the six scales of the Self-Directed Search for each of the four subject groups.

Occupational Level. The results of a multivariate analysis of variance across the six scales for the main effect of Occupational Level was not found to be significant, F=1.200 p<.316. Of the six univariate F tests between high and low occupational level subjects, none was found to be significant. These findings tend to support the hypothesis #1 of no differences due to occupational level on the six scales of the Self-Directed Search.
### TABLE 7

Means and Standard Deviations for the Six Scales of the Self-Directed Search by Subject Group

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Realistic</th>
<th>Investigative</th>
<th>Artistic</th>
<th>Social</th>
<th>Enterprising</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>19</td>
<td>Mean</td>
<td>3.53</td>
<td>2.84</td>
<td>1.95</td>
<td>7.52</td>
<td>12.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>3.66</td>
<td>2.99</td>
<td>2.22</td>
<td>3.72</td>
<td>2.20</td>
</tr>
<tr>
<td>II</td>
<td>23</td>
<td>Mean</td>
<td>5.09</td>
<td>3.26</td>
<td>1.78</td>
<td>7.04</td>
<td>10.61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>4.54</td>
<td>3.90</td>
<td>2.09</td>
<td>3.40</td>
<td>2.94</td>
</tr>
<tr>
<td>III</td>
<td>24</td>
<td>Mean</td>
<td>0.75</td>
<td>2.54</td>
<td>3.29</td>
<td>9.33</td>
<td>8.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>1.15</td>
<td>3.09</td>
<td>3.79</td>
<td>2.99</td>
<td>3.54</td>
</tr>
<tr>
<td>IV</td>
<td>18</td>
<td>Mean</td>
<td>1.94</td>
<td>1.33</td>
<td>4.00</td>
<td>10.11</td>
<td>8.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>3.13</td>
<td>2.61</td>
<td>3.73</td>
<td>2.87</td>
<td>3.49</td>
</tr>
</tbody>
</table>
Sex. For the main effect of sex, the multivariate F, $F=9.85$ $p<.001$, was again found to be highly significant. Five of six univariate F tests proved significant; two at the .01 level (Artistic and Conventional) and three at .001 level (Realistic, Social and Enterprising). These results tend not to be supportive of hypothesis #2, that of no differences due to sex on the six scales of the Self-Directed Search.

Interaction. The multivariate F for the effect of the interaction between occupational groups and sex was not found to be significant, $F=.70$, $p<.652$, none of the univariate tests was found to be significant ($p<.05$) (see Table 8).

TABLE 8
Summary of Univariate F Values for the Six Scales of the Self-Directed Search

<table>
<thead>
<tr>
<th>Sex</th>
<th>Occupational Level</th>
<th>SXOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>18.32***</td>
<td>3.53</td>
</tr>
<tr>
<td>Investigative</td>
<td>2.22</td>
<td>.30</td>
</tr>
<tr>
<td>Artistic</td>
<td>6.75**</td>
<td>.16</td>
</tr>
<tr>
<td>Social</td>
<td>11.45***</td>
<td>.04</td>
</tr>
<tr>
<td>Enterprising</td>
<td>15.51***</td>
<td>1.24</td>
</tr>
<tr>
<td>Conventional</td>
<td>9.96**</td>
<td>1.04</td>
</tr>
</tbody>
</table>

*p<.05  
**p<.01  
***p<.001
Secondary Analyses. Again, in order to locate specific mean differences between the four groups on SDS scales found to be significant (p<.05), a secondary analysis using the Tukey(b) multiple comparisons test was performed. Four of the six scales of the Self-Directed Search were found to have significant group differences. The results of the secondary Tukey(b) multiple comparisons for all significant scales on the Self-Directed Search are summarized in Table 9. The means for all four subject groups on the six SDS scales are rank ordered and presented in Table 10.

**TABLE 9**

Summary of the Secondary Tukey(b) Analyses for Significant Self-Directed Search Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>p&lt;.05</th>
<th>p&lt;.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>Low Male - High Female</td>
<td>Low Male - High Female</td>
</tr>
<tr>
<td></td>
<td>High Male - High Female</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low Male - Low Female</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Low Male - Low Female</td>
<td></td>
</tr>
<tr>
<td>Enterprising</td>
<td>High Male - High Female</td>
<td>High Male - High Female</td>
</tr>
<tr>
<td></td>
<td>High Male - Low Female</td>
<td>High Male - Low Female</td>
</tr>
<tr>
<td>Conventional</td>
<td>Low Male - High Female</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 10

Rank Order of the Mean Scores for the Six Scales of the Self-Directed Search

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>I</th>
<th>A</th>
<th>S</th>
<th>E</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Insurance Managers</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Male Route Salespersons</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Female Insurance Managers</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Female Route Salespersons</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

The results of the secondary analysis show for the Realistic Scale, that the male Route Salespersons scored significantly higher than female Insurance Managers, the male Insurance Managers scored higher than female Insurance Managers, the than male Route Salespersons scored significantly higher than female Route Salespersons, p<.05. Additionally at the .01 level for the Realistic Scale male Route Salespersons scored higher than female Insurance Managers, p<.01. On the Social Scale, it was found that female Route Salespersons scored significantly higher than male Route Salespersons, p<.05. On the Enterprising Scale, male Insurance Managers scored the highest, their group was found to be significantly differentiated from the female Insurance Managers. Male Insurance Managers and were also found to be significantly different from the female Route Salespersons, p<.01. Finally, on the Conventional Scale, female Insurance Managers (highest mean score) were significantly differentiated from the male Route Salespersons, p<.05.
In summary, the results of secondary analysis for the significant scales of the Vocational Preference Inventory and the Self-Directed Search identified specific differences between male and female groups, and some differences attributable to Occupational level. These results did not support the hypothesis of no differences in concurrent validity due to sex (hypothesis #2) and they provide mixed support for the hypothesis of no differences attributable to Occupational Level (hypothesis #1). The next section deals with group differences (High Male, Low Male, High Female, and Low Female) on measures of differentiation, consistency or congruence, and biographical data.

**Differentiation and Congruence**

**Differentiation** Two methods of computing differentiation scores were used in this study. The first method (1-6), is computed by subtracting the lowest from the highest (raw score) of the six occupational scales. The second method (1-3) is computed by subtracting the third highest from the highest (raw score) of the six occupational scales. The means and standard deviations for the two measures of differentiation for the Vocational Preference Inventory and the Self-Directed Search are summarized in Table 11.

Once again the technique of multivariate analysis of variance was used to analyze differentiation scores. For the first index (1-6), no significance was found for the main effect of occupational level, F=1.87, p< .161, or sex, F=2.40, p< .098. The main effect for interaction was also nonsignificant, F=.07, p< .930. No univariate F tests were significant (p<.05) for this measure of differentiation.
### TABLE 11

Means and Standard Deviations for the Differentiation Scores on the Vocational Preference Inventory and the Self-Directed Search

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>VPI(1-6)</th>
<th>SDS(1-6)</th>
<th>VPI(1-3)</th>
<th>SDS(1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>19</td>
<td>9.16</td>
<td>11.47</td>
<td>5.05</td>
<td>7.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.65</td>
<td>2.55</td>
<td>2.80</td>
<td>2.58</td>
</tr>
<tr>
<td>II</td>
<td>23</td>
<td>7.96</td>
<td>11.00</td>
<td>4.52</td>
<td>6.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.95</td>
<td>2.39</td>
<td>2.29</td>
<td>2.77</td>
</tr>
<tr>
<td>III</td>
<td>24</td>
<td>8.13</td>
<td>12.33</td>
<td>4.29</td>
<td>7.29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.22</td>
<td>1.52</td>
<td>2.14</td>
<td>2.91</td>
</tr>
<tr>
<td>IV</td>
<td>18</td>
<td>7.33</td>
<td>11.67</td>
<td>3.44</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.07</td>
<td>1.46</td>
<td>2.38</td>
<td>2.17</td>
</tr>
</tbody>
</table>

An identical analysis was performed for the second measure of differentiation (1-3). The multivariate F test for the main effect of occupational level was found to be significant, F=3.22, p<.045, and univariate F tests indicated one significant result F=5.45, p<.022 for the scores on the Self-Directed Search. The multivariate F test for the main effect of sex (F=1.27, p<.286) was found to be nonsignificant (p<.05) as were univariate F tests. The F value for the interaction effect was also nonsignificant, F=.06, p<.945. Again none of the univariate Fs were found to be significant (p<.05). The results of the univariate F tests are summarized in Table 12.
TABLE 12

Summary of Univariate F Values for the Differentiation Scores on the Vocational Preference Inventory and the Self-Directed Search

<table>
<thead>
<tr>
<th>Sex</th>
<th>Occupational Level</th>
<th>SXOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPI(1-6)</td>
<td>1.20</td>
<td>2.30</td>
</tr>
<tr>
<td>SDS(1-6)</td>
<td>3.51</td>
<td>1.62*</td>
</tr>
<tr>
<td>VPI(1-3)</td>
<td>2.55</td>
<td>1.71</td>
</tr>
<tr>
<td>SDS(1-3)</td>
<td>.14</td>
<td>5.45*</td>
</tr>
</tbody>
</table>

p<.05
p<.01

A secondary analysis using Tukey(b) resulted in no significant differences for SDS differentiation measure. However, a rank ordering of the mean show that the male Insurance Managers were the highest in differentiation; then male Route Salespersons, followed by female Insurance Managers and finally female Route Salespersons.

Correlations between same-named Scales on the Vocational Preference Inventory and the Self-Directed Search

Scores for all subjects on the VPI and the SDS were intercorrelated to test the fifth hypothesis. The resulting matrix is depicted in Table 13.
### TABLE 13

Correlations of the Same-Named Scales of the Vocational Preference Inventory and the Self-Directed Search

<table>
<thead>
<tr>
<th></th>
<th>Realistic</th>
<th>Investigative</th>
<th>Artistic</th>
<th>Social</th>
<th>Enterprising</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigative</td>
<td>.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artistic</td>
<td>.34</td>
<td>.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>-.11</td>
<td>.11</td>
<td>.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enterprising</td>
<td>-.37</td>
<td>-.12</td>
<td>-.01</td>
<td>.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>-.28</td>
<td>-.24</td>
<td>-.36</td>
<td>-.15</td>
<td>-.34</td>
<td>.34</td>
</tr>
</tbody>
</table>

The correlations of the same-named scales appear on the diagonal, and range from a high of .74 for the Artistic Scale, to a low of .34 for the Conventional Scale. All six correlation coefficients were significant (p < .01) and the findings tend to support hypothesis 87.

**Subject Preferences for the VPI and the SDS**

Table 14 presents the numbers and percentages of subjects preferring the Vocational Preference Inventory and the Self-Directed Search. A superficial inspection of these data suggests preferences for the SDS.

**Congruence**

Due to the small number of observations in each subject group no systematic attempt was made to examine the congruence variable. Numbers of congruent subjects were tallied, however, and Table 15...
TABLE 14

Percentage of Subjects Responses on Preference Questions for the Vocational Preference Inventory and the Self-Directed Search

<table>
<thead>
<tr>
<th></th>
<th>High Male (1,1)</th>
<th>Low Male (1,2)</th>
<th>High Female (2,1)</th>
<th>Low Female (2,2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Ss Believing VPI most accurate</td>
<td>4</td>
<td>22.2</td>
<td>7</td>
<td>35.0</td>
</tr>
<tr>
<td>Ss Believing SDS most accurate</td>
<td>14</td>
<td>77.8</td>
<td>13</td>
<td>65.0</td>
</tr>
<tr>
<td>Ss Preferring VPI</td>
<td>3</td>
<td>16.7</td>
<td>7</td>
<td>31.8</td>
</tr>
<tr>
<td>Ss Preferring SDS</td>
<td>15</td>
<td>83.3</td>
<td>15</td>
<td>68.2</td>
</tr>
</tbody>
</table>

TABLE 15

Percentage of Congruent One and Two Letter Codes for all Subjects by Group

<table>
<thead>
<tr>
<th></th>
<th>High Male (1,1)</th>
<th>Low Male (1,2)</th>
<th>High Female (2,1)</th>
<th>Low Female (2,2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>1st Letter VPI</td>
<td>13</td>
<td>68.4</td>
<td>12</td>
<td>52.5</td>
</tr>
<tr>
<td>1st and 2nd Letter VPI</td>
<td>4</td>
<td>21.0</td>
<td>3</td>
<td>13.1</td>
</tr>
<tr>
<td>1st Letter SDS</td>
<td>15</td>
<td>78.9</td>
<td>14</td>
<td>60.1</td>
</tr>
<tr>
<td>1st and 2nd Letter SDS</td>
<td>10</td>
<td>52.6</td>
<td>11</td>
<td>47.8</td>
</tr>
</tbody>
</table>
summarizes the number and percentage of congruent profiles in each of the four subject groups. This is done first in terms of consistency with occupational code for the first letter (E), and then for the first letter (E), and then for the first two letters (ES). A causal look at the data does suggest some difference between subject groups.
CHAPTER V

DISCUSSION

This study examined the relationship of occupational level and sex to the concurrent validity of Holland's theory of vocational choice and personality in a sample of employed adults. Two instruments developed by Holland (The Vocational Preference Inventory and the Self-Directed Search) were used to examine personality type in a sample of adults employed in Enterprising (ES), occupational environments.

In this chapter, the results will be discussed in terms of theoretical statements and extant research on Holland's theory. The discussion is divided into two sections: occupational level and sex differences.

Occupational Level

With the exception of the Masculinity scale of the Vocational Preference Inventory, the results of the multivariate analyses of variance suggest no differences between groups attributable to the occupational level variable. There was a tendency for subjects at high occupational levels (Insurance Managers) to score higher than subjects at low occupational levels (Route Salespersons) on the Masculinity scale. This result is supported by the Tukey(b) post hoc analysis.
According to Holland (1970), the Masculinity scale measures a cluster of variables "including choice of occupational roles, identification with males and females, conflicts about these identifications, and some personal traits usually associated with masculinity." High scores indicate frequent choice of masculine occupational roles. Adjectives applying to high scorers include; confident, masculine, shrewd, unsociable, hardheaded, competitive, and many technical and athletic competencies. There was a strong tendency for subjects at high occupational levels to score higher than low occupational level subjects on this variable.

Additionally, the results of the MANOVA for differentiation scores suggest a tendency for high occupational level subjects to have higher differentiation scores than low occupational level subjects on the Self-Directed Search using the criterion (1-3).

These results taken together suggest that, when compared to Enterprising adults at low occupational levels, those at high occupational levels tend to be more masculine and more differentiated. These results may be seen as supportive of Holland's (1973) notion that greater congruence, consistency, and differentiation tend to be associated with higher vocational achievement. They also lend some support to the earlier notion that self-evaluation, as opposed to personality type is related to occupational level.

The absence of significant differences between high and low occupational level subjects on the six personality types is consistent with theoretical predictions from Holland's theory, but does not support the Roe and Klos (1969) notion that occupations at lower levels
are somehow psychologically different or less important than at high levels. This is of course a limited sample, and no direct test of the Roe and Klos notion is implied.

Sex

The results of the multivariate analyses of variance performed on the data suggest significant differences between the subject groups attributable to the main effect of sex, for the eleven scales of the VPI, and for the six scales of the SDS, but not on the differentiation measures. For the VPI, there were differences between men and women on seven of the eleven scales (Realistic, Social, Enterprising, Conventional, Self-Control, Masculinity, and Infrequency), for the SDS, there were differences on five of the six scales (Realistic, Artistic, Social, Enterprising, and Conventional). There were no differences attributable to the main effect of sex on the differentiation measures (1-3 or 1-6) for either the VPI or the SDS.

For the VPI, on the Realistic Scale, the low male group was higher than the high female group, as they were on the SDS. Furthermore, for the SDS both male groups scored higher than both female groups on this scale, on the Social scale, for the SDS, low females scored higher than low males, however there were no differences on the VPI.

For the Enterprising scale, the primary type identifying this occupational sample, the male groups scored higher than the female groups on the SDS, and the high male higher than high female on the VPI. Additionally on the SDS, low males scored lower than high females on the Conventional Scale. Thus, for the Realistic and Enterprising Scales,
there are significant differences between the mean scores of men and women for both inventories.

It is interesting to note the presence of an interaction effect on the Enterprising scale of the VPI. This suggests that for male groups, high level subjects score higher than low level subjects, but not for female groups.

Supplemental scales of the VPI suggest some interesting differences between men and women. While differences on the Masculinity scale were achieved in the expected directions, there were also differences between men and women on Self-Control and Infrequency. On the Self-Control scale, high women scored highest, then low female, high male and low male. According to Holland (1970), the Self-Control Scale supposedly measures several variables or qualities which are often associated with over-control of impulses, namely hypochondriasis, fear of physically dangerous activities, repression, denial and passivity. Self-Control is defined simply as the habitual inhibition of impulses to act out motivation, thinking or phantasy. Or, in the words of the man on the street, it is captured in the expression "so and so is careful, smooth," "always says the right thing," "never makes anyone mad," "stays out of trouble." The results of this scale are combined with those of the Infrequency Scale.

On the VPI Infrequency scale, low females were the highest, then high females, low males and finally high males. According to the VPI manual (Holland, 1970), the infrequency scale, in addition to functioning as a social desirability scale, appears to top a cluster of positively correlated traits, attitudes, aspirations, and deficiencies—self-
deprecation, incompetency, socially undesirable traits, and a history of personal and vocational failure. In a broad sense, this heterogeneous validity scale can be characterized as a personal effectiveness scale with high scores indicative of incompetency and low scores indicative of personal effectiveness. Female subjects scored differently on this variable than male subjects, in much the same way as on the Self-Control Scale, thus characterizing the female sample as highly controlled and personally ineffective. These results do not support hypotheses—and are contrary to theoretical expectations. Two of the six Holland scales, Realistic and Enterprising, yielded significant results for both inventories in the same direction for men and women.

Strong controversy surrounds the equivalency of vocational interests for men and women. Cole and Hanson (1973) have suggested that when women's interests are compared with those of other women, the structure is the same as that found for men. While they are careful to point out that this does not mean that there are no differences between men and women, they do provide some support for their similarity in structure. In a more recent article, Prediger and Hanson (1976) suggest that the use of raw scores to compare men and women in the same occupational sample is questionable at best.

A second series of studies by Walsh and associates suggests that the concurrent validity of the SDS and the VPI for samples of women is not that different from that of men (O'Brien and Walsh, 1976; Horton and Walsh, in press; Caffey and Walsh, 1973). A more recent study (Walsh, Horton and Gaffey, submitted) supports the idea that when men and women are compared there are some scalewise differences, but not as many as suggested by Prediger and Hanson.
In considering scale-wise differences that appear on both the VPI and the SDS, this study found differences on the R, S, E, and C scales. No group differences were found on the I and A scales. At no time were these group differences on the I scale of either instrument.

The results of studies in the area of sex differences and the use of raw versus standard scores are both conflicting and confusing. The area is a quagmire of technical and theoretical measurement problems. No clear statements can be made regarding sex differences, bias, and fairness. The present study produced results that suggest differences, but the absence of differences on the I scale are not in agreement with previous research (Prediger and Hanson, 1976). Additionally only a single two letter occupational code ES was studied. The results of Walsh and associates were derived from data from all sex types. The Prediger and Hanson finding that for occupations for which the highest male type is E, few females receive E as their first or second code letter is at least partially supported. Two critical variables necessitating further study, and not accounted for in this study is that of traditional versus non-traditional male and female occupations, and differences between college students (vocational preference) and employed adults (vocational attainment).
CHAPTER VI

SUMMARY, LIMITATIONS AND IMPLICATIONS

This study investigated the relationship between occupational level sex and the concurrent validity of Holland's theory for a sample of employed Enterprising adults. The Vocational Preference Inventory and The Self-Directed Search were administered to four groups of employed adults (N=84) in Enterprising Occupational Environments (ES). Group I was comprised of high occupational level males (Insurance Managers); Group II was comprised of low occupational level males (Route Salespersons); Group III consisted of high occupational level females (Insurance Managers) and Group IV consisted of low occupational level females (Route Salespersons). While previous research has demonstrated the validity of these instruments with employed samples, few have compared male and female samples in the same study and few have investigated the occupational level variable. Holland suggests that there should be no differences due to occupational level or sex on scales of the VPI and the SDS (Holland, 1970).

Subjects with one or more years of experience in their respective fields voluntarily responded to the Vocational Preference Inventory, the Self-Directed Search and a biodata questionnaire. Group differences were analyzed using Multivariate Analysis of Variance on the eleven scales of the VPI, the six scales of the SDS and the differentiation
scores for both inventories, and Univariate Analysis of Variance with Tukey(b) test for multiple comparisons suggest several findings.

1. There were no significant differences on the six scales of the SDS and the same scales on the VPI due to occupational level.

2. High occupational level subjects were more differentiated and more masculine than low occupational level subjects, p<.05.

3. There were significant differences (p<.05) between groups on seven of eleven scales of the Vocational Preference Inventory (Realistic, Enterprising, Self-Control, Masculinity-Femininity, and Infrequency) attributable to sex differences. Female groups were lower on Realistic and Enterprising scales and higher on Self-Control and Infrequency.

4. There were significant differences between groups (p<.05) on five of six scales of the Self-Directed Search for the main effect of sex (Realistic, Artistic, Social, Enterprising, and Conventional). Female groups scored lower on R, and E scales, and higher on A, S, and C scales.

5. The correlations between same-named scales on the VPI and the SDS were moderate to high for all six scales.
Limitations

Any conclusions drawn from this study must be considered in light of some obvious limitations. First, pending replication of these results using subjects from another occupational group, no generalizations beyond the Enterprising type seem warranted.

Second, the sample was small and represented only two Enterprising occupations. Generalizations to the larger population of working men and women or other Enterprising occupations should be made with caution.

Additionally, it is possible that the failure to achieve results due to occupational level may be due to a failure to sample subjects who were in fact at different occupational levels. The difference between level 3 and level 5 may not have been sufficient to reveal differences attributable to this variable.

Thirdly, the difficulty in locating the female sample, combined with their unusual response and biodata patterns, might suggest a very selective sample, not representative of Enterprising women.

Finally, the use of raw score data without norms adds considerably to the complexity of theoretical implications.

Implications

There are several implications for theory research and practice which, though tempered by the study's limitations, can be drawn from the results. The finding of sex differences across the Enterprising, Realistic and Conventional scales for both the VPI and the SDS is
especially interesting in view of significant interaction F for the VPI Enterprising scale; the score defining this occupation. In terms of concurrent validity, the high female group seemed less consistent, and tended to evidence unusual response patterns. The data suggest differences attributable to the sex variable, and in view of other research findings (Gottfredson, in press; Prediger and Hanson, 1976; Walsh, Horton and Gaffey, submitted) the results punctuate the need for clear tests of the case for the use of non-normative data in research and practice. In the event that the weight of research replicates these results, the theory, and in practice, the SDS should either be revised, normed, or reconsidered.

Secondly, the negative results for the occupational level variable would suggest that for the Enterprising type at least, workers at high and low occupational levels are no different, as predicted from theory. The significant difference in differentiation at high occupational levels merits further investigation as to the role of homogeneity or crystallization of interests and occupational aspiration and achievement.

In summary, the results of this investigation are supportive of Holland's notions that differences in occupational level can be incorporated within the same occupational interest structure, but indicate differences between men and women within the same occupation in terms of personality and interest pattern.
<table>
<thead>
<tr>
<th>Variable</th>
<th>High Male (1,1)</th>
<th>Low Male (1,2)</th>
<th>High Female (2,1)</th>
<th>Low Female (2,2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Mean 37.7</td>
<td>Mean 43.4</td>
<td>Mean 43.2</td>
<td>Mean 36.1</td>
</tr>
<tr>
<td></td>
<td>Range 26-56</td>
<td>Range 21-67</td>
<td>Range 26-59</td>
<td>Range 22-55</td>
</tr>
<tr>
<td>Yrs. of Education</td>
<td>Mean 15.8</td>
<td>Mean 13.5</td>
<td>Mean 13.9</td>
<td>Mean 13.7</td>
</tr>
<tr>
<td></td>
<td>Range 12-21</td>
<td>Range 11-18</td>
<td>Range 12-18</td>
<td>Range 12-17</td>
</tr>
<tr>
<td>Yrs. Employed</td>
<td>Mean 7.28</td>
<td>Mean 14.9</td>
<td>Mean 9.33</td>
<td>Mean 5.9</td>
</tr>
<tr>
<td></td>
<td>Range 1-14</td>
<td>Range 2-40</td>
<td>Range 1-26</td>
<td>Range 1-13</td>
</tr>
</tbody>
</table>
**Biographical Data Sheet**

**Age:**

**Sex:**

**Occupation:**

(please be specific)

**Number of years employed in this occupation:**

**Education:**

<table>
<thead>
<tr>
<th>Grade School</th>
<th>High School</th>
<th>College</th>
<th>Graduate or Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
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<td>11</td>
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</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(please circle highest year completed)

**High School Major:**

Graduated? yes no

**College Major:**

Graduated? yes no

**Graduate or Professional Major:**

Graduated? yes no

(please circle)

**Hobbies/Leisure Activities:**

1. __________  2. __________  3. __________

**Father's Occupation:**

(please be specific)

**Mother's Occupation:**

(please be specific)

Please Answer the next Two Questions Based on the Inventories You Took.

1. Of the two inventories I took, the one which I believe best measured my interests was: (please circle the letter of the most appropriate as it applies to you).

   A. The Vocational Preference Inventory (VPI) (Single white sheet)
   or
   B. The Self-Directed Search (SDS) (The yellow booklet)

2. Of the two inventories I took, The one I most enjoyed taking was:

   A. The Vocational Preference Inventory (VPI)
   or
   B. The Self-Directed Search (SDS)
BIBLIOGRAPHY

Astin, A. W. Classroom environment in different fields of study. Journal of Educational Psychology, 1965, 56, 275-282. (b)

_____. Distribution of students among higher educational institutions. Journal of Educational Psychology, 1964, 55, 276-287.

_____. Effect of different college environments on the vocational choices of high aptitude students. Journal of Counseling Psychology, 1965, 12, 28-34. (c)


——. Explorations of a theory of vocational choice and achievement: II. A four-year prediction study. Psychological Reports, 1963, 12, 547-594. (a)


——. Explorations of a theory of vocational choice, Part II: Self-descriptions and vocational preferences. Vocational Guidance Quarterly, 1963, 12, 17-21. (c)

——. Explorations of a theory of vocational choice, Part III: Coping behavior, competencies and vocational preferences. Vocational Guidance Quarterly, 1963, 12, 21-24. (c)

——. Explorations of a theory of vocational choice, Part IV: Vocational daydreams. Vocational Guidance Quarterly, 1963, 12, 93-97. (e)


——. The psychology of vocational choice: A theory of personality types and model environments. Waltham, Massachusetts: Blaisdell, 1966. (a)


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