AN EXAMINATION OF THE RELATIONSHIP BETWEEN
HOLLAND'S VOCATIONAL SCALES AND A
MEASURE OF INTERPERSONAL NEEDS

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Previous research has provided evidence of relationships between vocational interests and other psychological variables. Test scores from the VPI and FIRO-B for 699 white male job applicants were subjected to multiple regression analyses to determine if individual interest scales could be predicted by particular configurations of interpersonal need scales. It was hypothesized that Enterprising, Realistic, and Investigative interests would be predicted by Inclusion and Control needs and Social interests by Inclusion, Control, and Affection needs. To control for effects of sample size, a smaller sample \((n = 125)\) was randomly drawn from the original data and subjected to identical analyses. Results indicated only partial support for some hypotheses and revealed little common variance between the two domains.
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AN EXAMINATION OF THE RELATIONSHIP BETWEEN
HOLLAND'S VOCATIONAL SCALES AND A
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The use of interest inventories is widespread among professionals involved in providing career and vocational counseling, those responsible for hiring and placement decisions, and others involved in the general process of matching people with jobs. The information obtained through the use of interest inventories has generally been considered as "attempts to quantify interests or provide a score which describes a client's feelings of like or dislike . . . for varied subjective areas of interest" (Cottle, 1968, p. 30). It has also been widely recognized that occupational interests are related to other psychological variables, including personality, although the exact nature of this relationship is unclear (Costa, McCrae, & Holland, 1984; Darley & Hagenah, 1955; Holland, 1966, 1973, 1985; Strong, 1943). One dimension of personality which seems particularly relevant to vocational psychology is that of interpersonal orientation. An important question for the professional counselor, the client, and the prospective employee alike is "How does the individual relate to others?" The relevance of this question lies in the recognition that occupations vary
significantly in terms of the type and extent of interpersonal interaction required or permitted. Equally important is the observation that individuals differ from each other with regard to both their occupational preferences and modes of interacting with others. Knowledge of the relationship between vocational interests and interpersonal orientation would facilitate more intelligent and effective counseling and job choice decisions.

Interpersonal Needs

Schutz (1966) discussed interpersonal orientation in terms of needs. He has proposed that each person has interpersonal needs which are manifested in behavior and feelings toward other people. This interpersonal behavior, he suggests, is rooted in the individual’s self-concept, the feelings one has for oneself, inasmuch as self-concept is derived from relations with other people. Schutz (1966, 1971) described interpersonal needs of three types: inclusion, control, and affection. Inclusion needs are concerned with feelings about being important or significant, of having some worth, and having other people care. The behavior associated with this need involves the associations between people, belonging, being together, being excluded or included. Control needs relate to the feeling of competence in such issues as intelligence, appearance, and ability to cope with the world. Control behavior involves decision-making processes between people and the issues of power,
influence, and authority. Affection refers to needs associated with feeling lovable, of being a lovable person. Behavior associated with this need always involves dyadic relations and includes close personal emotional feelings, especially love and hate.

Vocational Interests

Regarding vocational interests, Holland (1959, 1966, 1973, 1985a) has addressed the issue within a comprehensive theory of vocational behavior. This typological theory emphasizes the relationship between vocational interests and personality. According to Holland, individuals can be described in terms of their similarity to six different models, labeled Realistic (R), Investigative (I), Social (S), Conventional (C), Enterprising (E), and Artistic (A), to denote the distinct heredity and experiences of each which lead to characteristic preferences. Specifically, it is proposed that an individual's vocational preferences are shaped throughout life by both heredity and cultural experiences. Holland (1985a) has described the Realistic person as one who prefers activities which involve the manipulation of objects, tools, machines, and animals and avoids activities requiring social competencies; Investigative persons prefer activities involving the creative investigation of scientific and cultural phenomena and avoids activities requiring persuasive and social competencies; the Artistic type prefers activities involving the manipulation of
physical, verbal, or human materials to create art forms and avoids systematic and ordered activities; the Social person prefers activities involving the manipulation of others to inform, train, develop, cure, or enlighten, and avoids activities involving materials, tools, or machines; the Enterprising type prefers activities involving the manipulation of others to attain organizational goals and economic gain and avoids systematic, symbolic, and observational activities; and the Conventional person prefers activities involving the manipulation of data and operating business machines to attain organizational goals and economic gain and avoids ambiguous, exploratory, or unsystematized activities. The types can be conceptualized in a hexagonal arrangement with those adjacent in the configuration (R&I, I&A, A&S, S&E, E&C, C&R) having greatest similarity to each other, those diametrically opposed (R&S, I&E, A&C) having greatest dissimilarity, and those not adjacent but not opposed (R&A, I&S, A&E, S&C, E&R, C&I) being intermediate in similarity. Individuals can resemble one or more of these types to varying degrees. The ranking of resemblances to the types results in an individual's personality pattern or profile. It has been reported by Holland (1985a) that people with similar profiles also have similar interests, life goals, competencies, personal traits, and attitudes.
Holland (1973, 1985a) has proposed that vocational interests are an expression of one's personality. While his theory makes no direct assertion regarding the interpersonal needs of the various vocational types, such relationships are implied. This problem has also been addressed by a number of other investigators employing various theoretical approaches. Some have attacked the issue within a psychoanalytic or "need gratification" framework. Roe (1956, 1957) discussed the role of the occupation as a focus for attitudes, capacities, and interests. Her comparison of occupations in the physical, biological, and social sciences led to speculation that they differ in important personality characteristics. She proposed a classification of occupations on the basis of whether they involve an orientation toward persons or nonpersons. Nachman (1960) assumed that "occupations afford differing opportunities for expression of impulses, for the utilization of defenses, and for the organizing of one's dealings with the world" (p. 243). She compared occupational groups in law, dentistry, and social work. Findings were positive regarding hypothesized differences across these groups in childhood experiences which, she speculated, might lead to the particular vocational choice and personality needs expressed. Bordin and colleagues (Bordin, Nachman, & Segal, 1963) advanced the theory of need gratification
through their delineation of a series of dimensions accounting for the gratifications which occupational activities can offer and by describing occupations in terms of their correspondence to these dimensions. The dimensions posited included needs, motivations, impulses, and activities important in work and generally corresponded to Holland's "personality" types.

Vocational Choice versus Vocational Interest

A distinction can be made between vocational choice and vocational interest (Ginzberg, Ginsburg, Axelrad, & Herma, 1951; Trow, 1941). Crites (1969) recognized this distinction in proposing that, in making choices, individuals predict what they will "probably" do while the expression of a preference represents what an individual would "like" to do. Super (1957) classified vocational interests into four types. Of these, two are particularly relevant to this discussion. "Expressed" interests are defined as those which are expressions of special interest. These are also referred to as preferences. "Manifest" interests are those expressed in action, rather than words, through participation in activities. Vroom (1964) also suggested differences between vocational "preference" and vocational "selection." Preference concerns what an individual might do if possibilities were unlimited, while selection implies action and takes into consideration the compromises made because of limitations (real or imagined).
More recently, Pryor (1981, 1986) has pointed out that "expressed choice" has greater psychological utility than the criterion of occupational entry. He argues that although expressed choice (or preference) can become distorted by stereotypes and in other ways, it is still more accurate since occupational entry can result from many non-psychological factors (e.g., economic and financial influences, availability, transportation). Consequently, it should be helpful to view an individual's vocational "choice" as the occupation in which he or she has actually become involved, while "interest" or "preference" should refer to the occupation for which the individual expresses a desire to become involved in or otherwise endorses in some indirect manner. Defined in this manner, responses to interest inventory items are examples of preferences and interests, while current job classification is an example of vocational choice. While the two frequently overlap, such as with commitment to the job, they may also be mutually exclusive. The present study will recognize this distinction.

Vocational Interests and Personality

Although few studies investigating the relationship between personality and vocational interests have focused specifically on interpersonal needs, many have done so indirectly through the use of personality measures which assess such variables. Dunnette, Kirchner, and DeGidio
(1958) explored the relationships among several measures of personality and occupational interests. Using the Strong Vocational Interest Blank (SVIB; Campbell & Holland, 1972) as their measure of interests, these researchers found significant relationships among certain interests and various scales of the Edwards Personal Preference Schedule (EPFS; Edwards, 1959) and California Psychological Inventory (CPI; Gough, 1957). The directions of the association were described by the authors as making "good clinical sense" and would be predicted by the Holland model. For example, Dominance and Exhibition scales of the EPFS and the Dominance, Capacity for Status, and Social Presence scales of the CPI were positively related to occupations involving sales, personal contact, and verbal activities (Holland's E-types), while scientific interests (Holland's I-types) were negatively related to these measures. Subjects for this study were adults employed in engineering, sales, and management positions.

Bohn (1966) investigated the relationship between psychological needs and vocational interests in a sample of male counseling center clients. He used the SVIB to group subjects according to their similarity to Holland's six vocational dimensions and analyzed their scores on the Adjective Check List (ACL; Gough, 1965) according to Murray's (1938) manifest traits. All
Holland types, with the exception of the Realistic, were found to be significantly associated with relevant needs as measured by the ACL. Bohn concluded that although his study had serious limitations in terms of generalization, it did indicate that individuals with different occupational interests have different needs, including interpersonal needs such as dominance, abasement, and affiliation. Specifically, Realistic, Investigative, and Artistic types were negatively related to Dominance, while the Conventional and Enterprising types were positively related to Dominance and Affiliation. Realistics and Artistics were negatively related to Affiliation. Finally, Enterprising types were negatively related to Abasement while the Realistic and Investigative types were positively related to this need. Holland (1985a, 1985b) has reviewed other studies with similar findings.

Thorndike, Weiss, and Dawis (1968) attempted to correct some of the statistical shortcomings of previous research relating vocational interests to other psychological constructs. Using the SVIB to generate interest categories, they employed a canonical correlation technique to determine the relationship between these variables and a vocational needs measure, the Minnesota Importance Questionnaire (MIQ; Weiss, Dawis, England, & Lofquist, 1966). The MIQ includes measures of relevant interpersonal needs such as authority, independence,
social status, and human relations in supervision. The authors noted that correlational procedures used in previous studies underestimated the relationship which may have existed between interests and other variables. They concluded that their technique revealed stronger relationships which suggested that interests and needs belong to the same class of variables (i.e., they relate to one motivational system). Bailey (1971) also used canonical correlation in an attempt to determine if individuals selected through use of the SVIB and corresponding to Holland's six types could be discriminated from each other on the basis of certain representative personality variables when each type was compared to every other type. The variables included were needs scales from the EPPS. His analysis revealed that the two sets of variables were related but that the relationships were not entirely as Holland would predict. The subjects were 135 male high school students of high scholastic ability. The types were found to be separate when comparisons were made on the basis of the SVIB data. However, when such comparisons were made on the basis of the need variables, only the Realistic was significantly different from Social and Enterprising from Conventional. Several limitations of this study were pointed out, however, including sample size and the use of judges to determine
which scales from the SVIB would represent the six vocational types and which EPPS scales should be paired with them. In a similar vein, Lacey (1971) attempted to identify the pattern of needs associated with Holland's types. He used three instruments, the Preference Inventory (Beer, 1966), the Job Inventory (Beer, 1966), and the Actual Satisfaction Scale (Beer, 1966) to assess needs. These were designed to measure needs of the hierarchy developed by Maslow (1954), including esteem, autonomy, socialization, security, and self-actualization. Analyses indicated success in differentiating the Holland types generated by the Vocational Preference Inventory (VPI; Holland, 1985b) in a manner generally supporting Holland's theory. Lorr and Stefic (1978) developed an instrument, the Orientation and Motivation Inventory (OMI), for the purpose of assessing dimensions of general orientation, preferences, and motivation towards activities, tasks, and people. The OMI included scales such as Personal vs. Impersonal and Power-Oriented vs. Power-Avoiding. They found that the measure was partially successful in differentiating Holland types, as measured by the Self-Directed-Search (SDS; Holland, 1979). This measure is a career guidance instrument developed from Holland's theory which generates the types in terms of a broad range of activities, competencies, occupations, and self-ratings. The results
were consistent with Holland's theory. In contrast, Besyner, Bodden, and Winer (1978) were largely unsuccessful in their attempt to discriminate Holland types from each other on the basis of the psychological needs measured by the Personality Research Form (PRF; Jackson, 1967). In this study, all subjects were categorized according to their VPI scores. Male subjects were then assessed using the PRF need scales of Achievement, Exhibition, Play, and Understanding, while female subjects were tested for Impulsivity, Play, and Succorance needs. Only the Exhibition and Play scales for males and the Impulsivity scale for females differentiated individuals according to Holland's descriptions. Since the purpose of the study was to discriminate among same-sex groups, differences between males and females on the one common scale (Play) were not emphasized. The authors did not specify why males and females were administered different scales. Schmitt and White (1978) also found weak relationships between Holland scales of the Strong Campbell Interest Inventory (SCII; Campbell & Hansen, 1981) and job-related measures of motivation, including the Need Scales, (Alderfer, 1972), the Job Description Inventory (Smith, Kendall, & Hulin, 1969), and the Job Diagnostic Survey (Hackman & Oldham, 1975). Nevertheless, some of the expected relationships were observed for the Investigative (positive correlation with Autonomy and
negative correlation with Relatedness needs) and Social (positively related to Dealing with Others) scales. Another study (Gentry, Winer, Sigelman, & Phillips, 1980) attempted to determine the relationship between vocational interests, measured by the VPI, and certain lifestyles interpreted with respect to Murray's needs. They found that many of the factors of the Life Style Analysis (Thorne, 1965) were significantly related to the Holland scales in the expected manner. For example, the Enterprising scale showed positive correlations with the Exploitative, Domineering-Authoritarian, and Oneupmanship scales. However, they also demonstrated that the correlations accounted for little of the variance in the vocational scales.

Purpose and Hypotheses of Study

As demonstrated, several studies have provided support for the assumption that vocational interests are related to interpersonal needs. To date, however, this relationship has seldom been addressed directly. While the relevance of vocational interests appears to be widely accepted, the role of interpersonal need as a distinct personality construct seems to be more obscure. More often these variables are lumped together with other social or psychological factors and/or treated as part of a larger system. However, for purposes of the present study, interpersonal need will be regarded as a separate
entity and measured more directly. Murray (1938) has referred to need as a latent attribute, a potentiality or readiness to respond in a certain way under given conditions to satisfy individual requirements. In addition, he believed that each need has a uniqueness, as well as similarities to other needs and as such can be grouped into various classes on this basis. Likewise, interpersonal need will be treated here as one category of human needs: those which can be satisfied only through a favorable relationship with others. Schutz’s (1966) Fundamental Interpersonal Relations Orientation (FIRO) theory seems an appropriate base from which to study interpersonal needs as independent variables. The FIRO-B scales (Schutz, 1967) represent the instrument of choice for measuring interpersonal needs. This measure not only has a strong theoretical base but requires significantly less time for administration and scoring, a quality of considerable importance in applied settings. This measure assesses an individual’s needs in the three major dimensions of social interaction discussed by Schutz (1966), i.e., inclusion, control, and affection. The respondent can be characterized in terms of two different aspects of behavior, expressed and wanted, within each of these dimensions. More precisely, "expressed" behavior is that which the respondent expresses toward others,
while "wanted" behavior is that which he or she wants others to express toward him or her. This scheme results in six interpersonal needs: Expressed-Inclusion (EI), Wanted-Inclusion (WI), Expressed-Control (EC), Wanted-Control (WC), Expressed-Affection (EA), and Wanted-Affection (WA).

Schutz (1966) and Kramer (1967) have shown the FIRO-B to have satisfactory validity (content, concurrent, and construct). However, some more recent research (Froehle, 1970; Ryan, Maguire, & Ryan, 1970) has questioned the construct validity of this measure. Schutz (1966) outlined a series of studies which, in his view, offered evidence of the validity of the FIRO-B. One related the FIRO-B scores of college students to scores on a political attitude scale. Others used, as criterion groups, subjects from a wide variety of occupations and educational groups. Kramer, (1967), concerned with the construct validity of the FIRO-B, correlated college students' FIRO-B scores with their self-ratings or predictions of these scores. He found significant correlations for five of the six scales and concluded that the results contributed to the construct validity. Froehle (1970) attempted to replicate the validation study of Kramer. His results offered only partial support for Kramer's findings in that only one FIRO-B scale, Expressed-Control, was significantly related to subjects' self-ratings. However, Froehle proposed as
a possible explanation that each scale varies in its relevance for individual subjects. Ryan, Maguire, and Ryan (1970) examined three components of construct validity: substantive, structural, and external. The substantive component, which requires an item be part of the behavior domain under study and also that the test reflect the total trait domain, was examined through inspection of test items. The authors found questionable relationship between the test items and theory. For the structural component, the test items must be shown to conform to a selected structural model, in this case the Guttman scale. This component was tested by means of inspection of the reproducibility coefficient which failed to meet the criteria for Control and Inclusion scales. The external component involves relationships between test responses and non-test behavior. It was found that not all six constructs proposed by FIRO theory were being measured, and therefore this component could not be confirmed. The subjects were adult occupational groups (salesmen, policemen, and service volunteers). The researchers concluded that there was no evidence to support the validity of the FIRO-B regarding these three components. More recently, Coultas (1971) tested the convergent and discriminant validity of the FIRO-B using a multitrait-multimethod matrix analysis (Campbell & Fiske, 1959). This procedure examines both trait and
method variance by assessing each of two or more traits using two or more methods. The resulting intercorrelation matrix is used for determination of convergent and discriminant validity. More precisely, evidence of convergent validity is found if correlations between the same trait and different methods (validity coefficients) are significant. In order for evidence of discriminant validity to be shown, several other conditions must be met. First, the validity coefficients must be significantly greater than the correlations between different traits assessed by the same method and different traits assessed by different methods. Additionally, the patterns of correlations (in terms of comparison) should be similar within all these groups. Using 360 Caucasian college students as subjects, Coultas' results revealed evidence for convergent validity for all six scales. Three scales, Expressed-Control, Wanted-Control, and Wanted-Affection, satisfied the criteria of discriminant validity.

Williams (1978) also examined FIRO-B validity. Using college students as subjects, he was successful in demonstrating that the FIRO-B scales may be adequate predictors of many of the personality variables assessed by the California Psychological Inventory.

Many studies investigating the Holland types have employed classification methods described by Holland
(1973, 1985a, 1985b) in which an individual's type is determined by the highest scale score among the interest scales of the VPI, SDS, or SCII. It appears, however, that this system may have limitations in certain situations. First, it may often fail to account for the actual magnitude of the individual scales. For example, a respondent with a VPI score of $E = 4$ as the highest score would be classified as an Enterprising type. Likewise, an individual with VPI scores of $E = 13$ as the highest score would also be considered an Enterprising type. However, these individuals may differ dramatically in other characteristics and attributes (e.g., interpersonal needs), having different degrees of resemblance to the Enterprising model. Also, such a procedure for generating the types does not account for the impact of secondary and tertiary interests. For example, a respondent with a VPI profile of E-S-C will be classified as an Enterprising type as will an individual with an E-R-A profile. Again, these individuals may differ dramatically in relevant characteristics. For this reason, the present study will focus on individual VPI scales rather than types in order to avoid this potential problem.

On the basis of descriptions of the vocational personality types provided by Holland (1985a, 1985b) and numerous research findings supporting these descriptions,
it seems reasonable to expect certain relationships. Since Enterprising types are seen as sociable, extroverted, domineering, persuasive, and value being influential, it is likely that these individuals also have strong needs to interact with and exert control over others. In contrast, Investigative types are described as independent and having an aversion to persuasive activities and, therefore, should not have the need to interact with or control others. Social types, described as sociable, friendly, warm, empathic, and persuasive, should have strong needs to interact with others on both casual and more intimate levels as well as needs to influence others. Realistic types, on the other hand, are seen as asocial, uninvolved, conforming, and self-effacing. These individuals would be expected to lack the need for interaction with others, should allow others to be in control, and should accept the influence of others. In essence, the VPI scales associated with each of these Holland types would be predicted to be associated with a particular configuration of interpersonal needs. Review of the relevant literature provided little clear rationale for developing hypotheses regarding the Conventional and Artistic scales. Thus, the purpose of the present study is to determine if interpersonal needs (as measured by the FIRO-B) are related to vocational interests (as measured by the VPI).
The significance of the present investigation lies in its implications for research and career counseling. As Isaacson (1985) pointed out, many, if not most, career counselors use interest inventories as their major means of approaching occupational options for their clients. Many of these instruments are keyed directly to the occupational options and clients quite often use the test results to confirm their subjective evaluations, focusing only on those occupations corresponding to the high scores. Additionally, the counselor's limited skills and/or time constraints may lead to consideration of options identified by high scores on interest inventories. Since there is apparently heavy reliance on these measures by both clients and counselors in making important career decisions, it would be important to have a greater understanding of the relationship between interests and other personal characteristics. Much of the cost of inadequate counseling and job choices, both psychological and economic, could be spared. Since the precise nature of the relationship between vocational interest and interpersonal needs is largely unexplored, the results of the present study may also make a contribution by filling a gap in this literature. To determine if relationships exist between the VPI scales and the FIRO-B scales, the following hypotheses will be tested:
1. The Expressed-Inclusion, Wanted-Inclusion, and Expressed-Control scales of the FIRO-B will, collectively, provide the most effective prediction of the Enterprising scale of the VPI based on positive correlations.

2. The Expressed-Inclusion, Wanted-Inclusion, Expressed-Control, and Expressed-Affection scales of the FIRO-B will, collectively, provide the most effective prediction of the Social scale of the VPI based on positive correlations.

3. The Expressed-Inclusion, Wanted-Inclusion, and Expressed-Control scales of the FIRO-B will, collectively, provide the most effective prediction of the Investigative scale of the VPI based on negative correlations.

4. The Expressed-Inclusion, Wanted-Inclusion, and Wanted-Control scales of the FIRO-B will, collectively, provide the most effective prediction of the Realistic scale of the VPI based on both positive (Wanted-Control) and negative (Expressed-Inclusion, Wanted-Inclusion) correlations.

Method

Subjects

Permission was granted by a local psychological consulting firm for the use of existing client data stored in the firm's computer files. Records for 699 Caucasian male subjects were obtained. Subjects ranged in age from 22 to 50 years with mean age 32.5. All subjects were
applicants for various sales and managerial positions with several of the firm's client corporations representing various regions of the continental United States.

Measures

FIRO-B. The Fundamental Interpersonal Relations Orientation Behavior (FIRO-B) will be the measure of interpersonal needs. Developed by Schutz (1958, 1967), this self-report measure assesses needs in three major areas: Inclusion, Control, and Affection. These areas are described along two dimensions, expressed and wanted, giving a total of six nine-item Guttman scales. Twenty-four of the 54 items are answered on the basis of a six level continuum ranging from "nobody" to "most people", while all other responses are made on a continuum from "never" to "usually." There are several repetitions of items. The FIRO-B is self-administered.

Reliability is reported in terms of reproducibility, the appropriate measure of internal consistency for Guttman scales. The mean reproducibility score for the six scales is .94. Since interpersonal orientations are considered stable traits, an index of stability is important for this instrument. The mean coefficient of stability (test-retest) is .76 with individual scales ranging from .71 to .82.

VPI. The Vocational Preference Inventory (VPI; Holland, 1985) is a personality-interest inventory which
is essentially a list of 160 occupational titles. The respondent indicates which occupations appeal to him or her as well as those that do not. The responses are counted to determine the test taker's scores on 11 different scales: Realistic, Investigative, Artistic, Social, Enterprising, Conventional, Self-Control, Masculinity-Femininity, Status, Infrequency, and Acquiescence. The first six of these are the major dimensions and determine an individual's vocational personality type as prescribed by Holland's (1985a) theory of vocational personalities. The VPI is self-administered.

The homogeneity coefficients (KR20) range from .42 to .91, indicating that most scales have homogeneous content. When those scales which are heterogeneous by design are subtracted, the coefficients range from .81 to .91 with a mean of .88. The internal consistency for the six "type" scales is somewhat greater (.85 - .91). The test-retest reliability coefficients for various samples of males and females reveal that the VPI has moderate to high reliability. The VPI has been related to theoretical studies, personality variables, interests, values, competencies, and aptitudes, demonstrating its construct validity. It also fares well in terms of criterion-related validity, including both concurrent and predictive. Holland (1985a, 1985b) has summarized the
evidence for validity of the VPI scales as follows:

(1) the interest scales have moderate validity for predicting occupational membership and field of training;

(2) the scales' construct validity is also supported by a comprehensive literature supporting their use as personality scales.

Procedure

Data for the present study were collected in the form of computer printouts with each page containing information for one subject. This information consisted of the subject's name, position for which he was applying, identification code, age, sex, race, and relevant test scores. All information from each computer sheet, with the exception of the subject's name, was transferred to coding forms. The data were then entered and stored as a computer file and analyzed through multiple regression analysis.

Based on recommendations of Holland (1985a) regarding the sample size needed for reliable results, a large sample (n = 699) was initially selected. However, due to the possibility that such a large sample may result in statistically significant findings with little practical significance, a second, smaller sample was taken. This sample (n = 125) was drawn from the original sample through a random selection procedure. These
samples, labeled "Sample One" and "Sample Two", were then subjected to identical analyses.

A total of six analyses were conducted for each sample. For each analysis, the six scales of the FIRO-B served as predictor variables. The criterion variables were the Realistic, Investigative, Social, Conventional, Enterprising, and Artistic scales of the VPI. Forward selection was the equation-building method used. Selection criteria were the probability of F-to-enter and tolerance for each independent variable in the analysis. These values were set at .05 and .01, respectively.

Results

Sample One

Information describing sample one is presented in Table 1. Among the VPI scales, subjects scored highest on Enterprising ($M = 10.579$, $SD = 2.84$), while the lowest mean score for this group of variables was observed for the Realistic scale ($M = 4.388$, $SD = 3.502$). Mean scores for the FIRO-B scales range from a low for Wanted-Control ($M = 2.323$, $SD = 1.990$) to a high on Wanted-Affection ($M = 5.903$, $SD = 2.635$). The subjects in this sample ($n = 699$) ranged in age from 22 to 50 with mean age 33.5.

Correlations between the interest variables and the need variables for sample one are listed in Table 2.
Table 1
Means and Standard Deviations for Sample One

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>4.388</td>
<td>3.502</td>
</tr>
<tr>
<td>Investigative</td>
<td>5.883</td>
<td>4.550</td>
</tr>
<tr>
<td>Social</td>
<td>5.602</td>
<td>4.314</td>
</tr>
<tr>
<td>Conventional</td>
<td>4.515</td>
<td>3.498</td>
</tr>
<tr>
<td>Enterprising</td>
<td>10.579</td>
<td>2.840</td>
</tr>
<tr>
<td>Artistic</td>
<td>7.166</td>
<td>4.560</td>
</tr>
<tr>
<td>Expressed-Inclusion</td>
<td>5.375</td>
<td>1.857</td>
</tr>
<tr>
<td>Wanted-Inclusion</td>
<td>4.767</td>
<td>3.328</td>
</tr>
<tr>
<td>Expressed-Control</td>
<td>5.412</td>
<td>3.861</td>
</tr>
<tr>
<td>Wanted-Control</td>
<td>2.323</td>
<td>1.990</td>
</tr>
<tr>
<td>Expressed-Affection</td>
<td>4.641</td>
<td>3.349</td>
</tr>
<tr>
<td>Wanted-Affection</td>
<td>5.903</td>
<td>2.635</td>
</tr>
</tbody>
</table>

\[ n = 699 \]

Examination of this data reveals 17 significant correlations: Realistic is negatively correlated with EI \((r = -0.084, p = .013)\) and WI \((r = -0.066, p = .040)\), and positively correlated with WC \((r = 0.158, p = .000)\); Social is positively correlated with EI \((r = 0.109, p = .002)\), WI \((r = 0.101, p = .004)\), EC \((r = 0.088, p = .010)\), EA \((r = 0.126, p = .000)\), and WA \((r = 0.128, p = .000)\);
Table 2
Correlations of VPI Scales with FIRO-B Scales for Sample One

<table>
<thead>
<tr>
<th>FIRO-B Scales</th>
<th>VPI Scales</th>
<th>R</th>
<th>I</th>
<th>S</th>
<th>C</th>
<th>E</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI</td>
<td>-0.084*</td>
<td>-0.053</td>
<td>0.109**</td>
<td>0.012</td>
<td>0.211**</td>
<td>-0.047</td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td>-0.066*</td>
<td>-0.006</td>
<td>0.101**</td>
<td>0.065</td>
<td>0.209**</td>
<td>-0.007</td>
<td></td>
</tr>
<tr>
<td>EC</td>
<td>-0.004</td>
<td>0.001</td>
<td>0.088**</td>
<td>0.049</td>
<td>0.160**</td>
<td>0.074*</td>
<td></td>
</tr>
<tr>
<td>WC</td>
<td>0.158**</td>
<td>0.032</td>
<td>0.053</td>
<td>0.059</td>
<td>-0.044</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>EA</td>
<td>0.047</td>
<td>0.016</td>
<td>0.126**</td>
<td>0.088**</td>
<td>0.132**</td>
<td>0.015</td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>0.028</td>
<td>0.052</td>
<td>0.128**</td>
<td>0.075*</td>
<td>0.141**</td>
<td>0.051</td>
<td></td>
</tr>
</tbody>
</table>

Note. EI = Expressed-Inclusion, WI = Wanted-Inclusion, EC = Expressed-Control, WC = Wanted-Control, EA = Expressed-Affection, WA = Wanted-Affection.

*p ≤ .05. **p ≤ .01.

Conventional is positively correlated with WI (r = 0.065, p = 0.042), EA (r = 0.088, p = 0.010), and WA (r = 0.075, p = 0.024); Enterprising is positively correlated with EI (r = 0.211, p = 0.000), WI (r = 0.209, p = 0.000), EC (r = 0.160, p = 0.000), EA (r = 0.132, p = 0.000), and WA (r = 0.141, p = 0.000); and Artistic is positively correlated with EC (r = 0.074, p = 0.025). No correlations between Investigative and the FIRO-B variables were found to be significant.

A total of six multiple regression analyses were run for sample one. Each equation was developed using a
forward selection procedure with the probability of F-to-enter (PIN = .05) and tolerance (TOL = .01) values for each candidate predictor variable as selection criteria. Five significant regression equations were constructed.

For the first, Realistic served as the criterion variable with WC entering the equation on step one (Beta = .162, $R^2 = .025$, $F = 17.80$, $p = .000$) and EI entering on step two (Beta = -.091, $R^2 = .033$, $F = 11.92$, $p = .000$):

$$Y = 4.65 + 1.62 (X_1) - .091 (X_2)$$

where $Y =$ Realistic, $X_1 =$ WC, and $X_2 =$ EI.

Social was the criterion variable for the second regression analysis. Two variables were entered into this equation. WA was entered on step one (Beta = .108, $R^2 = .016$, $F = 11.69$, $p = .000$) and EI on step two (Beta = .082, $R^2 = .023$, $F = 8.14$, $p = .000$):

$$Y = 3.53 + .108 (X_1) + .082 (X_2)$$

where $Y =$ Social, $X_1 =$ WA, and $X_2 =$ EI.

Conventional was the criterion variable for equation three as one independent variable, EA, entered successfully (Beta = .088, $R^2 = .008$, $F = 5.48$, $p = .020$):

$$Y = 4.09 + .088 (X_1)$$

where $Y =$ Conventional and $X_1 =$ EA.

For the fourth analysis, Enterprising served as the criterion variable. A total of five variables entered this equation with EI entering on step one (Beta = .136,
$R^2 = .045, F = 32.60, p = .000), EC on step two
(Beta = .166, $R^2 = .064, F = 23.89, p = .000), WI on step
three (Beta = .117, $R^2 = .075, F = 18.77, p = .000), and
WC on the fourth step (Beta = -.102, $R^2 = .084, F = 15.96,
p = .000):

$Y = 8.67 + .136 (X_1) + .166 (X_2) + .117 (X_3) - .102 (X_4)$

where $Y =$ Enterprising, $X_1 =$ EI, $X_2 =$ EC, $X_3 =$ WI, and
$X_4 =$ WC.

For the final equation, Artistic was the criterion
variable. Only one independent variable, EC, success-
fully entered the equation in this analysis (Beta = .074,
$R^2 = .006, F = 3.88, p = .049$):

$Y = 6.69 + .074 (X_1)$

where $Y =$ Artistic and $X_1 =$ EC.

For the sixth criterion variable, Investigative, no
equation could be constructed due to the failure of the
independent variables to meet the selection criteria.

The results from the analyses for sample one are
summarized in Table 3. These data provide the basis for
hypothesis testing. Since WC was entered into the
equation for Enterprising interests, hypothesis one was
not confirmed. For Social interests, WA was entered into
the equation while the hypothesized predictors, WI, EC,
and EA, were not. As a result, hypothesis two also was
not confirmed. Hypothesis three was not upheld since no
equation was developed for Investigative interests.
<table>
<thead>
<tr>
<th>Criterion Variable</th>
<th>Variables in the Equation</th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
<th>R</th>
<th>$R^2$</th>
<th>F</th>
<th>Sig F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>WC</td>
<td>.285</td>
<td>.066</td>
<td>.162</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EI</td>
<td>-.171</td>
<td>.070</td>
<td>-.091</td>
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<td>(constant)</td>
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<td>.22</td>
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</tr>
<tr>
<td>Social</td>
<td>WA</td>
<td>.177</td>
<td>.063</td>
<td>.108</td>
<td></td>
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</tr>
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<td></td>
<td>EI</td>
<td>.191</td>
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<td>.082</td>
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<td></td>
<td>(constant)</td>
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<td>.557</td>
<td></td>
<td></td>
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<tr>
<td>Conventional</td>
<td>EA</td>
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<td>.039</td>
<td>.088</td>
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<td></td>
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<td></td>
<td>(constant)</td>
<td>4.087</td>
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<td>.225</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Enterprising</td>
<td>EI</td>
<td>.207</td>
<td>.066</td>
<td>.136</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EC</td>
<td>.122</td>
<td>.028</td>
<td>.166</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WI</td>
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<td>.037</td>
<td>.117</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WC</td>
<td>-.145</td>
<td>.055</td>
<td>-.102</td>
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<td></td>
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<td></td>
<td>(constant)</td>
<td>8.665</td>
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<td>.347</td>
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<tr>
<td>Artistic</td>
<td>EC</td>
<td>.088</td>
<td>.045</td>
<td>.074</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>(constant)</td>
<td>6.690</td>
<td></td>
<td>.297</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. EI = Expressed-Inclusion, WI = Wanted-Inclusion, EC = Expressed-Control, WC = Wanted-Control, EA = Expressed-Affection, WA = Wanted-Affection.

a Probability of F-to-enter.  b Tolerance.
Finally, the fourth hypothesis was not confirmed since WI did not enter the equation as predicted.

Sample Two

Listed in Table 4 are the relevant statistics for sample two. Among the six interest scales, Enterprising

Table 4

Means and Standard Deviations for Sample Two

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>4.024</td>
<td>3.463</td>
</tr>
<tr>
<td>Investigative</td>
<td>5.784</td>
<td>4.555</td>
</tr>
<tr>
<td>Social</td>
<td>5.536</td>
<td>4.283</td>
</tr>
<tr>
<td>Conventional</td>
<td>4.528</td>
<td>3.548</td>
</tr>
<tr>
<td>Enterprising</td>
<td>10.456</td>
<td>2.861</td>
</tr>
<tr>
<td>Artistic</td>
<td>7.144</td>
<td>4.533</td>
</tr>
<tr>
<td>Expressed-Inclusion</td>
<td>5.144</td>
<td>1.946</td>
</tr>
<tr>
<td>Wanted-Inclusion</td>
<td>4.336</td>
<td>3.471</td>
</tr>
<tr>
<td>Expressed Control</td>
<td>5.320</td>
<td>2.708</td>
</tr>
<tr>
<td>Wanted-Control</td>
<td>2.280</td>
<td>1.599</td>
</tr>
<tr>
<td>Expressed-Affection</td>
<td>4.296</td>
<td>2.170</td>
</tr>
<tr>
<td>Wanted-Affection</td>
<td>6.048</td>
<td>1.844</td>
</tr>
</tbody>
</table>

\( n = 125 \)

received greater endorsement by the subjects in sample two \( (M = 10.456, \ SD = 2.861) \), while the Realistic scale was
associated with the lowest scores ($M = 4.024, SD = 3.463$). Among the scales of the FIRO-B, subjects scored highest on Wanted-Affection ($M = 6.048, SD = 1.844$) and lowest on Wanted-Control ($M = 2.280, SD = 1.599$). The age range for this sample ($n = 125$) was from 22 to 50 with mean age 33.6.

Table 5 contains correlations between interest and need variables for sample two. Of the 36 correlation coefficients calculated for sample two, 11 reached statistical significance. Of these, Realistic is
positively correlated with WC ($r = .252, p = .002$); Social is positively correlated with WA ($r = .166, p = .032$); Conventional is positively correlated with EI ($r = .216$, $p = .008$), WI ($r = .225, p = .006$), EA ($r = .194, p = .015$), and WA ($r = .162, p = .035$); and Enterprising is positively correlated with EI ($r = .227, p = .005$), WI ($r = .204$, $p = .011$), EC ($r = .201, p = .012$), EA ($r = .251, p = .002$), and WA ($r = .245, p = .003$). The Investigative and Artistic scales were not significantly correlated with any FIRO-B scales.

As with sample one, data from sample two were subjected to a series of multiple regression analyses. Six analyses employing identical selection criteria were conducted, resulting in three significant regression equations.

The first equation involved Realistic as the criterion variable. A single independent variable, WC, was entered into this equation (Beta = .252, $R^2 = .064$, $F = 8.35, p = .005$):

$$Y = 2.78 + .252 (X_1)$$

where $Y =$ Realistic and $X_1 = WC$.

For equation two, Conventional served as the criterion variable and WI was entered as the sole predictor (Beta = .225, $R^2 = .051$, $F = 6.57, p = .012$):

$$Y = 3.53 + .225 (X_1)$$

where $Y =$ Conventional and $X_1 = WI$. 
For the third and final equation, Enterprising was the criterion variable as two independent variables were found to be significant predictors. EA was entered at step one (Beta = .237, $R^2 = .063$, $F = 8.26$, $p = .005$), while EC was entered on the second step (Beta = .183, $R^2 = .096$, $F = 6.49$, $p = .002$):

$$Y = 8.09 + .237 (X_1) + .183 (X_2)$$

where $Y =$ Enterprising, $X_1 =$ EA, and $X_2 =$ EC.

For the remaining three criterion variables of interest, Investigative, Social, and Artistic, no independent variables were found to be significant predictors and therefore no equations resulted.

Results of the regression analyses for sample two are summarized in Table 6. As with sample one, no hypotheses were confirmed on the basis of the analyses for sample two. Hypotheses two and three were not upheld since no equations were constructed for Investigative and Social interests. The first hypothesis was not confirmed since only one expected predictor (EC) entered the equation for Enterprising interests. Hypothesis four was not confirmed due to the failure of Inclusion needs to emerge as predictors of Realistic interests.
### Table 6

Summary Table: Forward Selection Procedure with PIN\(^a\) = .05 TOL\(^b\) = .01 for Sample Two

<table>
<thead>
<tr>
<th>Variables</th>
<th>Criterion Equation</th>
<th>B</th>
<th>SE B</th>
<th>BETA</th>
<th>R</th>
<th>(R^2)</th>
<th>F</th>
<th>SIG F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>WC</td>
<td>.546</td>
<td>.189</td>
<td>.252</td>
<td>.252</td>
<td>.064</td>
<td>8.350</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td>(constant)</td>
<td>2.779</td>
<td>.525</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>WI</td>
<td>.230</td>
<td>.090</td>
<td>.225</td>
<td>.225</td>
<td>.051</td>
<td>6.568</td>
<td>.012</td>
</tr>
<tr>
<td></td>
<td>(constant)</td>
<td>3.530</td>
<td>.498</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enterprising</td>
<td>EA</td>
<td>.312</td>
<td>.114</td>
<td>.237</td>
<td>.310</td>
<td>.096</td>
<td>6.486</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>EC</td>
<td>.193</td>
<td>.091</td>
<td>.183</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(constant)</td>
<td>8.087</td>
<td>.706</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. WI = Wanted-Inclusion, EC = Expressed-Control, WC = Wanted-Control, EA = Expressed-Affection.

\(^a\) Probability of F-to-enter. \(^b\) Tolerance.

### Discussion

#### Characteristics of the Samples

Due to concerns regarding the effects of sample size, a second, smaller sample \((n = 125)\) was randomly drawn from the original sample \((n = 699)\) for purposes of comparison. Data from these samples were then
subjected to identical statistical analyses. Comparison of the descriptive data for samples one and two (see tables 1 and 4) reveals that the distributions are similar in many respects. This finding is not surprising given the sampling procedure employed. Subjects clearly show greater interest in Enterprising occupations as would be expected for a group with this composition (sales and managerial applicants). Realistic occupations are the least preferred, a finding also consistent with expectations. The degree of preference for the remaining occupational areas ranges from low to moderate. Among the measured needs, the greatest is WA, the need for affection from others. The need for others to be in control, WC, appears to be the weakest, while the remaining needs are moderate in strength. In essence, the data suggest that the two samples are equivalent in terms of the types and levels of the needs and interests expressed.

Sample One Analyses

Correlational evidence. Results indicate that Realistic interests are negatively related to Inclusion needs and positively related to Wanted-Control. This relationship suggests that individuals who have strong interests in Realistic occupations tend to have little need for social involvement but have needs for others to assume control in the situations and activities in which
they are involved. On the other hand, Social interests appear to be positively related to Inclusion, Affection, and Expressed-Control needs. In more precise terms, these relationships imply that individuals with interests in Social occupations also have needs for social acceptance, an orientation to move toward people socially, tendencies to initiate involvements with others on an emotional level and an expectation for others to reciprocate, and a need to persuade and influence others. This description also characterizes individuals with Enterprising occupational interests in that the associated pattern of needs is essentially identical to that for those individuals with Social interests. Conventional interests show positive correlations with Affection and Wanted-Inclusion needs. This suggests that people who have strong interests in Conventional occupations tend to establish intimate relationships with others and have strong needs to belong or to be accepted by others on both superficial and deeper, emotional levels. For individuals who prefer Investigative occupations, no significantly related interpersonal needs were identified.

While several significant relationships between vocational interests and interpersonal needs are indicated, the relevance of the associations is not as clear. It appears that many of the relationships are consistent with expectations based on past research. For example,
individuals with preferences for Social and Enterprising occupations would be expected to have strong social and power orientations. Likewise, the rejection of such qualities among those with Realistic interests is also consistent with theory. Although speculative, the association of a need for acceptance with Conventional interests and need for control with Artistic interests, may represent a conformity - non-conformity dimension. However, the correlations upon which these relationships are based offer little explanatory power. For example, the need for acceptance by others (WI) accounts for roughly one percent of the variance in Social interests. The same need accounts for even less variance in Realistic and Conventional interests (.44 percent and .42 percent, respectively). In fact, the greatest amount of variance accounted for by a single relationship is less than 4 1/2 percent (E x EI). Relationships based on such small correlations provide little in terms of practical utility although they may be statistically significant.

Regression analyses. Results from the multiple regression analyses provide greater clarification regarding the nature of the observed relationships between needs and interests. In terms of ability to account for variance in vocational interests, many of the interpersonal needs prove to be redundant. This is seen when the introduction of an additional variable into the predictive relationship
results in little or no increase in predictive ability. This redundancy is controlled, however, by the multiple regression in that variables which do not significantly increase the predictive power of the relationship are excluded. Of the three needs shown through correlation to be related to Realistic interests, two, WC and EI, provide the best possible prediction when taken in combination. Including the remaining needs does not significantly increase the ability to predict levels of interest in Realistic occupations. Of particular interest is the observation that WI loses its importance as a predictor when combined with EI and WC. The implication is that knowing that an individual has tendencies to withdraw from certain social situations and also accepts the control and influence of others affords the best possible estimate when predicting Realistic interests from his or her interpersonal needs. Knowing that he or she has low needs for social acceptance, otherwise a predictor of Realistic interests, then contributes little over what is already explained and therefore becomes less important.

Social interests are significantly related to Inclusion and Affection needs, both expressed and wanted, as well as the need for control. Nevertheless, the regression reveals that the combination of WA and EI more effectively predicts Social interests than any other configurations of needs. This finding suggests that in
predicting preference for Social occupations from the interpersonal needs, the most important predictor is the presence of a social orientation and the need for affection from others. In this case, to the extent that one is socially oriented and accepting of the more intimate interactions of others, the greater is the tendency to have interests in Social occupations. Considering that the individual also initiates intimate relationships and has strong needs for control and social acceptance provides no improvement in the predictive ability. The general pattern of needs associated with the Enterprising scale (based on correlations) is identical to that of the Social scale. In predicting Enterprising interests, however, a combination of four needs is most effective, indicating that the needs to control others but not be controlled by them and to interact with and be accepted by others are the most important. Given information regarding these needs, the need for affection, a predictor of Enterprising interests in its own right, becomes relatively weaker in importance.

Interest in Conventional occupations is significantly related to Affection needs (EA, WA) and a need for acceptance by others (WI) based on correlations. Of these, WA and WI provide little improvement in the prediction of Conventional interests beyond the predictive ability of EA. This suggests that information regarding an individual's tendency to establish emotional or intimate relations with
others is the best predictor (among interpersonal needs) of Conventional interests. None of the six needs were found to be effective in predicting Investigative interests.

Implications for hypotheses. Hypothesis one predicts that Enterprising interests can be most effectively predicted by a combination of EI, WI, and EC. This prediction is not confirmed, however, on the basis of regression analysis since WC figures as an important predictor. Nevertheless, the results must be viewed as partial support for this hypothesis. While no hypotheses were presented regarding WC as a predictor of Enterprising interest, it is reasonable to expect individuals who are power- and people-oriented to have some tendencies to reject the control of others. The basic description of the individual with Enterprising interests does not change significantly with the addition of this need.

Hypothesis two states that a combination of EI, WI, EC, and EA is the most effective predictor of Social interests. This prediction is based on both theoretical and empirical data suggesting that individuals with strong interests in Social occupations are likely to be people-oriented, status-conscious, control-oriented, and have needs to interact with others on deeper, more emotional levels and in an initiating role. This hypothesis also cannot be upheld. Regression analysis demonstrates that
the configuration of needs which best predicts Social interests is composed of EI and WA. Again, these findings offer partial support for the hypothesized relationship and are not entirely inconsistent with theoretical expectations. It does seem reasonable to assume that in many Social occupations (e.g., psychologist, social worker) there would be an abundance of emotional give-and-take. Although it would be expected that individuals with Social interests would be more likely to initiate intimate interactions, it is also reasonable to assume that they may have needs for others to reciprocate. Inconsistent with both theory and empirical findings, however, is the failure of control needs (EC) to figure more prominently in the relationship between needs and Social interests. A plausible explanation is that control, in terms of the FIRO-B, may have more "competitive" connotations rather than "healing" or "training" ones and therefore would be less relevant for individuals with strong Social interests.

The third hypothesis predicts that Investigative interests are most effectively predicted by EI, WI, and EC based on negative relationships. This hypothesis is not confirmed since no needs are significantly related to the Investigative scale. This finding is somewhat surprising. Holland's (1973, 1985a) hexagonal model places the Investigative in direct opposition to Enterprising interests in terms of social and power orientations. These
descriptions have received support in the literature (Bohn, 1966; Dunnette, Kirchner, & DeGidio, 1958; Lacey, 1971; Schmitt & White, 1978). Results of the present study indicate relationships between Enterprising interests and Inclusion and Control needs. Likewise, it would be expected that Investigative interests would be related to these needs.

Hypothesis four is concerned with Realistic interests and asserts that the best prediction of these interests is achieved by a combination of EI, WI, and WC. More specifically, it is expected that EI and WI will have negative weights while WC will have a positive weight. As before, this hypothesis is not confirmed, but the results do provide some support. Two of the three hypothesized predictors are confirmed, indicating that low social-orientation and the need to defer control to others are important in predicting Realistic interests.

Statistical versus practical significance. As with the correlational data, many of the values resulting from the regression analyses also reach statistical significance. However, it can be shown that the results (relationships) have limited practical value. The usefulness of the information obtained in the present study is linked directly to the amount of variance in vocational interests that is explained or accounted for by the variance in interpersonal needs. For Realistic interests, the maximum amount of
variance accounted for by any bivariate relationship is 2.5 percent (WC). Through the use of multiple regression, the predictive power is improved by increasing this amount to 3.3 percent. For the Social scale, the increase is from 1.6 percent for the bivariate case (WA) to 2.3 percent as a result of regression. The results for other variables is even less impressive: .8 percent for Conventional interests and .6 percent for Artistic. The maximum increase in explained variance occurs in Enterprising interests for which regression accounts for 8.4 percent of the variance. Such relationships have theoretical implications but are quite inadequate for most applications where prediction is the major objective.

Sample Two Analyses

Correlational evidence. The correlations between the needs and interest variables in sample two show many of the relationship trends found in sample one. Nevertheless, there are important differences. As might be expected with a reduction in sample size, many correlations which previously reached significance now fail to do so. The correlation between Realistic and Wanted-Control suggests that individuals who display interest in Realistic occupations have tendencies to defer control to others and generally prefer to be free of responsibility. The negative correlations between Realistic interests and Inclusion needs seen in the first sample disappear for
sample two. This suggests that the issue of social interaction is not as important as previously indicated for individuals with Realistic interests. As with sample one, the Enterprising scale is significantly correlated with all needs except Wanted-Control. This suggests that individuals with strong Enterprising interests tend to be power- and people-oriented with needs for social recognition as well as deeper, emotional relationships with others. In contrast, Social interests are related to Wanted-Affection only, suggesting that the need for more intimate, emotional encounters from others is the most salient issue. This characterization of individuals with Social interests differs dramatically from that for subjects in sample one in that no confirmation is found for Inclusion and Control needs. Conventional interests are correlated with Inclusion and Affection needs on both the expressed and wanted dimensions. This finding implies that individuals with Conventional interests are more socially oriented than suggested by the analyses of sample one. Neither Investigative nor Artistic interests show any significant correlations with needs. Revealed in this finding is that individuals with interests in these occupations cannot be characterized by any of the interpersonal needs measured.

Regression analyses. The multiple regression analyses performed on sample two data resulted in three significant
equations. The results indicate that in predicting interest in Realistic occupations, knowledge of the extent to which an individual defers control and/or responsibility to others is the best estimate, accounting for 6.4 percent of the variance. For predicting Conventional interests, knowledge of the individual's need for social recognition and acceptance is the most valuable information, providing explanation for 5.1 percent of the variance in these interests. Finally, information regarding an individual's need to establish intimate social relationships and his or her need for control over others is the combination of needs which provides the best possible prediction of Enterprising interest. These two needs taken together will account for 9.6 percent of the variance in Enterprising interests.

Summary and Conclusions

The purpose of the present study was to investigate the relationship between vocational interests, measured by the VPI, and interpersonal need, measured by the FIRO-B. It was hypothesized that certain configurations of interpersonal needs would emerge as significant predictors of individual vocational interest scales. The proposed relationships were based on characterizations of the six vocational personality types provided by Holland's (1973, 1985a, 1985b) theory and numerous empirical studies. No hypotheses were confirmed, although some important
relationships were revealed. Generally, the results provide mixed support for Holland's typology. It is likely that sample size contributed significantly to the apparent discrepancies observed in the results from the two samples. This concern is validated by the observation that many of the basic trends in the data change across samples while changes in the correlations on which they are based are minimal. For this reason, it seems preferable to take a conservative approach in drawing conclusions. With regard to rejection or acceptance of the hypotheses presented, the choice of sample is not an important factor. Consequently, the more reasonable approach is to emphasize results based on the more statistically justifiable sample size (i.e., $n = 125$).

It appears that in predicting Realistic interests, information regarding an individual's need to defer control and/or responsibility to others is a significant correlate. This finding is consistent with Holland's description of the Realistic type as conforming, uninvolved, and self-effacing. The needs for control over others and interacting with others on an intimate level emerge as the most significant configuration of needs for predicting Enterprising interests. While the need for control is certainly in line with Holland's characterization of the Enterprising type, the affection needs are clearly inconsistent with descriptors such as domineering
and self-confident. Finally, in predicting Conventional interests, it appears that the need for social acceptance is the most important factor. This description is consistent with Holland's characterization of the Conventional type as conforming. Knowledge of the measured interpersonal needs is of limited value in predicting interests in the Investigative, Artistic, and Social areas.

The correlations of vocational interests with interpersonal needs are generally low. While several provide support for previous findings regarding the vocational types, their size indicates that no more than 6.35 percent of the variance is common variance. Multiple regression analyses improve the predictive ability of the need variables only slightly by increasing the common variance by roughly three percent. Relationships of such low strength are of limited value in applications in which prediction is the main objective. However, it is probably unreasonable to conclude that interpersonal need factors do not play a more important and central role in the dynamics of occupational preference. Greater knowledge of the need correlates of particular preferences may be gained through improvements in the present research methodology. Emphasis on the design of instruments for assessing more specific needs rather than general classes could be fruitful. Controlling for other potential factors such as age, current occupation, and employment history may also
improve the correlations between the two domains. Future research should also involve the investigation of other aspects of interpersonal behavior.
References


