JVIS

Jackson Vocational Interest Survey

Douglas N. Jackson, Ph.D.

Technical Manual

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Jackson Vocational Interest Survey

Acknowledgements

It is a pleasure to acknowledge the important contributions made by others to the second edition of this Manual and to the continuing research support and development of the JVIS.

Paul F. Tremblay coordinated the revision, playing a vital role in undertaking new analyses, assembling norms, contributing and revising text, and checking on data integrity. Others contributing significantly to the JVIS include Diana Holec, Blake Jelley, and Julie M. McCarthy, who together are responsible for a major portion of the development of the extensive career exploration support contained in the JVIS.COM website. Maureen Moffatt-Small provided important insights regarding user needs. Christine A. Spicer contributed editorial and composition design in the production of the JVIS Manual. Hilary Blokker supervised the development and evaluation of scoring and interpretive software programs, including those designed for Windows and internet use. Mr. Blokker also provided excellent advice on the content and format of JVIS reports. My colleagues and collaborators, particularly Ronald R. Holden, Ralph H. Locklin, and Edmond Marks, provided support, encouragement, and most important, research results contributing to a better understanding of the meaning of JVIS scores.

Marc A. Verhoeve provided the benefit of his wisdom regarding career development and counseling, as well as his expert knowledge regarding Cyber-counseling, that is, the use of new electronic media to facilitate career development and personal growth. We are delighted that he has prominently incorporated the JVIS in his materials and programs. Mr. Verhoeve has also contributed a JVIS Applications Handbook, an important resource for the counseling professional, that illustrates the creative use of the JVIS not only for career development, but as a means of realizing life goals.

Douglas N. Jackson

Version 2.0.8.

Contents

Chapter 1

Nature and Purpose of the Jackson Vocational Interest Survey

Purpose of the JVIS

The JVIS was developed to satisfy a need for an efficient hand or machine scorable vocational interest measuring device to appraise the interests of males and females along a common set of dimensions. As a technique to aid in vocational counseling and decision making, it will find its greatest utility in settings where such decisions are made. These settings include schools and colleges, university counseling services, employment offices and agencies, business and industry, vocational rehabilitation and adult counseling centers, or in any setting in which an individual wishes to undertake career exploration. The format and scales for the JVIS were designed to combine an optimal amount of information relevant to vocational interests with ease of interpretation.

Changes in the Second Edition Manual

The new manual for the Jackson Vocational Interest Survey (JVIS) incorporates a number of changes including a description of the new norms based on a sample of 3500 individuals, additional reliability analyses, descriptions of the JVIS Basic and Extended Reports, and an up-to-date section of research on the JVIS. Additions to the research section include a study in which 131 college majors were grouped into 17 clusters, the basis of the 17 university clusters found in the JVIS reports, as well as additional studies. The manual also includes improved profile graphs allowing for easier comparison of an individual's profile to the profiles of 32 job groups.

Format of the JVIS

The JVIS booklet consists of 289 pairs of statements or items describing occupational activities. The front cover of the booklet instructs respondents to select either the A or B alternative of the pair as representing their preferred choice or as being more characteristic of them. An effort was made to employ items describing familiar activities in relatively simple words, and to use scale names likely to be understood by the average high school student. There is a total of 34 scales comprised of 17 items each. Items are arranged and keyed in a format designed to maximize scoring convenience and to yield scaled groups by families of vocational interests. The scoring key is presented in Appendix A.

General Characteristics of the JVIS

The development of the Jackson Vocational Interest Survey has been the result of a number of new and unique approaches to vocational interest scale development, scoring, and reporting of scores. Primarily, these involved a reconceptualization of occupational preferences in terms of vocational *roles* and *styles,* the use of elaborate computer-based strategies in vocational interest scale development, and a convenient scoring format which makes optional the use of computing facilities for scoring responses to obtain the 34 basic interest scales.

Questionnaires of occupational interests have often involved scales based on empirical keying in terms of particular criterion groups. In one important vocational interest scale approach, occupational scales were developed to compare the interests of the members of a particular occupational category, such as chemists, with those of a group of men or women in general. Items were keyed in terms of the degree to which each one distinguished the criterion occupational group from the general reference group. Another approach has been to correlate the particular patterning of item responses with those of various occupational groups to determine whether the respondent's score was more similar to scores of individuals in one occupation than in another. While each of these approaches has merit, the primary one used in the development of the JVIS was based on a conceptualization of vocational interest dimensions or *Basic Interest Scales* transcending particular occupational groups. The attempt was to find a set of characteristics useful, singly and in combination, to describe a wide variety of occupations and to discriminate more effectively between subclassifications within particular occupations. Thus, the occupational role of interest in providing *Medical Service* would not only encompass many of the activities performed by physicians and by medical specialists, but interests characteristic of the activities of medical technologists, dentists, and of a variety of related occupations as well. Using basic interest dimensions rather than occupations as the fundamental unit of analysis thus provides a framework for economically describing the interest patterns of a wide array of occupational groups.

Although the unit of analysis is a set of Basic Interest dimensions, it has been possible to use previous information about the vocational interests of occupational groups as well as to gather new occupational data. Based on modern multivariate techniques, a set of occupational data has been developed for use in counseling. Previous research with the JVIS and the Strong Vocational Interest Blank has yielded a large number of different projected JVIS profiles for occupational groups, ranging from Accountant to Urologist. The availability of these occupational profiles and profiles derived from clusters of similar occupations should aid the vocational counselor, as well as those interested in the classification of occupations. Results of these studies using JVIS profiles to classify occupations are reported in this Manual.

The JVIS places equal emphasis upon the measurement of interests of women and men. It was developed in such a way that an equal number of males and of females

contributed to the selection of items and scales. Its format allows males and females to be measured in terms of a common set of interest dimensions. These dimensions thus do not make discriminations on the basis of traditional "male" and "female" occupations. Counselors who wish to give all individuals an equal opportunity to consider occupations traditionally associated with only one sex should thus consider employing the JVIS.

Perhaps the most unique feature of the JVIS is its method of scale construction. In this effort careful attention to the development of an item pool substantively reflecting basic interest work role and work style dimensions was combined with the use of a series of psychometrically-based procedures designed to develop optimum levels of scale discrimination. Thus, each scale was designed to measure the interest designated by the scale name, and to be relatively uncorrelated with other scales.

Many vocational interest questionnaires require computer scoring. Although the JVIS may be scored by computer with the option of comparing the individual's profile with various educational groups and occupational clusters, it is also possible to score Basic Interest dimensions conveniently and quickly by hand without the aid of a template. This is an advantage to a counselor who requires immediate information concerning the measured vocational interests of a counselee. However, computer scoring yields a richer and more comprehensive account of an individual's career interests.

Vocabulary employed in the JVIS is at about the seventh-grade level. JVIS items consist of fairly concrete descriptions of activities, like "making unusual glass vases," rather than more abstract concepts like job titles. It is thus possible for individuals unfamiliar with the nature of the work performed by particular occupational groups to indicate a preference for a related activity. Because the items were developed explicitly for the purpose of reflecting fairly differentiated basic interests, rather than representing simply an ad hoc heterogeneous item pool, item content more highly saturated with the characteristics being measured can be identified. Even though the JVIS was developed employing relatively simple vocabulary, a few junior high school students might have difficulty with a small number of its words or concepts. The section on administration indicates the permissible limits for providing help to such individuals.

Description of JVIS Scales

Distinction Between Work Roles and Work Styles

The Jackson Vocational Interest Survey is designed to yield with minimum hand scoring effort or by computer scoring, a set of scores representing interests and preferences relevant to work. As indicated previously, these have been conceptualized as work roles and work styles. Scales reflecting work roles in certain cases are closely associated with a particular occupation or class of occupations, as in the case of

Physical Science, Law, and Elementary Education. In other instances, for example, with Professional Advising and Human Relations Management, the interest scale is broadly relevant to particular work roles in a variety of occupations or professions. Work style preferences involve not so much an interest in a particular job-related activity, but rather a preference for working in a certain kind of environment, or working in a situation in which a certain mode of behavior is the norm. Thus, Stamina may be the norm in computer programming, but not in another area. Planfulness may be more characteristic of accounting than it is of a less exacting profession. There is a distinction between a preference and a capacity or a trait. Not everyone capable of planful behavior prefers to work in an environment where planfulness is the norm, and not everyone capable of high stamina prefers environments in which a great deal of sustained effort is required. Work styles thus involve preferences for modes of behavior important in particular work environments, rather than representing psychological or personality traits *per se.*

JVIS items typically describe an activity in which the individual is asked to indicate a preference. Respondents are asked to disregard "whether or not you now have the necessary training or experience." However, even though the requirements are simply to indicate a preference, it is inevitable that an individual will in many cases consider his or her ability to undertake the activity. Thus, in expressing a preference to undertake a certain kind of mathematical activity, a respondent might very well consider individual ability level in relation to the skills required to undertake this activity successfully. Although, strictly speaking, the JVIS reflects preferences and not abilities, in certain cases there will be correlations between abilities and expressed preferences. Certain empirical data bearing on vocational interests and success in college performance have been collected. Portions of these data are reported in Chapter Four.

The JVIS scales and the profile have been grouped into areas on substantive grounds so as to yield a profile with associated scales in adjacent positions. The JVIS Basic Interest Scales are described in the next chapter (see Table 2-1). This organization of scales was designed to facilitate interpretation. Below are listed the JVIS scales in the order in which they are given in the profile, together with interpretive categories. In another section of the Manual, results from factor analyses are presented which suggest a slightly different organization of the scales based on empirical data. It should be emphasized that each scale is interpretable in its own right, being comprised of items showing the highest association with that scale, and that alternative categorization of scales might be useful for different purposes. Scales indicating preferences for work roles are printed in boldface, while those indicating preferences for work styles are printed in italics.

A. The Arts

1. Creative Arts

2. Performing Arts

B. Science and Mathematics

3. Mathematics
4. Physical Science
5. Engineering
6. Life Science
7. Social Science

C. Practical, Outdoor Activities

8. Adventure
9. Nature-Agriculture
10. Skilled Trades

D. Service Activities

11. Personal Service
12. Family Activity

F. Medicine and Health

13. Medical Service

F. Interpersonal and Job-Related Work Styles

14. Dominant Leadership
15. Job Security
16. Stamina
17. Accountability

G. Teaching and Social Welfare Activities

18. Teaching
19. Social Service
20. Elementary Education

H. Business, Administrative, and Related Activities

21. Finance
22. Business
23. Office Work
24. Sales
25. Supervision

I. Legal, Professional, Persuasive Work Roles

26. Human Relations Management
27. Law
28. Professional Advising

J. Literary, Academic

29. Author Journalism
30. Academic Achievement
31. Technical Writing

K. Work Styles Related to Job Activities

32. Independence
33. Planfulness
34. Interpersonal Confidence

Applications

The JVIS was developed with the following applications in mind:

1. For individuals who are in the process of deciding upon a course of study and a career;
2. For high school and college students who are in the process of formulating vocational and educational plans, and who might find it helpful to have information concerning their measured interests prior to doing so;
3. For college orientation and testing programs;
4. In high school and college course work devoted to occupations and occupational choice;
5. For individuals out of school who are seeking vocational and employment counseling to aid them in making a decision regarding a change in occupation or to aid in the identification of interests which may be consistent with a particular set of jobs. This might occur in specialized vocational counseling centers, or in the personnel offices of a company or government agency concerned with placing individuals in work which is consistent with their measured interests;
6. For research in vocational interests, the psychology of work, and student characteristics; and
7. For research in employee classification and selection.

It should be recognized that the JVIS focuses only upon measured interests and that additional information should also be reviewed by an individual considering a vocational or educational decision. This other information should include the availability of opportunities, interest in pursuing the education or training necessary to qualify for a particular activity, abilities and interpersonal skills, and the individual's values in relation to the work satisfactions available in different kinds of activities. It is particularly important to emphasize to respondents that measured vocational interests are quite distinct from abilities. Therefore, high measured interests in a particular area are not guarantees of success, but generally indicate a greater probability of satisfaction.

Administering the JVIS

Since a great deal of attention went into the development of instructions, the profile format, and the definitions of the scales, it is advisable to adhere reasonably closely to

these standardized procedures in the use of the JVIS. It is best if the use of the JVIS can be incorporated as one aspect of a broader program of testing and counseling. In such a program, it is desirable for individuals to have access to vocational information and occupational opportunities, as well as to information about themselves.

Introduction of the JVIS

In general, the way in which the JVIS is introduced will depend upon the setting in which it takes place. Thus, as part of a college testing or orientation program, it is a fairly simple matter to describe the Survey as part of a battery of tests which will aid in vocational decision making. In individual counseling situations, the introduction of the JVIS to respondents can be presented in a manner which is most easily understood. In some circumstances it will be useful to describe what interests are, and explain that most individuals have distinct likes and dislikes in what they prefer to do, what school subjects they study and in whatever hobbies and work they decide to undertake.

Most people are very much interested in their vocational interests. Identification of the JVIS as a vocational interest questionnaire to respondents will arouse their interest and facilitate cooperation. Therefore, the purposes of testing and a brief introduction of the nature of vocational interests should precede specific instructions about taking the JVIS. It is advisable to point out to respondents that the JVIS is not a test in the usual sense and will not show things a person can do well and poorly but, rather, will identify areas of interest. On the other hand, administration of the JVIS without a statement of its purpose and use may result in inadequate motivation to complete it carefully.

Supervising Administration

The JVIS was designed to be appropriate either for group administration or for individual administration. The great majority of high school and college students and adults can complete the JVIS with a minimum of supervision by following the relatively simple instructions appearing on the JVIS booklet and answer sheet.

The instructions printed on the JVIS booklets are for most people clear and self explanatory. When administering the JVIS to groups, it is a good idea to read these aloud, instructing respondents to read along with the proctor, then to explain how answers are to be recorded on the answer sheet, and finally to ask if there are any questions. When machine scorable answer sheets are being used, particular care should be taken to remind respondents that a medium soft pencil should be used, and not a hard pencil. To ensure this, it is best to provide medium pencils. Proctors should also make efforts to be sure that respondents have properly filled the spaces indicating their name and sex. As soon as it is clear that instructions have been understood, respondents may be asked to begin. In group settings, respondents should be told that if they have a question, they should raise their hand and their question will be discussed with them *individually* by having a proctor proceed to the questioner's

desk. This procedure avoids disturbing the remainder of the group. Groups should be encouraged to work rapidly and not to spend too long on any pair of statements.

For group administration, near the end of the session respondents should be asked to review their answer sheets to see if they have left out any answers. They should be strongly encouraged to answer any omitted items. When an individual has indicated completion of the JVIS, the answer sheet should be examined to determine that instructions have been followed and all items answered. If any items have not been answered, the respondent should be encouraged to do so, even if not entirely sure of the answer. If responses which were intended to be erased are not erased completely, respondents should be instructed to do so, especially if machine scoring is to be used.

Figure 1-1 provides a complete recommended guide for group administration using the special answer sheets. It may be readily adapted for hand-scored answer sheets.

Computer and Internet Administration of the JVIS

There are two options for administering the JVIS on a computer. First, the *SigmaSoft JVIS for Windows* is a software package that allows one to administer the JVIS on a computer, score the responses, and generate three types of report. Second, the JVIS can be administered over the internet at *www.jvis.com*. The JVIS web page provides a set of simple administration instructions as well as a comprehensive description of the JVIS and a point-by-point Career Exploration Guide that explains every section of the JVIS report.

Scoring

Hand Scoring the JVIS

The hand-scored answer sheet provides a convenient format for scoring the 34 basic scales. The 289 item pairs are arranged in a matrix with seventeen pairs across and seventeen pairs down. To score the first set of seventeen scales, it is necessary only to count the number of *A* alternatives circled in each horizontal row and record that number in the first column of spaces provided at the right of the answer sheet, labelled ***R*** (for rows). The total number of *A* responses in each row should be recorded in the space adjacent to the appropriate row. In similar fashion the second set of seventeen scales is scored by counting the total number of *B* responses circled in each vertical column of the answer sheet. When each column is counted, a check should be placed in the box at the bottom of the page under the appropriate column to indicate that that column has been counted. Then the total number of *B* responses should be recorded and the second column of blanks labeled ***C*** (for columns). In addition, the number of omits (where an individual has circled neither *A* nor *B)* and the number of times the individual has circled both *A* and *B,* if any, should be noted.

Accuracy of scoring should be evaluated by adding the total scores for the first 17 scales, the total scores for the second 17 scales, and obtaining a grand total. To

Figure 1-1: Recommended Guide for Group Administration of the JVIS

Section A. Prior Preparation

1. Please read this Guide before the day of testing.
2. Select a testing room in which there will be ample seating and freedom from distraction.
3. The JVIS requires approximately 45 to 60 minutes of working time. Instructions require an additional ten minutes. Occasionally students may require more or less time. There is no time limit.
4. Become thoroughly familiar with the special instructions for machine-readable answer sheets. These sheets will be scored by a computer. Try answering the items on the sheets yourself.
5. It is strongly recommended that materials be placed on each desk in advance. This procedure will save test administration time.
6. The following materials should be distributed to students:
   (a) one JVIS Survey booklet with printed instructions on the cover
   (b) a sharpened medium soft pencil with eraser
   (c) one machine-readable answer sheet

Section B. JVIS Administration

Read Aloud To Students:

You are about to take the Jackson Vocational Interest Survey. When your survey is scored, you will receive the following:

(a) A profile of your vocational interests
(b) A profile of your general occupational themes
(c) An indication of the similarity of your profile to those working in occupational areas and to university students enrolled in different academic areas.
(d) Specific information for career exploration

Now check to see that you have the following materials on your desk:

(a) One JVIS survey booklet with printed instructions on the cover
(b) A sharpened pencil with eraser
(c) One answer sheet

Read Aloud To Students:

Please observe that we will be using an answer sheet which is separate from the test booklet. Now read the JVIS instructions printed on the booklet cover silently while I read them aloud. (Take a few minutes to read aloud instructions on cover of booklet) *Are there any questions?*

Now read the special instructions on the answer sheet under "Marking Instructions" while I read them aloud. (Read instructions for answer sheets) *Are there any questions?*

Section C. 35 Minutes after Starting

Read Aloud To Students:

1. *Please take a few minutes to check your answer sheets. Be sure all identification is complete.*
2. *Do not skip any. Check your sheets to make sure that you have given only one answer to each pair of statements.*
3. *Erase completely any double answers or unnecessary marks on your sheets. Darken any light marks.*

Section D. At End of Period

Read Aloud To Students:

1. *If anyone has not finished the JVIS, the following arrangements have been made for you to finish and return the JVIS. They are:*
   (Date) _____
   (Time) _____
   (Place) _____
2. *If you are finished, please return the materials to the table as follows:*
   (a) All JVIS booklets in a separate pile
   (b) Return all answer sheets face up
   (c) All pencils in a separate pile
3. *Thank you.*

Section E. Returned Materials

Answer sheets should be sorted in the order in which printed reports are to be returned (for example, by school, classroom, year, alphabetical order) and mailed to the address given for the JVIS Scoring Service.

this the total number of omitted and double responses should be added. If scoring is accurate, the sum will be 289. If the total is not 289, an error in scoring has been made and subtotals should be rechecked. Even if the scores sum to 289, it is good practice to have an answer sheet scored a second time by a different scorer as a check on accuracy. With a little practice JVIS answer sheets can be hand scored in less than five minutes. In general, JVIS answer sheets may be scored readily by a clerk who has been instructed in this scoring procedure and who is supervised by a competent professional. In the event that respondents are asked to score their own answer sheets, their scoring should be closely supervised and checked by someone experienced in this procedure.

Machine Scoring the JVIS

Those who wish to make use only of the hand-scoring features of the JVIS may omit this section.

Although hand scoring is quick and efficient, there are advantages in the use of machine scoring, especially when a large number of cases is to be processed. The advantages are, first, the obvious one of preserving professional time for service and research activities, and, second, the greater scope of information possible with computer scoring. The foundation of the information provided is the JVIS profile. This profile of the 34 basic scales is the same profile, in a slightly different form, generated from hand scoring. The computer scored JVIS also contains additional information and comes in two report formats: Extended or Basic. In addition to the basic interest scales profile, the **JVIS Extended Report** includes: (a) a general introductory orientation page, (b) a profile for 10 general occupational themes, (c) similarity to college and university student groups, (d) similarity to 32 occupational group clusters, (e) a narrative summary of the three highest-ranked educational and occupational clusters, (f) administrative indices and the academic satisfaction scale, and (g) a narrative report entitled "Where to Go From Here." The **JVIS Basic Report** contains the basic interest scales profiles and information similar to the Extended Report but with preprinted interpretive information rather than the personalized narrative summaries.

The JVIS Hand-Scored Profile

For hand-scored answer sheets a convenient profile for the 34 basic interest scales may be plotted. For machine-scored records, this is provided automatically. The profile was especially designed to be readily understandable by respondents. Experience has shown that, in fact, the great majority of respondents find scores presented in the profile to be quite meaningful. A greater proportion of counseling time may thus be reserved for educational and career exploration, rather than being taken up with lengthy test interpretation.

After test scores have been tabulated on the hand-scored JVIS answer sheet, the scores are transferred in the same order to the appropriate spaces on the JVIS

profile sheet. The column labeled ***R*** is transferred to the first 17 blank spaces in the column under the heading "Score" on the profile, and the column labeled ***C*** to the second 17 spaces. The next step is to find, for each scale, the printed value of the raw score in the shaded area corresponding to the raw score written in the blank space for that scale. The correct printed raw score on the profile should be circled. After the appropriate printed raw score has been circled, a marking pen should be used to draw a line from the left margin to the printed raw score circled. The profile is based on percentile scores. A percentile score indicates the proportion of people from a comparison group that have scores lower than a given raw score. The norms for these percentile scores are based on an equal number of males and of females. Also given on the hand-scored profile for each scale are reference points for male and for female norms. A thin line with a small break at its midpoint appears at the top and at the bottom of each of the 34 shaded horizontal bars for the 34 scales. The thin line at the top indicates the area in which the middle 50 per cent of the male normative group scores (from the 25th to 75th percentiles, usually referred to as the interquartile range) fell, with the small break indicating the mean. The thin line at the bottom gives corresponding information for females.

Although the standard scores employed for both the hand- and computer-scored profiles are based on combined male and female norms, there is nevertheless very useful information also contained in the interpretation of these standard scores in the light of separate male and female norms. Although mean differences for males and females are in general not large on the JVIS, for a small number of scales, like Engineering, raw scores will yield rather different means for males and for females. In such cases the consideration of like-sex norms has the effect of encouraging the diminishing of traditional occupational sex roles. Since this effect may not be obvious, one or two illustrations might be helpful. Higher percentiles on the Engineering scale would encourage females to consider this traditionally male occupational role. But since the mean for males on this scale is significantly higher than that for females, the use of combined norms would result in scores below the 50th percentile for the majority of females. The use of separate male and female norms guarantees that the same percentage of males and females receive high scaled scores. Similarly, for Family Activity percentile scores, where females in the normative groups scored significantly higher than did males, the use of separate norms insures that the same percentage of males as of females will receive a scaled score at a given level. For hand-scored JVIS profiles, counselors should be aware of this distinction and may refer to the percentile tables in the next section for percentiles based on separate male and separate female norms. On the computer-generated profile, these percentiles for male and for female norms are generated automatically.

When returning hand-scored profiles to respondents, they should be encouraged to read the reverse side, which contains a guide for interpreting the JVIS Basic Interest profile.

Norms

The most recent normative sample of JVIS profiles was collected in 1999. These consist of the responses of 1750 males and 1750 females from Canada and the U.S. This sample of 3500 individuals includes the responses of 2380 secondary school students (1190 males and 1190 females) and 1120 adults (560 males and 560 females). The adult sample consists of university and college students as well as adults seeking career interest assessment. The total sample of 3500 profiles is used to generate the JVIS Extended and Basic Reports as well as the profile sheets for hand scoring.

Basic Scale Means, Standard Deviations, and Percentiles

Table 1-1 presents means and standard deviations for males, for females, and for the combined normative sample. Also presented in Table 1-1 are corresponding values of skewness and kurtosis. It will be noted that means for the combined male and female sample are relatively close to the midpoint between 0 and 17. Considering the number of items on each scale, scales generally have a reasonable ceiling and floor, sufficient to identify reliable estimates of profile shape. Also, the majority of the values of kurtosis are negative, indicating a platykurtic distribution. This means that departures from the normal distribution tend in the direction of greater dispersion, a desirable property in differentiating the interests of different people. Tables 1-2, 1-3, and 1-4 present percentiles for JVIS Basic Scale scores for the normative samples of 1750 males, 1750 females, 3500 combined males and females, respectively.

Table 1-5 presents means and standard deviations for secondary school and adult groups. Male, female, and combined male-female statistics are presented within these two groups. It is noteworthy that differences between the secondary school and adult combined samples are relatively small. Differences in raw scores range from .11 to 1.3 with a median of .59.

Means for Students Enrolling in Different Academic Colleges

Tables 1-6 and 1-7 present means for a total of 10,134 students entering four-year and two-year Pennsylvania State University programs, respectively, classified in terms of their choice of an academic college. Of this total 8760 were enrolled in four year programs, and 1374 were enrolled in two year programs. Of the four-year students, 5124 were enrolled at Commonwealth campuses (e.g., Scranton), and 3636 were at the main campus.

It will be noted that the profiles for different colleges are quite distinct, and that differences are sharp for dissimilar programs. Compare, for example, the means for engineering students with the means for liberal arts students on the JVIS Engineering and Author-Journalism scales. These two scales discriminate these groups to a substantial degree. As expected, profiles for four-year students reveal a stronger commitment to academic and technical interests appropriate to their programs than do the profiles for two-year students. Over all programs, there is a strong tendency

Table 1-1: Summary Statistics for Normative Sample

	Males (N = 1750)				Females (N = 1750)				Combined (N = 3500)			
	Means	SD	Skew.	Kurt.	Means	SD	Skew.	Kurt.	Means	SD	Skew.	Kurt.
Creative Arts	8.10	4.12	.05	-.77	9.20	4.07	-.16	-.73	8.65	4.13	-.06	-.78
Performing Arts	8.95	3.81	-.14	-.61	8.84	4.08	-.02	-.81	8.89	3.95	-.08	-.72
Mathematics	7.10	4.80	.36	-.92	4.75	4.27	.97	.18	5.92	4.69	.64	-.59
Physical Science	8.13	4.50	.15	-.87	5.31	4.16	.85	.00	6.72	4.56	.46	-.73
Engineering	9.19	3.98	-.14	-.74	5.03	3.50	.77	.11	7.11	4.29	.30	-.84
Life Science	7.87	4.24	.16	-.81	6.97	4.35	.41	-.72	7.42	4.32	.27	-.80
Social Science	8.56	3.43	.11	-.55	8.86	3.36	.03	-.56	8.71	3.40	.07	-.56
Adventure	11.46	3.99	-.60	-.38	8.94	4.31	-.13	-.83	10.20	4.34	-.36	-.74
Nature-Agriculture	6.99	4.10	.34	-.67	5.87	3.95	.44	-.65	6.43	4.06	.39	-.65
Skilled Trades	6.00	3.87	.50	-.42	4.35	3.07	.79	.25	5.17	3.59	.71	-.02
Personal Service	7.85	2.94	.04	-.26	9.53	3.19	-.31	-.36	8.69	3.18	-.08	-.45
Family Activity	8.98	3.50	-.07	-.62	10.53	3.45	-.51	-.20	9.76	3.56	-.27	-.55
Medical Service	7.24	4.60	.34	-.81	6.58	5.16	.50	-.99	6.91	4.90	.41	-.92
Dominant Leadership	8.18	3.45	.07	-.42	6.27	3.29	.31	-.40	7.22	3.50	.20	-.47
Job Security	8.45	3.20	-.08	-.44	8.20	3.34	-.02	-.48	8.32	3.27	-.05	-.46
Stamina	9.46	3.19	-.14	-.44	8.76	3.16	-.08	-.50	9.11	3.19	-.11	-.47
Accountability	10.24	2.83	-.16	-.30	10.15	2.74	-.19	.05	10.20	2.79	-.17	-.14
Teaching	7.80	3.45	.15	-.44	10.01	3.23	-.27	-.25	8.91	3.52	-.09	-.51
Social Service	6.65	3.83	.45	-.42	10.60	3.74	-.33	-.60	8.63	4.27	.03	-.91
Elementary Education	7.24	3.66	.20	-.52	10.65	3.78	-.38	-.51	8.94	4.09	-.04	-.78
Finance	9.00	4.13	-.05	-.84	7.48	3.86	.29	-.65	8.24	4.07	.14	-.81
Business	9.07	3.04	.00	-.33	9.63	2.82	-.22	-.13	9.35	2.94	-.12	-.27
Office Work	7.12	3.22	.28	-.32	7.95	3.37	.33	-.45	7.53	3.32	.32	-.35
Sales	8.24	3.33	.16	-.53	8.35	3.23	-.01	-.61	8.30	3.28	.08	-.57
Supervision	9.11	3.39	-.11	-.54	9.05	3.25	-.10	-.48	9.08	3.32	-.10	-.51
Human Relations Mgmt.	9.11	3.38	-.05	-.49	9.49	3.21	-.21	-.33	9.30	3.30	-.13	-.42
Law	9.47	3.77	-.10	-.60	9.68	3.84	-.06	-.73	9.57	3.80	-.08	-.67
Professional Advising	8.92	2.90	-.10	-.27	9.30	2.67	-.08	-.08	9.11	2.79	-.11	-.17
Author-Journalism	8.83	3.80	.02	-.68	10.03	3.77	-.25	-.64	9.43	3.83	-.11	-.71
Academic Achievement	9.02	3.15	-.02	-.50	9.59	2.94	-.10	-.44	9.31	3.06	-.08	-.47
Technical Writing	6.59	3.00	.29	-.15	7.36	2.97	.39	-.01	6.97	3.01	.33	-.06
Independence	9.88	2.84	-.23	-.22	9.98	2.82	-.19	-.34	9.93	2.83	-.21	-.28
Planfulness	8.75	3.13	-.17	-.44	9.17	3.18	-.11	-.54	8.96	3.16	-.13	-.48
Interpersonal Confidence	11.49	3.18	-.49	-.25	12.56	2.78	-.84	.72	12.02	3.04	-.67	.12

for the unique profile of students entering a particular academic college to conform to expectations regarding associated interests. This issue and its implications is discussed in Chapter 5.

Table 1-2: Percentile Equivalents of JVIS Raw Scores—Male Norms

Score	Creative Arts	Performing Arts	Mathematics	Physical Science	Engineering	Life Science	Social Science	Adventure	Nature-Agriculture	Skilled Trades	Personal Service	Family Activity	Medical Service	Dominant Leadership	Job Security	Stamina	Accountability	Teaching	Social Service	Elementary Education	Finance	Business	Office Work	Sales	Supervision	Human Relations Mgmt.	Law	Professional Advising	Author-Journalism	Academic Achievement	Technical Writing	Independence	Planfulness	Interpersonal Confidence	Score
17	99	98	98	98	98	99	99	92	99	99	99	99	98	99	99	99	99	99	99	99	97	99	99	99	99	99	98	99	99	99	99	99	96	17
16	97	97	97	96	96	97	99	86	99	99	99	98	97	99	99	98	98	99	99	99	96	99	99	99	98	98	96	99	97	99	99	99	99	92	16
15	96	95	95	93	93	96	97	82	98	99	99	96	96	98	98	96	96	98	99	98	93	98	99	98	96	96	93	98	95	97	99	96	98	86	15
14	92	90	92	90	88	92	95	73	96	98	98	92	93	96	96	92	90	96	97	96	88	95	98	96	92	92	88	96	92	95	99	93	96	79	14
13	88	86	88	86	84	88	90	66	93	96	96	86	90	92	92	86	84	93	96	95	84	90	96	92	86	88	82	92	86	90	98	86	92	69	13
12	82	79	84	82	76	84	84	54	88	95	92	82	84	86	86	79	73	88	92	90	76	84	93	86	82	82	76	86	79	82	96	76	84	58	12
11	76	69	79	73	69	76	76	46	84	90	86	73	79	79	79	69	62	82	86	84	69	73	88	79	73	73	66	76	73	73	93	66	76	42	11
10	69	62	73	66	58	69	66	34	76	84	76	62	73	69	69	58	46	73	82	79	58	62	82	69	62	62	54	66	62	62	86	50	66	31	10
9	58	50	66	58	50	62	54	27	69	79	66	50	66	58	58	46	34	62	73	69	50	50	73	58	50	50	46	50	50	50	79	38	54	21	9
8	50	42	58	50	38	50	42	18	58	69	54	38	58	46	46	31	21	54	66	58	42	34	62	46	38	38	34	38	42	38	69	24	42	14	8
7	38	31	50	38	27	42	31	14	50	62	38	27	46	38	31	21	14	42	54	46	31	24	50	34	27	27	24	24	31	27	54	16	27	8	7
6	31	21	42	31	21	34	24	8	42	50	27	18	38	27	21	14	7	31	42	38	24	16	38	24	18	18	18	16	24	16	42	8	18	4	6
5	21	16	34	24	14	24	16	5	31	38	16	14	31	18	14	8	3	21	34	27	16	10	24	16	12	12	12	8	16	10	31	4	12	2	5
4	16	10	27	18	10	18	10	3	24	31	10	8	24	12	8	4	1	14	24	18	12	4	16	10	7	7	7	4	10	5	18	2	7	1	4
3	12	5	18	14	5	14	5	2	16	21	5	4	18	7	4	2	1	8	16	12	7	2	10	5	4	4	4	2	7	3	12	1	4	0	3
2	7	4	14	8	4	8	3	1	12	16	2	2	14	4	2	1	0	4	12	8	4	1	5	3	2	2	2	1	4	1	7	0	1	0	2
1	4	2	10	5	2	5	1	1	7	10	1	1	8	2	1	0	0	2	7	4	3	0	3	1	1	1	1	0	2	1	3	0	1	0	1
0	2	1	7	4	1	3	1	0	4	5	0	1	5	1	1	0	0	1	4	2	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0

Table 1-3: Percentile Equivalents of JVIS Raw Scores—Female Norms

Score	Creative Arts	Performing Arts	Mathematics	Physical Science	Engineering	Life Science	Social Science	Adventure	Nature-Agriculture	Skilled Trades	Personal Service	Family Activity	Medical Service	Dominant Leadership	Job Security	Stamina	Accountability	Teaching	Social Service	Elementary Education	Finance	Business	Office Work	Sales	Supervision	Human Relations Mgmt.	Law	Professional Advising	Author-Journalism	Academic Achievement	Technical Writing	Independence	Planfulness	Interpersonal Confidence	Score
17	97	98	99	99	99	99	99	97	99	99	99	97	98	99	99	99	99	99	96	96	99	99	99	99	99	99	97	99	96	99	99	99	95	17
16	96	96	99	99	99	98	98	95	99	99	98	95	96	99	99	99	98	97	92	92	99	99	99	99	98	98	95	99	95	99	99	98	98	88	16
15	92	93	99	99	99	96	96	92	99	99	96	90	95	99	98	98	96	93	88	88	97	97	98	98	96	96	92	98	90	96	99	96	96	82	15
14	88	90	99	98	99	95	93	88	98	99	92	84	92	99	96	96	92	88	82	82	96	93	96	96	93	92	86	96	86	93	99	92	93	69	14
13	82	84	97	96	99	92	88	82	96	99	86	76	88	98	92	90	84	82	73	73	92	88	93	92	88	86	82	92	79	88	97	86	88	58	13
12	76	79	96	95	98	88	82	76	95	99	79	66	86	96	86	84	76	73	66	66	88	79	88	86	82	79	73	84	69	79	95	76	82	42	12
11	66	69	93	92	96	82	73	69	90	99	69	54	82	92	79	76	62	62	54	54	82	69	82	79	73	69	62	73	62	69	88	66	73	27	11
10	58	62	88	86	92	76	62	58	84	96	54	42	76	86	69	66	46	50	42	42	76	54	73	69	62	58	54	62	50	54	82	50	62	18	10
9	50	50	84	82	86	69	50	50	79	93	42	34	69	79	58	54	34	38	34	34	66	42	62	58	50	42	42	46	38	42	73	38	46	10	9
8	38	42	79	73	79	58	38	42	69	88	31	24	62	69	46	42	21	27	24	24	54	27	50	46	38	31	34	31	31	31	58	24	34	5	8
7	31	31	69	66	73	50	27	31	62	82	21	16	54	58	34	27	14	18	16	16	46	18	38	34	27	21	24	18	21	18	46	14	24	2	7
6	21	24	62	58	62	42	18	24	50	69	14	10	46	46	24	18	7	12	12	12	34	10	27	24	18	14	16	12	14	12	31	8	16	1	6
5	16	18	54	46	50	31	14	18	42	58	8	5	38	34	16	12	3	5	7	7	27	5	18	16	12	8	12	5	10	5	21	4	10	0	5
4	10	12	42	38	38	24	8	14	31	46	4	3	31	24	10	7	1	3	4	4	18	2	12	10	5	4	7	2	5	3	14	2	5	0	4
3	7	8	34	27	27	18	4	8	24	34	2	1	24	16	5	4	1	1	2	2	12	1	7	4	3	2	4	1	3	1	7	1	3	0	3
2	4	4	27	21	18	14	2	5	16	21	1	1	18	10	3	2	0	1	1	1	8	0	4	2	1	1	2	0	2	1	4	0	1	0	2
1	2	3	18	16	12	8	1	4	12	14	0	0	14	5	1	1	0	0	1	1	4	0	2	1	1	1	1	0	1	0	2	0	1	0	1
0	1	1	14	10	8	5	1	2	7	8	0	0	10	3	1	0	0	0	0	0	3	0	1	1	0	0	1	0	0	0	1	0	0	0	0

Table 1-4: Percentile Equivalents of JVIS Raw Scores—Combined Norms

Score	Creative Arts	Performing Arts	Mathematics	Physical Science	Engineering	Life Science	Social Science	Adventure	Nature-Agriculture	Skilled Trades	Personal Service	Family Activity	Medical Service	Dominant Leadership	Job Security	Stamina	Accountability	Teaching	Social Service	Elementary Education	Finance	Business	Office Work	Sales	Supervision	Human Relations Mgmt.	Law	Professional Advising	Author-Journalism	Academic Achievement	Technical Writing	Independence	Planfulness	Interpersonal Confidence	Score
17	98	98	99	99	99	99	99	95	99	99	99	98	98	99	99	99	99	99	98	98	99	99	99	99	99	99	98	99	98	99	99	99	95	17
16	96	96	98	98	98	98	98	90	99	99	99	96	97	99	99	99	98	98	96	96	97	99	99	99	98	98	96	99	96	99	99	98	99	90	16
15	93	93	97	96	96	96	97	86	98	99	98	93	96	99	98	96	96	96	93	93	96	97	99	98	96	96	92	98	93	97	99	96	97	84	15
14	90	90	96	95	95	93	95	82	97	99	96	88	92	97	96	93	92	92	90	88	92	95	97	96	93	92	88	96	88	93	99	92	95	76	14
13	86	84	93	92	92	90	90	73	95	99	92	82	88	96	92	88	84	88	84	84	88	88	95	92	88	86	82	92	82	88	98	86	90	62	13
12	79	79	90	88	86	86	84	66	92	97	84	73	84	92	86	82	73	82	79	76	82	82	90	86	82	79	73	84	76	82	96	76	84	50	12
11	73	69	86	82	82	79	76	58	86	95	76	62	79	86	79	73	62	73	73	69	76	73	84	79	73	69	66	76	66	73	90	66	73	38	11
10	62	62	82	76	76	73	66	50	82	90	66	54	73	79	69	62	46	62	62	62	66	58	76	69	62	58	54	62	54	58	84	50	62	24	10
9	54	50	76	69	66	66	54	38	73	86	54	42	66	69	58	50	34	50	54	50	58	46	66	58	50	46	46	50	46	46	76	38	50	16	9
8	42	42	66	62	58	54	42	31	66	79	42	31	58	58	46	38	21	38	46	42	46	31	54	46	38	34	34	34	34	34	62	24	38	10	8
7	34	31	58	54	50	46	31	24	54	69	31	21	50	46	34	24	14	31	34	31	38	21	42	34	27	24	24	21	27	21	50	16	27	4	7
6	27	24	50	42	38	38	21	16	46	58	21	14	42	38	24	16	7	21	27	24	27	14	31	24	18	16	18	14	18	14	38	8	18	2	6
5	18	16	42	34	31	27	14	12	34	50	12	10	34	27	16	10	3	14	18	16	21	7	21	16	12	10	12	7	12	8	24	4	10	1	5
4	14	12	34	27	24	21	8	8	27	38	7	5	27	18	10	5	1	8	14	12	16	4	14	10	7	5	7	4	8	4	16	2	5	1	4
3	8	7	27	21	16	16	4	4	21	27	4	3	21	12	5	3	1	4	10	7	10	1	8	5	4	3	4	1	4	2	10	1	3	0	3
2	5	4	21	16	12	10	2	3	14	18	2	1	16	7	3	1	0	2	5	4	7	1	4	3	2	1	2	1	3	1	4	0	1	0	2
1	3	2	16	10	8	7	1	2	10	12	1	1	12	4	1	1	0	1	4	3	4	0	2	1	1	1	1	0	1	0	2	0	1	0	1
0	2	1	10	7	4	4	1	1	5	8	0	0	8	2	1	0	0	1	2	1	2	0	1	1	0	0	1	0	1	0	1	0	0	0	0

Table 1-5: Summary Statistics for Secondary School and Adult Normative Sample

	Secondary Schools						Adults					
	Males (N = 1190)		Females (N = 1190)		Combined (N = 2380)		Males (N = 560)		Females (N=560)		Combined (N=1120)	
Scale	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Creative Arts	8.04	4.07	9.06	4.14	8.55	4.14	8.24	4.22	9.50	3.90	8.87	4.11
Performing Arts	9.08	3.62	9.06	4.07	9.07	3.85	8.67	4.19	8.36	4.08	8.52	4.14
Mathematics	7.39	4.88	4.83	4.42	6.11	4.82	6.48	4.57	4.57	3.93	5.52	4.37
Physical Science	8.53	4.51	5.37	4.38	6.95	4.72	7.28	4.36	5.18	3.66	6.23	4.16
Engineering	9.69	3.88	5.07	3.54	7.38	4.37	8.13	4.00	4.96	3.42	6.54	4.04
Life Science	8.19	4.23	7.14	4.48	7.67	4.39	7.20	4.18	6.62	4.04	6.91	4.12
Social Science	8.47	3.38	8.74	3.36	8.60	3.37	8.75	3.51	9.11	3.36	8.93	3.44
Adventure	11.79	3.76	9.32	4.24	10.55	4.19	10.76	4.35	8.14	4.37	9.45	4.55
Nature-Agriculture	6.90	4.08	5.64	4.02	6.27	4.10	7.16	4.13	6.37	3.75	6.77	3.96
Skilled Trades	6.39	3.86	4.52	3.06	5.45	3.61	5.16	3.77	4.01	3.04	4.59	3.47
Personal Service	8.00	2.94	9.79	3.12	8.89	3.16	7.54	2.90	8.97	3.26	8.25	3.17
Family Activity	8.96	3.47	10.47	3.43	9.71	3.53	9.04	3.57	10.66	3.49	9.85	3.62
Medical Service	7.57	4.60	6.85	5.26	7.21	4.96	6.53	4.54	6.01	4.88	6.27	4.72
Dominant Leadership	8.64	3.33	6.63	3.23	7.64	3.43	7.20	3.48	5.49	3.30	6.34	3.50
Job Security	8.64	3.07	8.38	3.15	8.51	3.11	8.03	3.42	7.82	3.68	7.93	3.56
Stamina	9.45	3.17	8.71	3.16	9.08	3.19	9.50	3.23	8.88	3.15	9.19	3.20
Accountability	10.04	2.81	9.99	2.61	10.01	2.71	10.68	2.83	10.49	2.97	10.59	2.90
Teaching	7.35	3.28	9.76	3.23	8.56	3.47	8.77	3.61	10.54	3.16	9.66	3.50
Social Service	6.14	3.54	10.62	3.76	8.38	4.28	7.73	4.18	10.56	3.71	9.15	4.20
Elementary Education	6.90	3.53	10.73	3.83	8.82	4.15	7.96	3.83	10.46	3.65	9.21	3.94
Finance	9.07	4.14	7.53	3.91	8.30	4.10	8.86	4.11	7.39	3.75	8.12	4.00
Business	9.04	3.03	9.58	2.83	9.31	2.94	9.13	3.05	9.72	2.81	9.43	2.95
Office Work	7.27	3.16	7.99	3.35	7.63	3.28	6.79	3.32	7.85	3.41	7.32	3.41
Sales	8.39	3.31	8.62	3.20	8.50	3.26	7.94	3.37	7.78	3.21	7.86	3.29
Supervision	8.94	3.32	8.93	3.24	8.93	3.28	9.48	3.51	9.31	3.25	9.40	3.38
Human Relations Mgmt.	8.75	3.24	9.28	3.15	9.01	3.20	9.88	3.56	9.94	3.30	9.91	3.43
Law	9.59	3.74	9.85	3.95	9.72	3.85	9.22	3.81	9.30	3.57	9.26	3.69
Professional Advising	8.63	2.80	9.06	2.60	8.85	2.71	9.55	3.00	9.81	2.75	9.68	2.88
Author-Journalism	8.66	3.67	9.94	3.74	9.30	3.76	9.20	4.06	10.24	3.83	9.72	3.97
Academic Achievement	8.60	3.09	9.21	2.87	8.91	3.00	9.92	3.08	10.40	2.92	10.16	3.01
Technical Writing	6.36	2.90	7.05	2.76	6.71	2.85	7.06	3.14	8.02	3.27	7.54	3.24
Independence	9.69	2.80	9.86	2.78	9.77	2.79	10.28	2.91	10.23	2.88	10.26	2.89
Planfulness	8.63	3.05	9.07	3.11	8.85	3.08	8.99	3.29	9.38	3.31	9.18	3.30
Interpersonal Confidence	11.21	3.24	12.38	2.84	11.79	3.10	12.08	2.96	12.94	2.61	12.51	2.83

Table 1-6: Means for Male and Female Four-Year Students in Different Academic Colleges

JVIS Scales	Agriculture		Arts and Architecture		Business		Earth & Mineral Science		Education		Engineering		Health, Physical Education & Recreation		Human Development		Liberal Arts		Science		Division of University Studies	
	Male 555	Female 292	Male 152	Female 147	Male 741	Female 310	Male 277	Female 38	Male 88	Female 378	Male 1222	Female 189	Male 67	Female 124	Male 199	Female 493	Male 661	Female 884	Male 706	Female 538	Male 449	Female 250
Creative Arts	9.43	11.24	11.65	13.27	5.74	7.55	8.31	9.32	7.74	9.38	8.51	9.82	8.97	9.87	6.67	8.91	7.05	8.58	7.56	9.75	7.85	9.90
Performing Arts	7.05	7.63	9.70	9.67	6.60	6.43	7.19	7.50	6.89	7.34	6.87	6.94	7.58	8.02	7.48	6.79	7.74	7.80	6.82	7.21	7.07	7.70
Mathematics	8.13	7.89	8.49	6.48	7.61	7.15	11.42	11.34	8.00	5.01	13.14	12.77	5.88	6.15	5.61	5.12	6.23	4.56	12.20	9.99	8.33	6.09
Physical Science	10.90	9.77	7.96	6.04	6.25	4.18	12.60	11.71	7.64	4.50	12.37	10.32	7.21	5.74	5.82	5.41	6.65	4.74	12.85	10.30	9.22	6.18
Engineering	10.86	8.05	10.57	7.37	7.74	4.85	12.61	11.03	8.99	4.62	13.92	12.24	8.46	5.98	7.51	5.30	7.43	4.86	11.93	8.50	10.41	6.12
Life Science	12.64	13.25	8.14	7.50	5.19	4.84	10.79	10.89	7.47	7.06	9.58	8.80	9.19	9.07	6.75	8.08	6.87	6.84	12.30	11.90	8.86	8.47
Social Science	9.79	10.79	9.35	10.01	7.30	7.89	9.25	10.11	8.22	9.57	8.34	9.62	8.76	9.67	8.80	10.44	9.43	10.00	9.50	10.41	8.89	9.45
Adventure	13.01	11.41	11.38	10.12	8.91	6.78	12.21	10.53	9.56	7.66	11.97	10.18	12.36	11.07	10.49	8.71	10.08	8.73	11.63	10.08	11.04	9.50
Nature/Agriculture	13.28	13.22	8.66	8.43	4.92	4.50	9.26	8.74	6.47	6.52	8.12	7.07	9.91	9.52	6.76	7.29	6.20	6.37	8.46	8.68	7.72	7.75
Skilled Trades	5.64	4.48	5.16	4.51	3.62	2.85	5.58	3.87	3.89	3.39	6.20	4.03	4.64	4.06	3.84	3.24	3.24	2.53	4.77	3.73	4.87	3.79
Personal Service	6.96	8.22	7.28	8.76	6.09	7.64	6.23	7.16	6.07	8.53	6.21	7.66	8.10	9.97	6.68	8.72	5.71	7.73	5.93	7.69	6.37	8.79
Family Activity	9.33	10.97	9.60	10.89	6.55	8.96	7.83	9.24	6.75	9.77	8.07	9.72	8.97	11.10	7.11	9.42	6.15	8.30	7.43	9.84	7.40	10.10
Medical Service	9.10	10.49	6.16	4.38	4.93	3.68	7.69	6.50	5.86	5.31	7.19	6.13	6.52	7.59	6.92	9.01	5.88	5.22	11.57	11.06	7.35	6.96
Dominant Leadership	6.57	5.09	5.57	4.53	6.08	4.89	3.82	6.03	6.14	4.35	6.66	5.11	6.45	4.94	7.24	5.27	5.95	4.44	6.47	4.99	6.36	4.56
Job Security	8.79	7.53	7.79	6.89	7.67	7.23	8.84	7.71	6.92	7.04	8.61	7.29	8.25	7.65	7.53	7.27	6.66	6.20	7.83	7.33	8.08	7.34
Stamina	10.85	10.43	9.86	9.46	8.70	8.12	10.26	10.87	9.00	8.32	11.00	10.19	9.06	9.33	9.13	9.04	8.74	8.14	10.76	10.30	9.28	8.44
Accountability	12.31	12.06	11.62	11.27	11.10	11.43	12.15	12.45	11.32	11.13	12.51	12.19	11.10	11.34	11.31	11.38	10.70	10.56	11.87	11.88	11.27	11.18
Teaching	7.56	8.54	8.53	9.40	9.11	10.62	7.23	8.37	12.38	12.72	7.00	8.02	10.04	10.65	9.60	10.66	9.69	11.05	7.56	8.56	8.33	9.86
Social Service	6.72	9.95	7.27	10.98	7.54	10.99	5.86	7.76	9.90	14.12	5.12	8.43	8.70	12.49	10.00	13.96	9.04	12.64	6.81	10.83	7.56	11.67
Elementary Education	5.96	8.42	7.11	9.73	7.09	10.32	5.21	7.16	10.36	13.98	5.30	8.03	8.06	10.98	7.83	11.15	7.59	10.52	5.74	8.71	6.56	10.06
Finance	6.45	4.24	7.29	6.22	13.08	11.33	8.21	6.45	7.97	6.12	8.49	7.70	6.87	5.23	9.84	6.36	10.17	7.99	7.65	5.53	9.24	7.00
Business	7.28	6.58	8.31	8.46	11.75	11.56	7.51	7.47	8.57	8.67	7.78	8.12	8.63	8.23	9.96	8.71	9.86	9.60	7.03	7.12	8.96	9.11
Office Work	4.68	4.83	5.25	5.81	8.06	9.34	5.29	5.79	6.09	7.40	5.60	5.76	6.25	6.33	6.46	6.35	6.08	6.73	5.09	5.49	6.15	7.18
Sales	6.19	5.22	6.98	7.15	10.36	9.63	6.63	5.13	7.69	7.95	6.54	6.30	7.69	7.26	8.93	7.61	8.60	8.51	6.06	5.64	8.06	7.75
Supervision	6.54	5.20	7.11	6.07	11.40	10.76	7.39	6.13	9.10	7.66	7.98	7.36	7.96	6.80	9.60	7.85	9.03	8.07	7.05	5.93	8.68	7.44
Human Relations Mgmt.	8.16	7.68	9.22	8.88	11.52	10.75	8.80	8.63	10.85	10.15	8.53	9.03	9.66	9.54	11.00	10.30	11.60	11.40	8.43	8.50	9.69	9.44
Law	7.23	6.35	8.41	8.59	12.31	11.32	8.57	7.42	9.52	8.74	8.32	8.41	8.37	7.89	11.62	9.29	11.86	11.09	8.10	7.40	9.93	9.04
Professional Advising	7.19	6.81	8.08	8.37	11.30	11.11	7.89	8.37	8.94	9.05	8.18	8.56	8.21	8.09	9.43	8.80	10.22	10.04	7.55	7.60	9.02	8.98
Author/Journalism	6.51	7.27	9.41	10.50	8.38	9.03	6.83	8.08	9.34	10.31	6.21	7.20	8.06	8.60	8.60	9.08	11.04	11.97	3.91	7.81	8.08	9.71
Academic Achievement	9.35	9.85	9.63	10.09	10.36	10.61	9.31	10.50	1.43	10.66	9.55	9.94	9.37	9.12	10.13	10.14	10.88	10.87	10.08	10.23	9.81	10.01
Technical Writing	5.64	6.65	6.28	7.46	7.43	7.85	5.66	7.29	7.31	8.11	5.14	6.18	6.31	6.56	7.01	7.20	8.58	9.23	5.97	6.67	6.58	7.54
Independence	9.33	9.22	10.44	10.14	10.39	10.07	9.23	8.66	10.30	9.55	9.41	9.01	10.12	8.74	10.13	9.23	10.96	10.47	9.25	8.90	9.92	9.57
Planfulness	8.59	8.20	8.51	8.76	10.58	10.75	8.74	8.95	9.88	9.92	9.23	8.82	9.37	8.75	9.79	9.45	9.41	9.10	8.44	8.51	9.48	9.35
Interpersonal Confidence	10.54	10.85	11.27	12.56	12.86	13.56	10.70	11.42	11.75	13.22	10.47	11.37	11.58	12.46	12.87	12.76	12.69	13.21	10.13	11.51	11.41	12.37

Table 1-7: Means for Male and Female Two-Year Students in Different Academic Colleges

	Agriculture		Business		Earth & Mineral Science		Engineering		Health, Physical Education & Recreation		Human Development		Liberal Arts		Science	
JVIS Scales	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Number of respondents	132	26	110	72	42	1	563	34	20	16	12	24	124	81	57	58
Creative Arts	10.21	12.85	6.22	7.79	8.79	—	9.43	11.21	10.35	10.44	5.42	10.92	7.26	9.59	8.00	8.14
Performing Arts	6.88	8.23	6.54	5.43	6.81	—	6.61	6.62	6.90	7.75	6.08	8.21	6.87	7.31	6.67	5.36
Mathematics	6.73	5.65	5.45	5.42	8.29	—	11.82	9.71	3.45	5.19	3.92	4.54	6.32	5.36	10.39	8.45
Physical Science	10.47	8.65	5.58	3.72	9.76	—	11.06	8.12	8.60	3.88	5.58	5.25	7.61	5.67	10.61	6.03
Engineering	10.62	8.58	7.03	3.93	12.14	—	13.26	10.88	9.00	4.94	6.67	5.58	8.64	5.69	11.03	6.66
Life Science	12.24	12.50	5.16	4.64	8.95	—	8.90	8.53	10.80	5.94	4.33	6.67	7.28	7.91	8.68	7.95
Social Science	9.47	10.46	6.71	8.54	8.29	—	8.21	8.62	10.40	8.19	7.00	9.42	8.34	9.77	7.63	9.48
Adventure	13.29	12.08	8.75	5.65	12.24	—	11.69	10.62	12.50	8.63	6.92	8.21	9.95	8.47	10.98	7.86
Nature/Agriculture	14.12	13.81	5.72	4.74	9.55	—	8.47	8.56	13.05	8.94	6.92	6.62	7.06	7.02	8.25	5.98
Skilled Trades	6.68	4.54	4.47	3.17	7.43	—	7.67	5.79	6.85	3.25	3.58	5.00	4.56	3.99	6.35	4.10
Personal Service	7.48	8.23	6.70	8.17	7.10	—	7.25	8.59	8.70	9.69	6.42	10.38	6.59	8.01	6.86	8.62
Family Activity	10.00	10.88	6.72	8.74	9.24	—	8.74	10.59	9.60	9.94	6.41	11.00	6.77	9.27	8.25	9.90
Medical Service	8.32	9.39	4.12	3.86	9.12	—	7.24	4.76	7.20	5.63	4.58	3.96	7.03	6.99	6.05	8.91
Dominant Leadership	7.09	4.92	5.80	4.18	8.57	—	6.56	5.85	6.10	4.69	8.58	4.63	6.66	4.91	6.21	4.53
Job Security	9.91	7.46	7.93	7.79	10.29	—	9.54	9.00	8.85	8.25	7.33	8.83	8.15	7.41	9.14	8.67
Stamina	11.33	9.12	8.13	8.11	10.05	—	10.65	10.00	9.00	8.81	8.42	8.50	9.03	8.81	10.11	9.62
Accountability	12.42	11.73	10.45	10.93	12.26	—	12.21	11.74	10.85	11.38	10.17	10.83	10.59	10.30	11.96	12.03
Teaching	7.33	9.23	9.48	11.18	7.00	—	7.14	8.91	8.90	10.88	10.17	10.25	9.07	10.70	7.82	10.60
Social Service	6.79	10.38	8.51	12.88	6.43	—	6.32	9.88	10.25	13.00	9.33	12.08	8.82	13.47	6.56	13.41
Elementary Education	5.86	9.08	7.89	11.88	5.57	—	5.93	8.71	8.45	11.63	7.08	10.79	7.07	11.49	5.79	11.38
Finance	6.08	4.50	12.29	10.43	8.57	—	7.92	6.29	7.30	5.94	11.58	7.33	9.46	6.47	9.10	6.12
Business	7.36	6.62	12.04	11.81	8.07	—	8.03	8.03	8.40	8.94	12.33	10.67	9.72	8.77	8.33	8.43
Office Work	5.11	5.31	9.40	11.19	6.29	—	6.29	7.15	6.15	7.75	8.42	7.42	6.94	7.46	8.07	7.71
Sales	6.11	5.92	11.39	10.58	7.57	—	7.08	6.53	7.90	8.31	10.00	9.13	9.02	8.60	7.88	7.76
Supervision	6.67	4.50	11.39	11.04	8.50	—	8.09	6.91	7.70	8.38	12.42	9.04	9.69	7.43	8.40	7.72
Human Relations Mgmt.	7.64	7.38	11.43	10.71	8.38	—	7.90	7.97	8.70	10.63	11.92	8.92	10.40	9.69	8.46	9.14
Law	6.82	6.50	12.07	10.74	8.43	—	8.02	7.59	7.10	8.00	10.58	8.58	10.42	9.20	8.81	8.07
Professional Advising	6.68	7.38	11.18	10.86	8.05	—	7.77	7.56	7.25	9.06	10.50	10.13	9.31	8.62	8.54	8.55
Author/Journalism	5.76	8.19	8.11	8.19	5.93	—	6.13	6.76	6.00	8.63	9.83	8.54	8.35	10.41	6.91	7.52
Academic Achievement	8.87	9.42	9.60	10.53	7.83	—	9.21	9.79	8.20	11.19	11.83	9.33	10.08	10.48	9.14	10.69
Technical Writing	5.08	6.92	7.37	8.42	5.04	—	5.12	5.94	6.05	7.56	9.33	6.54	7.26	8.21	5.42	6.74
Independence	9.39	9.46	10.67	9.40	8.38	—	9.03	9.35	8.95	10.56	10.42	9.42	10.12	9.26	9.37	8.62
Planfulness	9.10	8.27	10.72	11.04	9.71	—	9.93	10.03	8.55	10.06	10.33	9.08	10.47	9.12	10.42	10.69
Interpersonal Confidence	10.04	10.77	12.78	13.25	11.04	—	10.08	43.38	10.65	13.00	13.50	12.88	11.87	12.01	10.93	12.34

Chapter 2

Interpreting the Jackson Vocational Interest Survey

The first chapter introduced the reader to the nature of the JVIS, the type of basic interest scales employed, potential applications, JVIS administration and scoring, the hand-scored profile, and norms. An understanding of each of the above areas is essential as a background to appropriate interpretation. The present chapter discusses more directly the interpretation of scales and deals more generally with the range of issues encountered in the day-to-day use of the JVIS in counseling. Topics covered include interpretation of JVIS standard scores, the meaning of high and low Basic Scale scores, profile interpretation, the additional information provided by the Extended Report, including General Occupational Themes, Administrative Indices, Academic Orientation, Similarity to College Student Groups, Similarity to Job Groups, and information relevant to career exploration of the three highest-ranked clusters. Also included in this chapter are illustrative case studies and suggestions to counselors.

JVIS Standard Scores

Raw scores for the 34 basic scales range from 0-17, but these scores in themselves are limited in the degree to which they are interpretable, without reference to how other people respond. For this reason they are transformed to percentiles on the hand-scoring profiles and on the computer-generated profiles. With respect to the hand-scored profile, it was indicated in Chapter 1 that separately-computed male and female means differ for certain of the JVIS basic scales and that the hand-scored profile therefore contains two horizontal blue lines for each scale on the border of the shaded blue area. The one at the top refers to male norms, while the one at the lower border refers to female norms. These lines indicate the interquartile range for each sex. This is the region in which the middle 50% of the scores in the normative sample fall. The midpoints of these lines indicate the means respectively for males and for females. At the top of the profile there is an indication as to whether a given standard score is “very high,” “high,” “average,” “low,” or “very low.”

A number of observations are pertinent to the interpretation of these scores. The first step for the counselor in interpreting a hand-scored and plotted profile should be to check to determine whether or not raw scores have been properly posted. Only after accuracy is established should the counselor proceed to interpretation. A second point to consider is that profiles plotted on combined sex norms might possibly take on a somewhat different shape had these same scores been plotted on separate sex norms. In general, the use of combined norms will tend to yield a different standard score for scales in which there is a mean difference between the sexes. The counselor

should therefore then assess the profile in the light of both the combined norms and those for a particular sex. Counselors should make a special effort to ensure that clients understand how to interpret the profile in terms of different norms

The computer-generated profile, in addition to presenting a profile based on combined male and female norms, also reports percentiles for each basic scale separately for male and for female norms. The percentiles on the JVIS profile refer to the percentage of males (m) and females (f) receiving a lower raw score than the respondent. An individual thus has an opportunity to consider his or her percentile with respect to like gender or opposite gender norms or both. For most scales the differences will not be large, but for some, like Engineering or Elementary Education, there are differences. Counselors wishing to convert raw scores to percentiles based on either separate male and female norms or on the combined norms may also refer to Chapter One Tables 1-2, 1-3 and 1-4.

Interpretation of the Basic Scales

As indicated in Chapter One, JVIS scales are divided into a set of scales designated as comprising *work roles,* and a second set designated *work styles.* To recapitulate, *work roles* refer to relatively homogeneous sets of occupationally relevant activities. They may characterize strongly certain occupations, such as scales for Medical Service and Law, or cut across particular jobs, as in the case of Professional Advising and Human Relations Management. *Work styles* refer to preferences for situations requiring a certain mode of behavior, such as characterized by the Planfulness scale.

Work Roles

Table 2-1 contains a list of the JVIS scales, together with a brief description of the interpretation of a high score. Similar information is provided to people when they receive their JVIS profile. It should be studied and assimilated both by counselors and others wishing to interpret the JVIS. Counselees should be encouraged to examine this information prior to the counseling interview in which they discuss their results. In general, the scale definitions are straightforward and easy to understand. For some, like Law and Elementary Education, the items comprise a work sample of relevant activities, making the interpretation of a high score relatively simple. Persons who receive high scores tend to be interested in activities described by the scale name. For work roles transcending a particular narrow occupation, like Professional Advising, the interpretation similarly is in terms of the respondent having expressed an interest in the diversity of activities subsumed under the scale definition. Note that this is a different interpretation from that for occupational scales. For occupational scales in the tradition of E. K. Strong, Jr., the appropriate interpretation is that a high score indicates interests similar to those in a particular occupational group, such as chemists, and not interest in chemistry, per se. But a perusal of occupational cluster profiles generated for the JVIS basic scales (Chapter Four) indicates that occupational groups are likely to show the highest scale scores on basic interest scales

Table 2-1: JVIS Basic Interest Scale Descriptions

CREATIVE ARTS
Interested in arranging materials in an aesthetically pleasing manner; enjoys being creative and original in the applied or fine arts, for example in music, drawing or decorating.

PERFORMING ARTS
Enjoys performing for an audience.

MATHEMATICS
Enjoys working with mathematical formulas and quantitative concepts; interested in performing computations and in planning and applying mathematical methods to the solution of problems.

PHYSICAL SCIENCE
Interested in the systematic investigation of various aspects of nonliving nature, for example, chemistry, physics, geology or astronomy.

ENGINEERING
Interested in the designing, testing or manufacturing of a wide variety of products; applies scientific principles to the solution of practical problems.

LIFE SCIENCE
Interested in investigating various aspects of living organisms.

SOCIAL SCIENCE
Interested in investigating and learning about various aspects of the organization of society, human behavior, and social interaction.

ADVENTURE
Enjoys novel situations; seeks out the unusual or dangerous.

NATURE-AGRICULTURE
Likes to work outdoors with animals or plants.

BUSINESS
Interested in the day-to-day functioning of business and commercial organization.

INTERPERSONAL CONFIDENCE
Prefers a working environment requiring a high degree of self-assurance in dealings with others. Reports not being afraid of meeting strangers and speaking with confidence about a variety of topics. Believes in own ability to accomplish most interpersonal tasks undertaken.

PERSONAL SERVICE
Enjoys providing direct services to individuals, e.g., travel guide or cosmetician.

FAMILY ACTIVITY
Enjoys domestic activities, likes to take an active part in family life and child care, in decorating and caring for a home and garden, entertaining guests, and related activities.

MEDICAL SERVICE
Interested in working toward promoting health and curing disease in individuals.

DOMINANT LEADERSHIP
Prefers a forceful aggressive style of leadership. Enjoys a position of authority in which active, direct supervision and criticism of the work of others is involved.

JOB SECURITY
Prefers a job with a definite and predictable future. Avoids taking social or economic risks on the job.

STAMINA
Reports a willingness to work at a task for long hours without rest. Perseveres in the face of difficulty. Is likely to be challenged by difficult, involved assignments.

ACCOUNTABILITY
Reports a preference for working environments requiring a high degree of integrity and traditional virtues.

TEACHING
Interested in teaching a specific subject.

SOCIAL SERVICE
Interested in helping troubled people cope with their problems.

ELEMENTARY EDUCATION
Enjoys teaching or caring for young children.

FINANCE
Interested in meeting the financial needs of the public, in solving financial problems, and in investment and trade.

SKILLED TRADES
Prefers working with hands or with machines, usually in making or repairing some product.

OFFICE WORK
Interested in clerical work and in activities involving detail, usually in a business context.

SALES
Interested in selling; likes to work with and to attempt to influence other people.

SUPERVISION
Interested in planning, organizing and coordinating the activities of others. Enjoys holding a position of managerial responsibility.

HUMAN RELATIONS MANAGEMENT
Enjoys acting as "the person in the middle" between people in conflict; enjoys resolving interpersonal situations, including those which are difficult or emotionally charged.

LAW
Interested in legal matters.

PROFESSIONAL ADVISING
Enjoys counseling and giving expert advice.

AUTHOR-JOURNALISM
Likes to be creative and original in writing; enjoys writing for a general audience.

ACADEMIC ACHIEVEMENT
Is interested in scholarly activities, particularly of a verbal nature. Reports systematic study habits.

TECHNICAL WRITING
Enjoys writing detailed, factual reports, manuals, or essays about scientific, technical, legal, or historical matters.

INDEPENDENCE
Prefers working in an environment free from restraints and close supervision. Feels confined by rules and regulations. Would rather find own solutions to problems than seek advice from others.

PLANFULNESS
Is organized in work habits and prefers working in an environment in which activities occur in an expected sequence.

highly related to their work. Thus, lawyers are interested in Law, mathematicians in Mathematics, and musicians in Performing Arts.

Work Styles

The interpretation of scales reflecting work styles is a bit more complicated. Work style scales, it will be recalled, include Dominant Leadership, Job Security, Stamina, Accountability, Academic Achievement, Independence, Planfulness, and Interpersonal Confidence. The immediate tendency is to treat these as personality characteristics, and to interpret the score as indicating the degree to which the respondent possesses the trait indicated by the scale name. A better interpretation within the context of vocational interests is to consider these as interests in working in environments placing a premium upon or requiring the behavior implied by the scale. Thus, accountants, who are often called upon to project future requirements and budgets, tend to have high scores on Planfulness. Generals and admirals work in environments in which a certain style of military behavior is expected in relation to subordinates; their calculated Dominant Leadership scores were the highest of those for any group. Physical scientists and computer programmers typically are required to work long hours to find solutions to difficult problems—their scores for Stamina are consistently high. Work style scales such as these tend to round out the interest profile and provide a basis for a more accurate appraisal of the total range of a person's interests in relation to various criterion groups.

Three of the work style scales deserve special mention because scores are frequently misinterpreted. These are Accountability, Academic Achievement, and Interpersonal Confidence. Accountability refers to an interest in working in environments in which traditional virtues like reliability and honesty, are required or expected. Farmers usually receive higher than average scores; people employed in advertising tend to score low. It is not correct to interpret low scores as indicating that the respondents lack the qualities or traits suggested by the scale definition. Rather, it is a matter of identifying interests in working in certain kinds of environments. In the case of Accountability, low scorers typically prefer to avoid jobs highlighting interpersonal activities, especially those emphasizing influencing others. As an illustration of the subtlety and complexity of this interpretation, ministers, who are generally regarded as among the more virtuous members of society, do not typically score high.

Academic Achievement reflects an interest in activities appropriate for a scholar. Unlike certain other approaches, this scale was not developed with reference to an empirical criterion of academic achievement, although the scale has been shown to predict grade point average to a modest degree. People who score high on Academic Achievement value activity of an intellectual nature—attending lectures on serious subjects and reading serious work. In addition, they report a preference for reviewing what is learned and for maintaining orderly patterns of intellectual work. Other things being equal, persons with higher Academic Achievement scores should be encouraged to seek further education, to consider occupational alternatives requiring scholarly activity, and to seek out environments where others are engaged in such

activities. Lower scores on Academic Achievement, without other compensating considerations like high ability, should be discussed with counselees as possible factors to consider when planning educational and occupational objectives. Not all advanced education and training is intellectual or scholarly in nature, a fact which should be brought to the attention of counselees engaged in educational planning who score low on Academic Achievement. The activities included in the item pool emphasize verbal activities more than scientific or quantitative activities, a fact also important in scale interpretation.

How well does Academic Achievement predict grade point average? Obviously, the degree to which grades can be predicted with this scale will vary as a function of the setting and subject matter. Data are available from an entering class at the Pennsylvania State University, indicating consistent and significant (but not high) correlations for both sexes with first-term and cumulative second- and third-term grade point average in the range of .15 to .20 for this relatively carefully selected group. Obviously, a correlation of this magnitude does not preclude the possibility of a low scorer seeking and being successful in advanced education, even of a quite scholarly nature, but is one of many variables to be considered. If empirical prediction is of major concern, this and other JVIS scales should be evaluated together with other variables, including those reflecting aptitudes and past performance, in terms of their combined contribution to predicting grade point average.

Interpersonal Confidence, as its name and definition make clear, refers not to generalized confidence, but to a preference for situations requiring confidence in interpersonal situations. Thus, if a respondent reports confidence in the quality of his or her work or something else, a low scale score on Interpersonal Confidence need not be taken as contradictory. Persons high in Interpersonal Confidence seek out work settings demanding meeting and dealing with people in new or unstructured situations. They are oriented toward people, enjoy work involving interpersonal activity, are not bashful about speaking up, and believe that they have skills in this area.

Profile Interpretation

Since the JVIS profile is based on scales with explicit construct interpretations, the interpretation of the profile is more straightforward than that for other psychological tests developed with different rationales. Interpretation may take place at three levels: (a) by considering individual high and low scales; (b) by considering the entire configuration of scale scores in relation to profiles for job groups and individual occupations; (c) by integrating the above interpretations with other information derived from the counseling interview, biographical and educational records, and data from standardized personality, aptitude, and achievement tests.

Individual JVIS Scales

Evidence obtained by Campbell, Borgen, Eastes, Johansson, and Peterson (1968) and by Campbell (1971) indicate that occupational groups show a consistent ten-

dency to obtain high scale scores in areas relevant to their occupation. Many of the work role scales comprise a sample of activities identifiable in terms of a certain class of occupations. Initially, it is often useful to consider each of the 34 basic scale scores one by one, noting whether it is high, medium, or low. This should be done not primarily as a way of locating a particular occupational choice, but rather as a means of evaluating broader areas of interest. It is a mistake to narrow a counselee's focus too early to consideration of a particular occupation, even if it appears to be indicated by one or two very high basic interest scale scores. This is true for two broad reasons (a) it is poor counseling practice, a point which will be discussed later in this chapter, and (b) there is a distinction between being *interested in* a subset of the activities characteristic of an occupational group, and showing a configuration of interests *similar to* those demonstrated by the occupational group. Thus, for example, although mathematicians tend to be strongly interested in mathematics, not all persons strongly interested in mathematics are employed as mathematicians. Indeed, the fact that a person scores high on a scale like Mathematics is no guarantee that his or her entire profile of interests is similar to that of mathematicians—high Mathematics scales scores are also consistent with occupations such as those in the physical sciences, business accounting, and economics, for example.

It is important in reviewing individual scales to note scales that are low. The item format of the JVIS is such that low scores are obtained for scales in which the activities have been rejected. The likelihood is that these activities are disliked and avoided. It is important in vocational decision making not only to try to seek activities of interest, but to avoid areas of work that are noxious. The number of people who find themselves in jobs they detest is probably sufficient justification in itself for an examination of vocational interests.

Insight into an individual's more general dispositions toward work, other people, and self-attitudes may be obtained from the work style scales. A person with a very high Job Security scale score, for example, is likely to find risks and uncertainties so distasteful that certain broad categories of occupational activities should be avoided. In addition, these scales might serve to refine interpretations of high work role Basic Interest scales. Thus, two people both with their highest scores in Finance, might seek different realizations of this interest depending on their scores on Job Security. The person high in Job Security would probably be more satisfied in accounting or banking, whereas a person with a low Job Security—implying a preference for risky situations—might prefer commodity or stock brokerage, where income is based on commissions which vary as a function of successful prediction of uncertain events. (This example is merely an illustration and admittedly oversimplified—other interests, abilities, personality traits, and values are also relevant to such a decision.)

Interpreting the Profile as a Whole

In a sense, every scale, high, medium, or low, is relevant to every occupation. This is true because each occupation is characterized by a certain profile pattern. Fortunately,

even though there are many thousands of distinct job titles, our studies indicate that there is a considerably smaller number of distinct profiles, and that occupations are clustered rationally into groups. Thus, physicians, whether they be surgeons, psychiatrists, or pathologists, tend to be more similar than different in terms of their profiles. All groups of physicians form a single cluster, as do physical scientists. One approach to profile interpretation is therefore that of appraising the degree of similarity between a given individual's profile and the profiles characteristic of the variety of job groups. For hand scored profiles, this may be done by comparing the client's profile with those for each of the 32 job groups. For computer scoring, this is done automatically by ranking job groups in terms of their similarity to the client's profile. But with hand-plotted profiles it is necessary for the counselor to be aware of the profile configurations related to various job groups and to interpret profiles accordingly. Similarly, college students in different programs have distinct profile configurations. Again, counselors using hand-plotted profiles should be aware of the shapes of these various configurations from the tables in Chapter Four.

Integrating JVIS Results with Information from Other Sources

Although a good deal of information is contained on the JVIS Basic Interest profile and Extended Report, it does not by any means tell the whole story about a person. In addition to interests, information about past performance, values, abilities, personality, and aspirations are relevant to educational and career planning. Material reflecting past performance may be available from records and documents. A skilled interviewer can often elicit and clarify a good deal of pertinent information. Also of considerable value is psychological test data bearing on intellectual abilities and personality. Such a battery might include, for example, the Multidimensional Aptitude Battery (Jackson, 1998) and the Personality Research Form (Jackson, 1984) or the Jackson Personality Inventory-Revised (Jackson, 1994), and/or other similar standardized tests. A consideration of past performance and aspirations, together with data bearing on a person's own estimate of success and on intellectual abilities will often provide a perspective on how realistic is a given educational or career plan. The focus of the JVIS Extended Report on areas or clusters, rather than on specific occupations, is an advantage because it is often possible within a cluster to find an occupation appropriate to an individual's educational aspirations and intellectual abilities. For example, within the cluster of Agriculturalists, occupations range from those requiring little or no formal education to those which, like agronomist, require one or more advanced university degrees.

Personality is also relevant to career choice. One would not encourage a fearful, harm avoidant person to seek employment spraying crops by airplane, nor would one encourage a disorderly person to become an accountant. Often people are quite capable of considering these factors when making their own career plans. But sometimes their knowledge is very limited of the actual job demands in terms of personality. Personality test data can therefore be helpful. The JVIS work style scales, although

not personality dimensions as such, also have a place in counseling, because they provide information on work settings and environments for which a respondent has expressed some degree of preference.

Even if abilities, interests, and personality all point in a particular direction, a person should also seek to clarify values in relation to particular career plans. To some persons, it is important to be located in a certain community, for example, to be close to family and friends. Others place great importance on their level of earnings. Some find prolonged travel noxious, while others find it exhilarating. These and other values provide reinforcement that is distinct from the activities intrinsic to an occupation, but are, nevertheless, relevant to career planning. Career choice may represent, in part, a compromise between the satisfactions derived from extrinsic and intrinsic rewards. It is not usually appropriate for the counselor to provide these values, nor to alter them through persuasion, but the counselor can play an important role in clarifying them. Such clarification in turn should lead to more enlightened career decisions.

The sources of career planning information considered up to this point are those appraised at the individual level. But the environment, in terms of educational and career opportunities, places important constraints upon career choices. Not everyone who applies to medical school is admitted; not everyone trained as a musician finds employment in that field. It is a fundamental tenet of labor economics that supply and demand affect employment markets and individual opportunities. It is probably true that counselees have even less information about opportunities than about their own interests in relation to particular occupations. Additionally, career opportunities change over time, frequently in less time than it takes a person to complete a course of study. It is therefore especially important to introduce information about occupational opportunities in the perspective of the person's own abilities, aspirations, interests, personality, and values.

The JVIS Extended Report

Introduction

The JVIS Extended Report consists of several pages. A sample Extended Report is presented in Figure 2-1. The first page contains the respondent's name and a general orientation to the interpretation of the report. Note that the respondent's name is also printed at the bottom of every page beyond page two. Note also that the Extended Report is updated periodically to incorporate new lists of suggested readings and organizations in specific occupational areas.

Basic Interest Scales

The second page consists of the Basic Interest Scale Descriptions. These are also presented in Table 2-1 of this manual.

The third page consists of the profile containing the basic interest scales. Adjacent to each of the 34 scale names is the individual's raw score, and percentiles based on female, male, and combined norms. The combined percentile scores are also presented in a bar graph. Longer bars identify the respondent's areas of greatest interest compared to the normative sample. Short bars show the areas in which the respondent shows little interest. Percentile scores in the range of 30 to 70 are considered average. A percentile score of 51 means that approximately half the respondents in the normative group received a lower score. The higher the percentile, the greater is the percentage of persons in the normative sample who received a lower score, and consequently, the stronger the interest in the set of activities encompassed by the basic interest scale.

General Occupational Themes

A bar graph based on 10 general patterns of interest is presented on page four of the report. The General Occupational Themes are described on pages four and five of the report (see Figure 2-1). Note that the General Occupational Themes refer to broad patterns of interests rather than to interests in specific activities. Taking as a point of departure the work of John Holland, who defined six occupational themes, and considered them as a kind of personality substrate to vocational interests, factor analytic studies with the JVIS have revealed ten distinct dimensions subsuming particular interests. The emergence of the larger number of themes in the JVIS as contrasted with fewer previously is no doubt attributable to the existence of a larger number of basic interest scales (including scales for Work Styles), as well as the JVIS method of scale development, resulting in greater scale independence. The ten themes are as follows: *Expressive, Logical, Inquiring, Practical, Assertive, Socialized, Helping, Conventional, Enterprising,* and *Communicative*. Please refer to the sample Extended Report in Figure 2-1 for a complete description of the General Occupational Themes.

Academic Satisfaction

The Academic Satisfaction score is presented on page five of the Extended Report. The Academic Satisfaction scale was derived empirically by contrasting the average scores of university students and high school students on basic interest scales. Those showing significant differences were keyed in the appropriate direction and given unit weight. The scoring of the Academic Satisfaction scale involves correlating the respondent's 34 Basic Interest scale scores with the weighted composite derived from scales differentiating university and high school groups. This correlation is converted to standard scores with a mean of 500 and a standard deviation of 100 using the distribution of Academic Satisfaction scale correlations obtained from the normative group as the basis for computing the standard scores. In addition to a numerical value, a percentile score is also presented on the computer printout.

Figure 2-1: JVIS Extended Report

Jackson Vocational Interest Survey (JVIS)
Extended Report

Name: **Sam Sample**
Gender: **Male**
Report Date: **November 26, 2017**

This report is based on your answers to the Jackson Vocational Interest Survey (JVIS). It outlines your areas of interest, and how your interests compare with those of people in different occupations and educational programs.

It is extremely important to recognize that interests are different from abilities. These results tell you only about your interests. They do not indicate whether or not you have the ability, skill, or educational background necessary to do a particular kind of work. Thus, a high score on the Mathematics scale would indicate an interest in using mathematical reasoning to solve problems, but would not necessarily mean that you have the ability to become a mathematician. Other sources of information, as well as your past record of performance, should be considered in addition to your JVIS results.

Most people find their vocational interest results very useful. However, you should not expect this report to choose a career for you without some careful thinking on your part. Results quite often turn out to be what you expected. If so, it is of some benefit to know that an objective comparison of your interests to those of others confirms the direction of your present planning. If this report suggests career directions very different from your present plans, you should carefully review these plans and your reasons for making them. Generally, people are more likely to be satisfied in an occupational area to which their interests are similar.

You are encouraged to find out more about specific occupations in the areas to which your interests are similar. This report lists several possible activities and resources to get you started.

The information in your JVIS report is arranged as follows

JVIS Basic Interest Profile

Your Basic Interests are reported below and represent your areas of interest and your preferences for 34 work roles and work styles. Use your list of Basic Interests to learn what types of job-related activities you would most enjoy and what types of activities aren't very interesting to you.

Your **Combined (Comb)** percentile scores are reported below and show how your interests compare with the interests of other males and females who have taken the JVIS. The scores represent the percentage of people who scored lower than you did on that interest. Longer bars indicate your strongest interests and shorter bars indicate low interests. The scores in the **Male (M)** and **Female (F)** columns show how you compare to just the males and just the females in our JVIS sample group. Use these profiles to explore how you compare to your gender group.

Work Roles describe preferences for activities associated with certain occupations. **Work Styles** describe preferences for certain types of work environments.

Work Roles

Basic Interest	Raw Score	Percentiles F	M	Comb.	Combined Percentile Score (Low 0 · 20 · 40 · Average · 60 · 80 · 99 High)
Nature-Agriculture	17	99	99	99	
Family Activity	16	95	98	96	
Adventure	17	97	92	95	
Engineering	14	99	88	95	
Sales	12	86	86	86	
Personal Service	12	79	92	84	
Office Work	10	73	82	76	
Life Science	10	76	69	73	
Performing Arts	11	69	69	69	
Business	10	54	62	58	
Skilled Trades	6	69	50	58	
Creative Arts	9	50	58	54	
Dominant Leadership	7	58	38	46	
Finance	8	54	42	46	
Physical Science	6	58	31	42	
Human Relations Mgt.	8	31	38	34	
Social Service	7	16	54	34	
Elementary Education	7	16	46	31	
Social Science	7	27	31	31	
Teaching	7	18	42	31	
Mathematics	3	34	18	27	
Technical Writing	5	21	31	24	
Professional Advising	7	18	24	21	
Author-Journalism	6	14	24	18	
Law	6	16	18	18	
Supervision	6	18	18	18	
Medical Service	1	14	8	12	

Work Styles

Basic Interest	Raw Score	Percentiles F	M	Comb.	Combined Percentile Score (Low 0 · 20 · 40 · Average · 60 · 80 · 99 High)
Job Security	12	86	86	86	
Accountability	11	62	62	62	
Independence	8	24	24	24	
Interpersonal Confidence	9	10	21	16	
Stamina	6	18	14	16	
Planfulness	5	10	12	10	
Academic Achievement	3	1	3	2	

Each of the names in the **Basic Interest** column represents an area of interest. See the next two pages for more information about each area of interest.

Basic Interest Scale Descriptions

Scale	Description
Academic Achievement	Is interested in scholarly activities, particularly of a verbal nature. Reports systematic study habits.
Accountability	Reports a preference for working environments requiring a high degree of integrity and traditional virtues.
Adventure	Enjoys novel situations; seeks out the unusual or dangerous.
Author-Journalism	Likes to be creative and original in writing; enjoys writing for a general audience.
Business	Interested in the day-to-day functioning of business and commercial organizations.
Creative Arts	Interested in arranging materials in an aesthetically pleasing manner; enjoys being creative and original in the applied or fine arts, for example in music, drawing or decorating.
Dominant Leadership	Prefers a forceful aggressive style of leadership. Enjoys a position of authority in which active, direct supervision and criticism of the work of others is involved.
Elementary Education	Enjoys teaching or caring for young children.
Engineering	Interested in the designing, testing or manufacturing of a wide variety of products; applies scientific principles to the solution of practical problems.
Family Activity	Enjoys domestic activities, likes to take an active part in family life and child care, in decorating and caring for a home and garden, entertaining guests, and related activities.
Finance	Interested in meeting the financial needs of the public, in solving financial problems, and in investment and trade.
Human Relations Mgt.	Enjoys acting as "the person in the middle" between people in conflict; enjoys resolving interpersonal situations, including those which are difficult or emotionally charged.
Independence	Prefers working in an environment free from restraints and close supervision. Feels confined by rules and regulations. Would rather find own solutions to problems than seek advice from others.
Interpersonal Confidence	Prefers a working environment requiring a high degree of self-assurance in dealings with others. Reports not being afraid of meeting strangers and speaking with confidence about a variety of topics. Believes in own ability to accomplish most interpersonal tasks undertaken.
Job Security	Prefers a job with a definite and predictable future. Avoids taking social or economic risks on the job.
Law	Interested in legal matters.
Life Science	Interested in investigating various aspects of living organisms.

Basic Interest Scale Descriptions (continued)

Scale	Description
Mathematics	Enjoys working with mathematical formulas and quantitative concepts; interested in performing computations and in planning and applying mathematical methods to the solution of problems.
Medical Service	Interested in working toward promoting health and curing disease in individuals.
Nature-Agriculture	Likes to work outdoors with animals or plants.
Office Work	Interested in clerical work and in activities involving detail, usually in a business context.
Performing Arts	Enjoys performing for an audience.
Personal Service	Enjoys providing direct services to individuals, e.g., travel guide or cosmetician.
Physical Science	Interested in the systematic investigation of various aspects of nonliving nature, for example, chemistry, physics, geology or astronomy.
Planfulness	Is organized in work habits and prefers working in an environment in which activities occur in an expected sequence.
Professional Advising	Enjoys counseling and giving expert advice.
Sales	Interested in selling; likes to work with and to attempt to influence other people.
Skilled Trades	Prefers working with hands or with machines, usually in making or repairing some product.
Social Science	Interested in investigating and learning about various aspects of the organization of society, human behavior, and social interaction.
Social Service	Interested in helping troubled people cope with their problems.
Stamina	Reports a willingness to work at a task for long hours without rest. Perseveres in the face of difficulty. Is likely to be challenged by difficult, involved assignments.
Supervision	Interested in planning, organizing and coordinating the activities of others. Enjoys holding a position of managerial responsibility.
Teaching	Interested in teaching a specific subject.
Technical Writing	Enjoys writing detailed, factual reports, manuals, or essays about scientific, technical, legal, or historical matters.

General Occupational Themes

Studies with the JVIS have revealed 10 general patterns of interest. These patterns reflect general orientations to the world of work, rather than specific interests in particular areas. Your scores on these 10 General Occupational Themes are plotted below.

	Percentiles		Male Percentile Score
			Low Average High
Theme	**Female**	**Male**	**0 20 40 60 80 99**
Practical	95	95	
Conventional	62	66	
Expressive	50	58	
Helping	12	46	
Logical	79	46	
Enterprising	31	34	
Socialized	38	34	
Inquiring	31	27	
Assertive	18	16	
Communicative	4	8	

Descriptions of each of the themes in the **Theme** column can be found on the following pages. The two **Percentile** columns compare your General Occupational Theme scores to the females, and then the males, in a large group of students and young adults. Each percentile score is the percentage of people that received a score less than yours. The bars at the right illustrate how your General Occupational Theme scores compare to people of your own sex.

General Occupational Theme Descriptions

Theme	Description
Assertive	A high score on this theme may indicate a preference for working in situations in which you can exercise control, and where your authority is clearly defined. You may enjoy exercising authority over others, and will do so self-confidently, without the need to seek advice or assistance. High scorers may sometimes be seen as outspoken and direct with others, and will enjoy working with others, especially in a dominant role. People working in environments, such as the military, where this style of leadership is appropriate, frequently receive high scores on this theme.
Communicative	If you scored high on this theme, you will tend to be interested in ideas and in communicating these ideas to others. You are likely to enjoy serious expressions of thoughts, reading, attending lectures, studying, or engaging in intellectual discussions. Your enjoyment of communication may focus more on the formulation and expression of concepts than on the entertainment of others. High scorers tend to be described as intellectual, articulate, and well-informed, having a broad range of interests. Professional writers score highly on this theme. However, since communication is important in a wide range of occupations, many others score highly as well.
Conventional	If your score on this theme is high, you may prefer a well-defined role in a business or other larger organization. You will likely enjoy the day-to-day operations of a business, such as operating an office, selling products, making decisions, and supervising others. You may prefer working in a smoothly running organization to working in a highly-charged or variable environment. You may also thrive on detail, preferring not to be required to be highly creative, nor to work at tasks involving mechanical skill, discomfort, or physical risk.
Enterprising	Scoring high on this theme indicates that you will likely enjoy work involving talking with others, especially if the purpose of that discussion is to persuade or influence. Self-confident, rarely shy in difficult situations, dominant, forceful; high scorers are usually interested in the marketing or management aspects of business, rather than in the details of daily operation or in particular specialties. They are often motivated by the conventional symbols of social status -- money, influence and prestige -- rather than by other forms of recognition. In addition to business, high scorers can be found in the legal profession, administration, public relations, diplomacy, and related areas.
Expressive	If you scored high on this theme, you will likely be considered artistic by others, even if you are not presently engaged in any artistic work. You will likely enjoy creative activities such as drama, music, writing, visual art, or any of the applied or fine arts. You will also enjoy the creative work of others. High scorers tend to consider themselves perceptive, inventive, sensitive, imaginative, and aware of their environments. People in the arts receive high scores on this theme, but many others combine this theme with others in finding expression for their interests.
Helping	People with high scores on this theme express a genuine concern for others, particularly those with problems or requiring assistance. High scorers enjoy social interaction, giving advice, and may be described as benevolent, comforting, sympathetic, supporting, charitable, assisting and cooperative. If you scored high on this theme, consider occupations in which you may take a direct role in helping, serving or teaching others.

General Occupational Theme Descriptions *(Continued)*

Theme	Description
Inquiring	A high score on this theme indicates that you have a great deal of curiosity about your environment, living things, other people and social institutions. You have a desire to learn about many areas of knowledge, and may be described as investigative, intellectually probing, and reflective. Consider entering one of the social or biological sciences, one of the professions, or combine this theme with others when choosing a career.
Logical	High scorers enjoy rational abstract thought that is characterized by testable generalizations, deductive reasoning, and precision. They enjoy the challenge of difficult intellectual work, particularly in the areas of mathematics and physical sciences, and in applications such as engineering, work with computers, as well as a variety of other areas where quantitative and exacting work is required. If you scored high on this theme, you may prefer working with the physical world and abstract ideas to working primarily with people.
Practical	If you scored high on this theme, you are likely to enjoy activities requiring physical or mechanical skill -- seeking satisfaction from the quality of your work, rather than from exercising influence or power over others. You are also likely to enjoy outdoor work and not to be overly concerned about physical risks. You may tend to avoid activities that require you to be the center of attention, and may prefer practical arts to the world of abstract ideas. You are also likely to enjoy close family ties and may enjoy arranging for the comfort and well-being of others. High scorers can be found in a wide variety of activities, such as agriculture, skilled trades, and service occupations.
Socialized	If you scored high on this theme, you are likely to be regarded as a responsible, stable worker -- disciplined, prompt, systematic and deliberate, but not usually creative. You would rather be confident about a relatively certain future at a predictable salary, than accept the uncertainty of a riskier but possibly more rewarding prospect. You will likely favor occupations that offer stability and reward traditional virtues.

Academic Satisfaction

Your Academic Satisfaction score reflects the degree of similarity between your profile and that of an average university student who is engaged in a traditional academic and/or scientific course of study. It is not a measure of your ability to do university level work, nor can it predict your success as a university student. Instead, it provides an indication of the degree to which you might enjoy scholarly activities such as serious reading, studying, doing research and assignments, etc.

	Score	%ile	Percentile 0 20 40 60 80 99
Academic Satisfaction	421	21	

The average score is 500. Approximately two thirds of high school and college students score between 400 and 600. The percentile figure and bar graph show you the percentage of a large group of students that received a score lower than yours.

Similarity to College Students

JVIS profiles from over 10,000 university students who were enrolled in more than 150 different major fields, ranging from accounting to zoology, have been collected and analyzed. That analysis indicated that the major fields could be classed into 17 broad academic clusters. Each cluster is based on data from both males and females and represents a set of educational majors that shared a similar pattern of JVIS scores.

The chart below ranks the similarity of your JVIS Basic Interest profile to each of the student clusters. A high score indicates that your pattern of interests is similar to students in the fields of concentration defining the cluster, while a low score indicates dissimilarity. These scores indicate your probable interest and satisfaction with these academic clusters. These scores do not tell you whether or not you will be successful in any particular field.

Score	Similarity	University Major Cluster
+0.62	**Very Similar**	**Environmental Resource Management**
+0.55	**Similar**	**Health, Physical Education and Recreation**
+0.39	**Moderately Similar**	**Agribusiness and Economics**
+0.37	Moderately Similar	Art and Architecture
+0.30	Moderately Similar	Food Science
+0.12	Neutral	Engineering
+0.03	Neutral	Science
-0.03	Neutral	Computer Science
-0.08	Neutral	Performing Arts
-0.12	Neutral	Social Service
-0.12	Neutral	Health Services and Science
-0.19	Neutral	Mathematical Sciences
-0.25	Neutral	Business
-0.25	Dissimilar	Communication Arts
-0.30	Dissimilar	Behavioral Science
-0.32	Dissimilar	Education
-0.54	Dissimilar	Social Science, Law and Politics

Your JVIS profile is most similar to college students whose academic areas of specialization are in the three clusters listed below. Sample majors for each of these three areas are also listed.

University Major Cluster	Sample Majors
Environmental Resource Management	Wildlife Technology, Recreation and Parks, Environmental Resource Management, Agricultural Business Management, Agriculture, Forest Science and Technology, Horticulture.
Health, Physical Education and Recreation	Health and Physical Education, Recreation and Parks.
Agribusiness and Economics	Agricultural Economics and Rural Sociology, Agricultural Business Management, Food Service and Housing Administration.

Similarity to Job Groups

Ranked below is the similarity of your JVIS Basic Interest profile to the interests of people working in 32 job groups. A positive score indicates that your profile shows some degree of similarity to those already in the job cluster, while a negative score indicates dissimilarity.

Score	Similarity	Job Group
+0.61	**Very Similar**	**Agriculturalists**
+0.53	**Similar**	**Construction/Skilled Trades**
+0.35	**Moderately Similar**	**Machining/Mechanical and Related Occupations**
+0.34	Moderately Similar	Occupations in Fine Art
+0.31	Moderately Similar	Service Occupations
+0.30	Moderately Similar	Occupations in Life Sciences
+0.28	Moderately Similar	Sport and Recreation Occupations
+0.28	Moderately Similar	Occupations in Commercial Art
+0.28	Moderately Similar	Protective Services Occupations
+0.23	Neutral	Health Service Workers
+0.19	Neutral	Medical Diagnosis and Treatment Occupations
+0.18	Neutral	Assembly Occupations-Instruments and Small Products
+0.17	Neutral	Occupations in Music
+0.13	Neutral	Engineering and Technical Support Workers
+0.10	Neutral	Occupations in Entertainment
+0.10	Neutral	Occupations in the Physical Sciences
+0.09	Neutral	Occupations in Computer Science
-0.03	Neutral	Mathematical and Related Occupations
-0.05	Neutral	Occupations in Pre-school and Elementary Teaching
-0.07	Neutral	Clerical Services
-0.09	Neutral	Occupations in Merchandising
-0.13	Neutral	Sales Occupations
-0.14	Neutral	Teaching and Related Occupations
-0.18	Neutral	Occupations in Accounting, Banking and Finance
-0.23	Neutral	Occupations in Writing
-0.30	Dissimilar	Personnel/Human Management
-0.35	Dissimilar	Occupations in Religion
-0.35	Dissimilar	Administrative and Related Occupations
-0.42	Dissimilar	Occupations in Law and Politics
-0.44	Dissimilar	Counselors/Student Personnel Workers
-0.55	Dissimilar	Occupations in Social Science
-0.59	Dissimilar	Occupations in Social Welfare

Descriptions, sample job titles and suggested activities for each of your three highest ranked job groups are presented on the next three pages. Remember, the ranking of these job groups reflects the similarity of your JVIS Basic Interest profile to those of people employed in these areas. The ranking is not a reflection of your ability to perform any required duties or to benefit from training in these areas. You may find this information useful in planning your education and your career. Your counselor or adviser can be of help to you in this process.

In the descriptions that follow, O*NET codes are listed along with sample job titles. O*NET offers a comprehensive classification of occupational titles and job categories that is based on the Standard Occupational Classification (SOC) system. Use these codes to locate additional information on the O*NET web site at http://www.onetonline.org. To find occupation descriptions and links to related jobs, enter either the O*NET/SOC code (for example 27.3043.04), the job title (for example copy writer) or a keyword (such as writer) within the given fields on the site. Additional information can be found in the suggested activities listed along with each of your top three job groups.

1. Agriculturalists

This group of occupations relates to farming and/or raising animals. Individuals working on a farm or ranch would have a wide range of responsibilities, such as planting and harvesting crops, applying pesticides and fertilizers, feeding and taking care of livestock, and operating heavy machinery such as tractors. Individuals working in forestry manage forested lands for economic, recreational, and conservation purposes. An interest in animals might lead to becoming a Veterinarian or an Animal Breeder. People in this group typically score high on the Nature-Agriculture, Family Activity, Skilled Trades, Life Science, and Accountability scales of the JVIS. Listed below is a sample of some of the occupations available in this area. Both post-secondary education and on-the-job training is available for many of these jobs. To learn more about the occupations that make up this job group, search the complete O*NET listings at http://www.onetonline.org.

O*Net Div. 11 - Management
O*Net Div. 19 - Life, Physical, and Social Science
O*Net Div. 29 - Healthcare Practitioners and Technical
O*Net Div. 37 - Building and Grounds Cleaning and Maintenance
O*Net Div. 45 - Farming, Fishing, and Forestry

O*NET Code	Job Title	O*NET Code	Job Title
11-9013.01	Nursery & Greenhouse Manager	11-9013.02	Farm & Ranch Manager
11-9013.03	Aquacultural Manager	19-1031	Conservation Scientist
19-1031.01	Soil and Water Conservationist	19-1031.02	Range Manager
19-1031.03	Park Naturalist	19-1032	Forester
19-4011.01	Agricultural Technician	19-4093	Forest & Conservation Technician
19-4099.02	Precision Agriculture Technician	29-1131	Veterinarian
37-3011	Landscaping & Groundskeeping Worker	37-3013	Tree Trimmer & Pruner
45-2011	Agricultural Inspector	45-2021	Animal Breeder
45-3011	Fisher & Related Fishing Worker		

Organizations

1. American Fisheries Society. (http://fisheries.org/)
2. American Society of Agricultural & Biological Engineers. (www.asabe.org)
3. American Society of Agronomy. (www.agronomy.org/)
4. American Veterinary Medical Association. (www.avma.org)
5. Crop Science Society of America. (www.crops.org/)
6. National FFA Organization - Future Farmers of America. (www.ffa.org)
7. Society of American Foresters. (www.safnet.org)
8. Soil Science Society of America. (www.soils.org/)
9. Tree Care Industry Association. (http://tcia.org/)

Activities

1. Get hands-on experience working on a farm.
2. Interview a local breeder.
3. Learn more about growing plants in your own backyard by experimenting with various vegetable, herb, and floral gardens.
4. Visit www.volunteer.gov to find volunteer opportunities at parks, forests, campgrounds or to get involved with natural resources.
5. Visit a farm show or county fair.
6. Visit farms specializing in dairy cattle, livestock, grain, or vegetable growing.
7. Volunteer to help plant trees. Visit www.arborday.org to get information about programs in your area.

2. Construction/Skilled Trades

This job group includes a variety of occupations that are involved in the making, building, assembling, and repairing of products, buildings, roads, bridges, and machinery. Carpenters, Stonemasons, and Boilermakers, for example, may work with various materials, such as wood, stone, metal, and plastic. Individuals working in construction may use tools such as cement mixers and air hammers, and/or operate heavy machinery, such as bulldozers. People in these trades tend to show high scores in Skilled Trades, Engineering, Family Activity, Adventure, and Nature-Agriculture. Listed below is a sample of some of the occupations available in this area. Many of these jobs provide apprenticeships and on-the-job training. To learn more about the occupations that make up this job group, search the complete O*NET listings at http://www.onetonline.org.

O*Net Div. 11 - Management
O*Net Div. 47 - Construction and Extraction
O*Net Div. 49 - Installation, Maintenance, and Repair
O*Net Div. 51 - Production
O*Net Div. 53 - Transportation and Material Moving

O*NET Code	Job Title	O*NET Code	Job Title
11-9021	Construction Manager	47-2021	Brickmason & Blockmason
47-2031	Carpenter	47-2041	Carpet Installer
47-2061	Construction Laborer	47-2081	Drywall & Ceiling Tile Installer
47-2111	Electrician	47-2141	Painter, Construction & Maintenance
47-2152	Plumber, Pipefitter, and Steamfitter	47-2161	Plasterer & Stucco Mason
47-2181	Roofer	47-4011	Construction & Building Inspector
49-9096	Rigger	51-7011	Cabinetmaker & Bench Carpenter
53-7021	Crane & Tower Operator		

Organizations

1. Associated Builders & Contractors, Inc. (www.abc.org)
2. Association of Construction Inspectors. (www.aci-assoc.org)
3. Independent Electrical Contractors. (www.ieci.org)
4. International Association of Bridge, Structural, Ornamental & Reinforcing Iron Workers Union. (www.ironworkers.org)
5. National Association of Home Builders. (www.nahb.org)
6. National Roofing Contractors Association. (www.nrca.net)
7. Painting & Decorating Contractors of America. (www.pdca.org)
8. Plumbing-Heating-Cooling Contractors Association. (www.phccweb.org)
9. The Flooring Contractors Association. (www.fcica.com/)
10. The Masonry Society. (https://masonrysociety.org/)

Activities

1. Check out www.builderonline.com/ for links to construction businesses, products, forums, news, resources, and more.
2. Gain hands-on experience by getting a summer job doing construction work.
3. Join a humanitarian organization such as Habitat for Humanity to help build houses for families in need. Visit www.habitat.org to get involved.
4. Take a woodworking class.
5. Volunteer to help a family member or a neighbor with painting, home renovations, and home repair and maintenance.

3. Machining/Mechanical and Related Occupations

These occupations are concerned with the operating, controlling, and setting up of machines to cut, shape, and/or print such materials as metal, paper, wood, and stone. There are a wide variety of jobs in this field of mechanically oriented work, such as Tool and Die Maker, Machinist, Printer, and Electrician. People in this occupational group tend to have high interests in the JVIS areas of Skilled Trades, Engineering, Mathematics, Creative Arts, and Physical Science. Listed below is a sample of some of the occupations available in this area. Job training and apprenticeships are usually available on the job; however, some may require specialized training or education. To learn more about the occupations that make up this job group, search the complete O*NET listings at http://www.onetonline.org.

O*Net Div. 11 - Management
O*Net Div. 47 - Construction and Extraction
O*Net Div. 49 - Installation, Maintenance, and Repair
O*Net Div. 51 - Production

O*NET Code	Job Title	O*NET Code	Job Title
11-3051	Industrial Production Managers	47-2111	Electricians
49-3023.01	Automotive Master Mechanics	49-3052	Motorcycle Mechanics
49-9021.01	Heating & Air Conditioning Mechanics & Installers		
49-9041	Industrial Machinery Mechanics	49-9044	Millwrights
49-9052	Telecommunications Line Installers & Repairers		
51-2041	Structural Metal Fabricators & Fitters	51-4041	Machinists
51-4111	Tool & Die Makers	51-4121.06	Welders, Cutters, & Welder Fitters
51-5112	Printing Press Operators	51-8021	Stationary Engineers & Boiler Operators

Organizations

1. American Welding Society. (www.aws.org)
2. Automotive Service Association. (www.asashop.org)
3. Mechanical Contractors Association of America. (www.mcaa.org)
4. Millwright Employers Association. (http://millwrightemployers.org)
5. National Tooling & Machining Association. (www.ntma.org)
6. Precision Machined Products Association. (www.pmpa.org)
7. Professional Lighting & Sound Association. (www.plasa.org/)
8. Truck & Engine Manufacturers Association. (www.truckandenginemanufacturers.org/)

Activities

1. Attend a machine tool show or another similar convention in your area.
2. Check out the American Machinist online at http://americanmachinist.com for the latest industry news and other resources.
3. Get hands-on experience and training by finding an apprenticeship in your field of interest.
4. Look into co-op programs and other learning experiences that allow you to practice your skills.
5. Take on a 'do-it-yourself' project in mechanics, installation, or repair under the supervision and guidance of someone knowledgeable in the area.
6. Talk to a machine shop, metal working and fabricating, or mechanics teacher.
7. Talk to a millwright, mould maker, tool and die maker, or a heavy manufacturer.

Where To Go From Here

By completing a vocational interest instrument like the JVIS, you have taken the first step toward the thoughtful selection of your career. You have learned more about yourself, your vocational interests, and how they compare to people studying and working in a variety of career areas. However, in order to choose a career successfully, you will have to learn more about your areas of interest. Listed below are a variety of suggestions to help you explore your career options.

Activities

Use the general activities listed below to structure your career exploration process. These activities are patterned on a career exploration process outlined in the Career Exploration Guide which can be found at JVIS.COM.

Gather Information About Yourself

- Take a look at your school marks to see what subject areas are your strongest. See how your marks relate to your top job groups and make decisions accordingly.
- Make a list of your physical, mental, interpersonal, informational, and practical skills. Look into how to improve the skills that relate to your career matches.
- Make a list of the qualifications you have, e.g., courses, degrees, certificates, diplomas, and licenses. Check to see whether your qualifications match those required for the careers you are interested in, or what is involved in obtaining those you don't have.
- Explore your values and beliefs and think about how they may affect your career decisions.
- Consider how important public contact, compensation, opportunities for advancement, challenge, travel, working conditions, family responsibilities, and hobbies are to you. Relate these preferences to your job groups.

Gather Information About Careers

- Check out the descriptions of occupations in your top three job groups and your other high job groups. Visit the Occupational Outlook Handbook at www.bls.gov/ooh/ or the Occupational Information Network resource center at www.onetcenter.org.
- Check out the official job site of the U.S. federal government for valuable employment information at www.usajobs.gov.
- Research potential careers by googling job titles, career fields, and employers, or arrange informational interviews with people working in your field of interest.
- Visit job fairs or employment agencies in your area to learn more about what companies are hiring and what positions related to your high job groups are currently in demand.
- Watch videos on http://careertv.com to learn about different careers, companies, and job search techniques.
- Read hard copy or online magazines that focus on career trends and issues as well as on industries that relate to your top occupational interests.
- Find out what it is like to actually work in a certain occupation. Read interviews from people in careers that you may be interested in or job shadow someone working in an occupation of interest.
- Explore career resources, career links, and industry information on the web at www.careeronestop.org.

Where To Go From Here (continued)

Start Decision Making and Action Planning

- Check out College and University Fairs to find schools that have programs that relate to your possible career paths. Search for suitable schools online at www.petersons.com and www.campusprogram.com.
- Research ways to finance an education in the area that interests you. Visit www.fastweb.com and www.finaid.org for information on available scholarships and financial aid.
- Take extra classes that relate to your potential career paths. Contact your local high schools, colleges, universities, and private organizations for more information.
- Attend Resume Writing and Interview Workshops or check out articles on www.monster.com to prepare yourself for job searching.
- Get the work experience you need by being an intern in a position that matches your career interests. Visit www.internshipprograms.com for more information on internship possibilities.
- Start searching online for jobs in your field to learn what positions local companies are hiring. Check out www.monster.com, www.aftercollege.com, or other job sites.

Administrative Indices

The following scores show how much confidence can be placed in your JVIS results. For most people, these scores fall in the normal range, indicating consistent and normal responses to the JVIS. If one of your scores falls outside the normal range, you should take a second look at your JVIS results. If you feel that your results do not reflect your true interests, you should talk to your counselor about redoing the JVIS.

	Count	0 High
Unscorable Responses	0	

	Score	Low Normal
Response Consistency Index	0.64	

	Score	%ile	Normal High
Infrequency Index	18	76	

There were no unscorable responses. Both your Response Consistency Index and your Infrequency Index fall in the normal range, indicating that you responded consistently and that your responses fit a normal pattern.

If you have any questions about these administrative indices and their impact on your JVIS results, please see your counselor.

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Report for **Sam Sample**

JVIS Basic Interest Profile

Work Roles

Basic Interest	Raw Score	Percentiles F	M	Comb.
Nature-Agriculture	17	99	99	99
Family Activity	16	95	98	96
Adventure	17	97	92	95
Engineering	14	99	88	95
Sales	12	86	86	86
Personal Service	12	79	92	84
Office Work	10	73	82	76
Life Science	10	76	69	73
Performing Arts	11	69	69	69
Business	10	54	62	58
Skilled Trades	6	69	50	58
Creative Arts	9	50	58	54
Dominant Leadership	7	58	38	46
Finance	8	54	42	46
Physical Science	6	58	31	42
Human Relations Mgt.	8	31	38	34
Social Service	7	16	54	34
Elementary Education	7	16	46	31
Social Science	7	27	31	31
Teaching	7	18	42	31
Mathematics	3	34	18	27
Technical Writing	5	21	31	24
Professional Advising	7	18	24	21
Author-Journalism	6	14	24	18
Law	6	16	18	18
Supervision	6	18	18	18
Medical Service	1	14	8	12

Combined Percentile Score — Low / Average / High — 0 20 40 60 80 99

Work Styles

Basic Interest	Raw Score	Percentiles F	M	Comb.
Job Security	12	86	86	86
Accountability	11	62	62	62
Independence	8	24	24	24
Interpersonal Confidence	9	10	21	16
Stamina	6	18	14	16
Planfulness	5	10	12	10
Academic Achievement	3	1	3	2

Combined Percentile Score — Low / Average / High — 0 20 40 60 80 99

JVIS Summary Report *Date: November 26, 2017* *Page: 2*

Report for **Sam Sample**

General Occupational Themes

Theme	Percentiles Female	Male	Male Percentile Score (Low 0 20 40 60 80 99 High)
Practical	95	95	
Conventional	62	66	
Expressive	50	58	
Helping	12	46	
Logical	79	46	
Enterprising	31	34	
Socialized	38	34	
Inquiring	31	27	
Assertive	18	16	
Communicative	4	8	

Academic Satisfaction

	Score	%ile	Percentile (0 20 40 60 80 99)
Academic Satisfaction	421	21	

Similarity to College Students

Score	Similarity	University Major Cluster
+0.62	**Very Similar**	**Environmental Resource Management**
+0.55	**Similar**	**Health, Physical Education and Recreation**
+0.39	**Moderately Similar**	**Agribusiness and Economics**

Similarity to Job Groups

Score	Similarity	Job Group
+0.61	**Very Similar**	**Agriculturalists**
+0.53	**Similar**	**Construction/Skilled Trades**
+0.35	**Moderately Similar**	**Machining/Mechanical and Related Occupations**

Administrative Indices

	Count	0 High
Unscorable Responses	0	

	Score	Low Normal
Response Consistency Index	0.64	

	Score	%ile	Normal High
Infrequency Index	18	76	

Academic Satisfaction scale scores may be useful in predicting degree of satisfaction in educational settings, particularly those emphasizing traditional scholarly or scientific programs. Indirectly, this scale may be useful in arriving at decisions between two or more occupations in the same cluster requiring different amounts of advanced educational preparation. For example, the cluster identified as Occupations in the Physical Sciences encompass laboratory technician, which might require no more than two years of technical college training, to professional chemist, usually involving Ph.D. and post-Ph.D. training. Of course, other considerations, like abilities and values, would also be pertinent to such a decision.

It should be recognized that many successful university graduates will be found to have below average Academic Satisfaction scale scores. This has not prevented them from graduating. But the probability is that these individuals as a group were somewhat less satisfied in the scholarly aspects of their role as a university student than were those with higher Academic Satisfaction scale scores. This score is but one of a number of sources of information, from vocational interests and elsewhere, relevant to educational planning.

Similarity to College Students

The analysis of profiles from more than 10,000 university students in 131 diverse fields, ranging from accounting to zoology, resulted in a cogent organization of these academic majors into 17 broad clusters. Each cluster, then, represents a set of specific educational majors and is based on interest profiles of both male and female groups. The Similarity to College and University chart presented on page six of the Extended Report ranks the similarity of the respondent's Basic Interest same-sex profile to those of students in each of the 17 broad clusters. Consistent with the metric of the correlation coefficient, similarity scores are in the range +1.00 to –1.00. A high positive score indicates high similarity and the probability of greater satisfaction in that particular course of study, while a negative score indicates dissimilarity and the probability of low satisfaction. Similarity scores are labeled as follows: Very Low (negative correlation larger than -.60), Low (-.60 to -.25), Neutral (-.24 to -25), Moderately High (.26 to .40), High (.41 to .60) and Very High (greater than .60). It should be recognized that some programs are more homogeneous than others in terms of both the pattern of interests of the individuals comprising the student group and the course of study required. Thus, engineering students comprise a more homogeneous group than do liberal arts students, who might major in any one of a number of diverse sub-specialties.

Similarity to Job Groups

In addition to a respondent's Basic Interest profile and measures of Similarity to College Student Groups, JVIS computer scoring provides data bearing on the similarity to each of 32 job groups, spanning the major families of occupations. As with college and university student groups, the scores reported are correlation coefficients, in this case

between each cluster and the respondent's own profile. The names and similarity indices for each of the 32 clusters are ranked from highest to lowest levels of similarity for the respondent. Similarity indices have a potential range of +1.00 to -1.00 and go from extremely similar through neutral to extremely dissimilar. Similarity scores are labeled as follows: Very Low (negative correlation larger than -.60), Low (-.60 to -.25), Neutral (-.24 to -25), Moderately High (.26 to .40), High (.41 to .60) and Very High (greater than .60). Thus, the profile is organized so that job groups showing patterns of interests most similar to those of the respondent may be considered first. It is recommended that counselors encourage advisees to consider exploring occupations related to clusters at the top of the list, as these are the ones in which the counselees are more likely to experience satisfaction. Advisees should be cautioned that if they are considering occupations in clusters for which they have obtained a negative similarity index, they should be especially careful about weighing the factors affecting their choice.

The counselor familiar with other career interest measures might wonder why the decision was made to employ job groups as the unit of measurement rather than individual occupations. There are essentially six reasons for considering job groups or families preferable as the basis for assessing an individual's profile for counseling and career planning: (a) a computer printout containing a very large number of occupations can be bewildering to respondents in its complexity; (b) occupational scores in related occupations contain much redundant information, providing spurious confidence in its diversity; (c) the initial focusing of the counselee's attention upon particular occupations is misplaced—exploration should proceed from the general to the particular; (d) individual occupational criterion groups may suffer from biases in sampling as well as other distortions not properly communicated by an occupational title, thus increasing the possibility of inaccurate information; (e) scores for particular occupations can be difficult to interpret psychologically both by counselors and respondents; and (f) even if a relatively large number of individual occupations is listed, these still will not adequately span the many thousands of existing and emerging occupations potentially available to the person engaged in career planning. These and other criticisms of the emphasis upon particular occupations in vocational interest measurement have been discussed in the literature. The use of broad-based job groups, some of them encompassing a large number of specific jobs, avoids these difficulties. Using job groups also has the advantage of permitting greater flexibility in considering alternatives for entry into a family of occupations. Thus, a person showing similarity to the occupational cluster of Health Service Workers not wishing to undertake the education necessary for an advanced university degree in one of the healing arts might be encouraged through the use of cluster information to consider allied occupations.

Career Exploration Information

In addition to the information outlined above, the Extended Report contains further information relevant to career exploration. Beginning on page seven of the report

is a section titled "Your Top 3 Job Groups." This section provides descriptions and sample job titles for the respondent's three highest ranked job groups. The sample jobs include the *National Occupational Classification* (NOC; 2011) for respondents in Canada and the *Occupational Information Network* (O*NET; 2010) for respondents in the United States. These codes can be used to locate additional information. A section titled "Where To Go From Here", beginning on page thirteen of the Extended Report, provides information on general career books, and professional organizations and exploration activities tailored to the respondent's strongest areas of career interests.

Administrative Indices

Administrative indices are useful in determining the care with which the JVIS was completed and hence the reliability of the profile. These consist of Unscorable Responses, the Response Consistency Index, and the Infrequency Index.

The *Unscorable Responses* score refers to the number of items that could not be scored due to responses that were marked too lightly on the answer sheet to be read by a scanner, double responses, or omitted responses. If the Unscorable Responses score is 10 or greater, no profile is computed. A list of the unscorable responses is printed instead.

The *Response Consistency Index* is essentially a correlation coefficient that measures the consistency with which a person describes his or her interests. A person's responses are divided in two equal sets consisting of two columns of numbers obtained from sections of the Basic Interest Scales. With well-motivated individuals of college age possessing articulated interests, the Response Consistency Index is ordinarily above +.70, although it is sometimes lower. With younger students, it is usually above +.50. If a person has answered completely randomly, it has an expected value of .00. The profiles of individuals with a Response Consistency Index below .50 should be interpreted with some caution; those below .20 should be treated even more cautiously. In the latter case, reasons for lack of consistency might be explored. Possible reasons include (a) low interest articulation, (b) poor reading or English ability, (c) carelessness, for example, in not matching item numbers in the question booklet with numbers adjacent to answer spaces, (d) passive noncompliance as revealed, for example, in answering without reading items, (e) failure to comprehend instructions. For whatever reason, the Response Consistency Index should be reviewed before results are returned to respondents. The first reason given *low interest articulation*, requires some explanation. The Response Consistency Index depends on intra-individual variability. Thus, when all or most JVIS basic interest scales are near the mean population value, the Response Consistency Index can be low because the respondent lacks strong likes and dislikes for different types of work activity. Thus, a person can respond purposefully and still obtain a low Response Consistency Index if interest articulation is low.

The *Infrequency Index* is a score derived from items that have low endorsement frequency as indicated by the responses of a normative sample. This score is converted to a same sex percentile score. A high score indicates that the respondent has endorsed several items that are usually not endorsed. There are at least two interpretations for a high score: (1) the respondent has interests that are markedly different from those in the normative sample (2) the respondent has answered carelessly.

One can get a better sense of the validity of the profile by combining the Response Consistency Index and the Infrequency Index. If both indices depart from the normal range, then there is more evidence for an invalid profile than would be the case if only one of the two indices depart from the normal range. It is possible for example, to obtain a profile with a normal Response Consistency Index but with a high Infrequency Index. In the latter case, the high Infrequency Index might merely reflect atypicality of response patterns. For example, a person with strong intellectual and scientific interests might express interests that are substantially different from those of the average person in the normative sample. In such an instance, the elevated Infrequency Index is simply a reflection of genuinely distinctive interest patterns.

JVIS Basic Report

The JVIS Basic Report is a four-page short version of the Extended Report printed on a colored form. It consists of the Basic Interest Scales, the General Occupational Themes, Administrative Indices, and the Similarity to College Students chart, the Academic Satisfaction score, and the Similarity to Job Groups chart. This report also includes interpretive information and descriptions of the Basic Interest Scales and General Occupational Themes. The individualized information for the Top 3 Groups and additional career exploration information found in the Extended Report is not included in the Basic Report.

Case Summaries

In interpreting any psychological test, experience is invaluable. In becoming acquainted with a new test, it is especially useful to complement information about test construction and psychometric properties with examples from typical counseling experience. A few such cases are presented in this section. In addition, the JVIS Applications Handbook (Verhoeve, 1993, 1999), an applied guide to interpreting the JVIS profile, provides a comprehensive analysis of case studies. Experienced counselors will have already encountered similar presenting problems in educational and career planning. The discussions, although based largely on the Basic Interest profile of the JVIS, will make reference to other tests, and occasionally to the extended output. But this focus on the Basic Interest profile should be appropriate both for those who employ hand scoring, and those who prefer computer interpretation. Undoubtedly, counselors who become experienced with the JVIS will recognize similar cases in their own practice, and might provide different examples as well.

Career Goal: Labor Law This 19 year-old female had been working for the past six months as a swimming instructor. She had previously graduated from high school with highest honors but decided not to attend college immediately for a number of reasons. First, she would have to be self supporting after high school and wanted to accumulate enough money to do this. Second, she believed that it was important to have work experience before undertaking a scholarly career. Third, she was uncertain as to her educational and career objectives, "I did equally well in mathematics and history, but I spend most of my time reading about politics . . . I might enjoy writing for a newspaper." Indeed, she expressed a number of anti-establishment political views to the counselor, and demonstrated that she could back up her opinions with a wealth of detailed information.

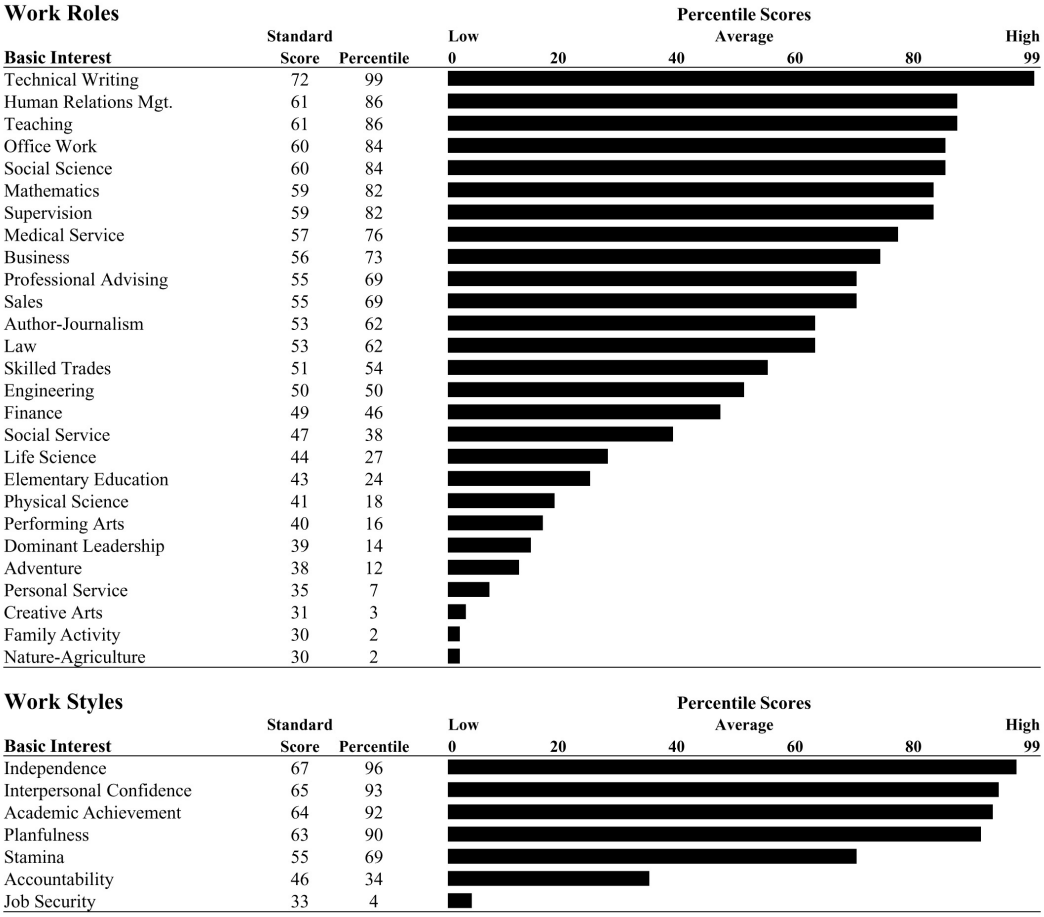
In high school she had a number of avocations, particularly sailing and skiing, but more recently, her time had been taken up with union and political activities. Her father is a retired dental technician, having been in poor health for a number of years. Her mother had been a nurse when she was younger.

Her aptitude test scores supported impressions of superior ability based on her academic record. On the Scholastic Aptitude Test, she scored above the 96th percentile on the verbal subtest, and at the 89th in quantitative. On a test of mechanical comprehension, she was above the 99th percentile. On a scale of values she scored highest on Social and Theoretical, lowest on Religious. On the Personality Research Form, her highest scores were on Cognitive Structure, Understanding, Achievement, Endurance, Dominance, and Autonomy, with lowest scores on Nurturance, Succorance, and Abasement.

Her profile on the Jackson Vocational Interest Survey presented in Figure 2-2, is notable for its high scores on Technical Writing, Independence, Interpersonal Confidence, Academic Achievement, Planfulness, Teaching, Social Science, Human Relations Management, and Mathematics, among others. Also notable are low scores for Nature-Agriculture, Family Activity, Job Security, and Creative Arts. The Extended Report indicated the greatest similarity to the cluster entitled Occupations in Law and Politics, followed by Occupations in Social Welfare, Counselors/Student Personnel Workers, and Occupations in Social Science. During the first counseling session, it was suggested that she study her results and plan to discuss them further the following week.

Upon her return there was considerable discussion as to her earlier tentative plans, as well as alternatives raised by the JVIS. It was she who observed that Technical Writing was considerably higher than Author-Journalism, a result consistent with her stated preference for scholarly and political writing over that designed to entertain. When she reported a long-standing interest in labor history, the counselor suggested that she consider an undergraduate program in industrial and labor relations. Although no decision was made at the time, she did subsequently enter such a program at a major university. When contacted she reported that she was in her second year, on

Figure 2-2: Career Goal: Labor Law



Note. The bar graph printed next to each scale name indicates how the respondent's standard scores compare with those of a large group of male and female students and young adults. The column labeled 'Standard Score' to the left has a M = 50 and a SD = 10. Percentiles indicate the number of females and males out of 100 who would receive a score lower or equal to the respondent's score. A higher score indicates greater relative interest.

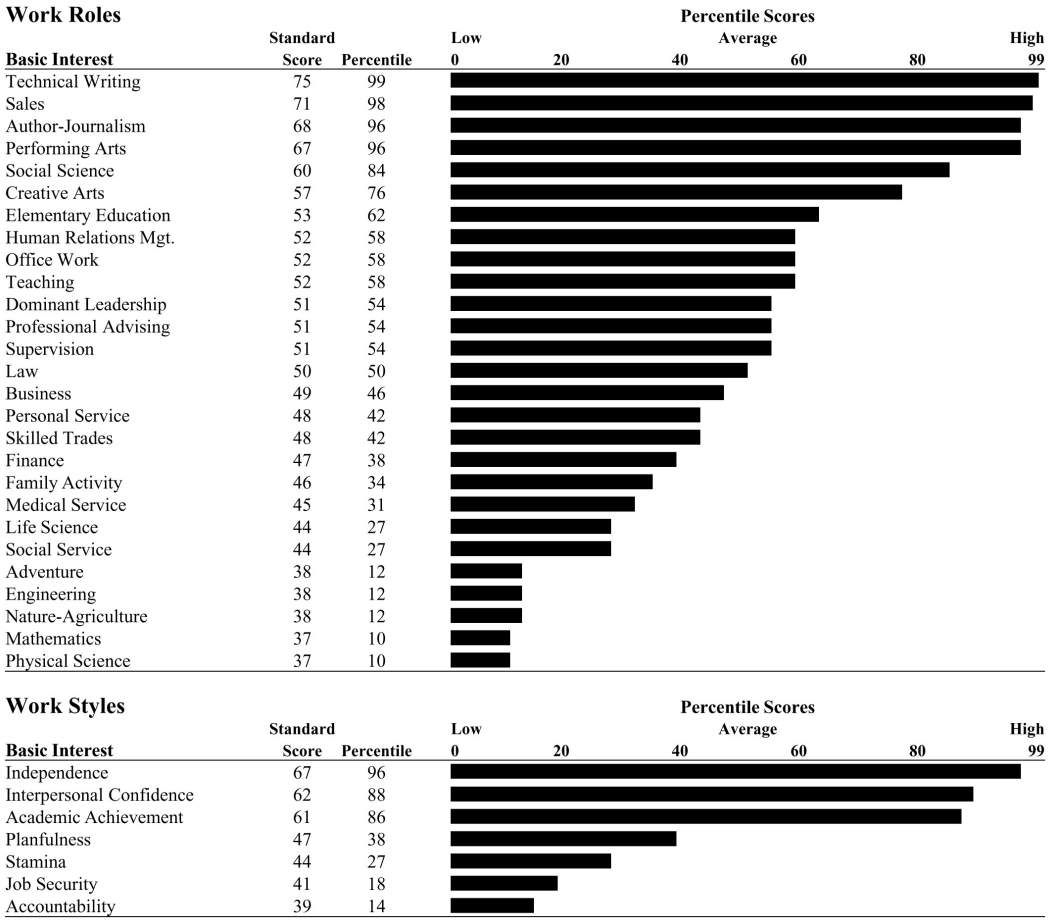
the dean's list, and very satisfied. She planned to apply to law school after completing her degree requirements with the intention of entering labor law.

Career Goal: Newscasting This 21 year-old female college student arranged for counseling during the final year of a college Administrative Assistant course. She reported that she was sorry her education had taken this direction because she did not want to be a secretary, but might consider teaching business courses.

Her Scholastic Aptitude Test scores were at the 82nd percentile in verbal and the 60th in quantitative. The Personality Research Form yielded triple peaks, on Exhibition, Affiliation, and Autonomy. She impressed the counselor as being outgoing, vivacious, talkative, and quite purposeful in planning her career.

Her JVIS profile (Figure 2-3) is distinguished by its high scores in Technical Writing, Sales, Author-Journalism, Performing Arts, and Independence among others.

Figure 2-3: Career Goal: Newscasting



Also notable were low scores for Math, Physical Science, Engineering, Adventure, and Nature-Agriculture. In terms of her similarity to college student groups, she was most similar to Liberal Arts students. Among her General Occupational Themes, the highest score obtained was for Communicative, and in terms of Similarity to Job Groups, she was most similar to Occupations in Writing.

The interest results elicited from her the report that she had always been interested in writing. As a child she had a fantasy of becoming a writer of children's stories. After some considerable exploration of opportunities both with the counselor and on her own, she narrowed her career alternatives to two, teaching and journalism, at which point formal counseling ended. Follow-up two years later revealed that she was employed by an FM radio station working on a variety of tasks, including her own interviewing feature (note her high JVIS Performing Arts percentile). She was quite happy with her work, but hoped to break into newscasting.

Career Goal: Landscape Architecture This case illustrates in a more mature person the results of somewhat conflicting interests and their effect upon a career. It is of a 25 year-old artist who had previously dropped out after two years of an

engineering program even though he had done B-level work because he found it "boring" and found his fellow-students "dull." He had subsequently taken night courses in art (oil painting) and had attempted unsuccessfully to make a living at this work, supplementing it with other odd assignments, such as free-lance photography, tinting pictures, and, sometimes, casual work. He had come to the conclusion that although he believed he had some considerable talent, there were other artists with far more talent than he who were "washing dishes" for a living. His aptitude test scores showed scores at the 88th percentile in verbal, and 84th percentile in quantitative. On a test of spatial visualization he scored at the 96th percentile.

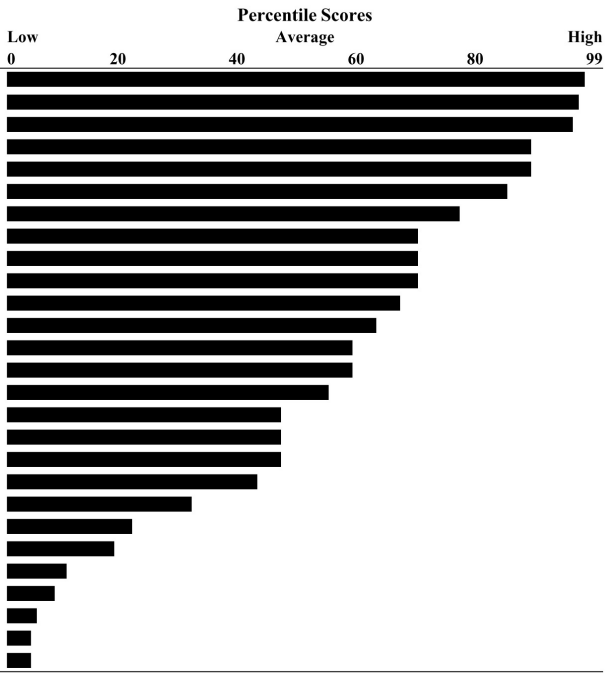
His JVIS profile (Figure 2-4) showed three notable elevations—Physical Science, Creative Arts, and Nature-Agriculture, all above the 90th percentile. He proved to be most similar to college students in Agriculture and Engineering, and highly dissimilar to students in Liberal Arts and in Business.

His results were discussed with him at some length. The opportunities and educational requirements in architecture were explored in detail. He expressed considerable interest in this area, but was concerned that it was "too much like engineering." In re-reviewing his JVIS profile, he confirmed an interest in the outdoors as reflected

Figure 2-4: Career Goal: Landscape Architecture

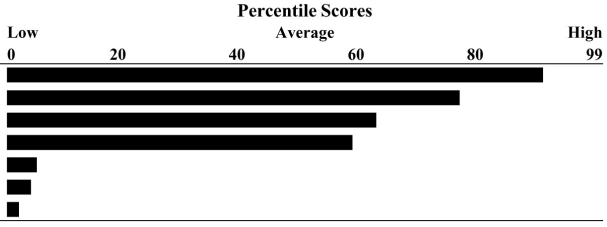
Work Roles

Basic Interest	Standard Score	Percentile
Creative Arts	69	97
Physical Science	67	96
Nature-Agriculture	66	95
Family Activity	62	88
Skilled Trades	62	88
Personal Service	60	84
Life Science	57	76
Mathematics	55	69
Office Work	55	69
Teaching	55	69
Dominant Leadership	54	66
Adventure	53	62
Engineering	52	58
Sales	52	58
Elementary Education	51	54
Business	49	46
Finance	49	46
Medical Service	49	46
Social Science	48	42
Supervision	45	31
Social Service	42	21
Professional Advising	47	18
Law	37	10
Author-Journalism	36	8
Performing Arts	34	5
Human Relations Mgt.	32	4
Technical Writing	33	4



Work Styles

Basic Interest	Standard Score	Percentile
Job Security	63	90
Accountability	57	76
Planfulness	53	62
Stamina	52	58
Independence	34	5
Academic Achievement	32	4
Interpersonal Confidence	30	2



by his relatively high Nature-Agriculture standard score. His decision was to enter a university architecture program providing an option for specialization in landscape architecture. With credits for his previous work, at the time of this writing he had completed successfully in one year and a half the equivalent of two and one half years of this program. Not one to state strong views, he reported that it was "more interesting than engineering." His conversation about his work during the follow-up telephone conversation revealed, however, that he was enthusiastic about his work, and plans for the future.

Career Goal: Business This 17 year-old high school senior arranged for counseling at the student services office in his high school. After the interview the counselor described him as "gregarious, not afraid to approach people... fond of the limelight... has a good sense of humor, but one who becomes annoyed easily at trivial things."

His academic record and previous performance on standardized achievement tests was good, sufficient for university admission, but not outstanding. He explained that he had been considering a number of alternatives, including engineering, business, and physical education (he had participated in a number of sports, notably football, in high school).

The Personality Research Form revealed high points on Aggression, Defendence, Impulsivity, and Social Recognition, and somewhat elevated scores on Autonomy, Exhibition, Play and Sentience. Low scores were present on Cognitive Structure, Endurance and Harmavoidance.

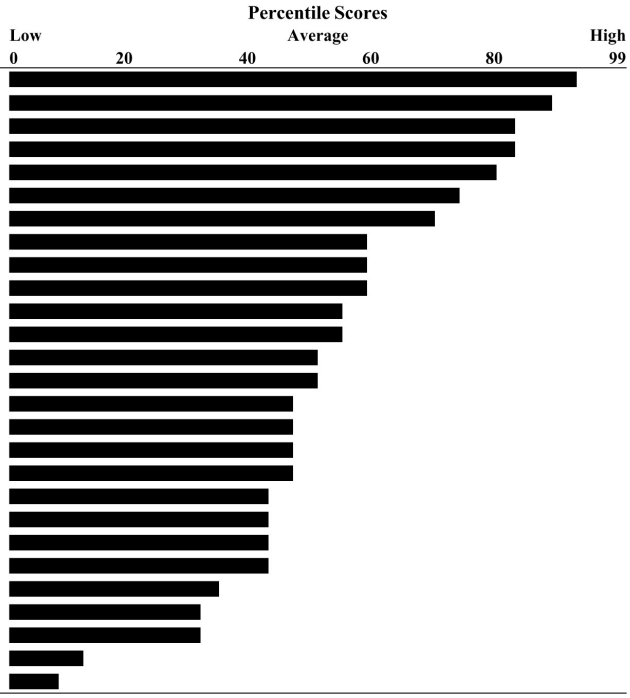
The JVIS profile (Figure 2-5) contains elevations for Mathematics, Engineering, Finance, Sales, Supervision, and Interpersonal Confidence. Although his profile indicated a score at the 83rd percentile on the Engineering Basic Interest scale, his score on the cluster entitled Engineering and Technical Support Workers was only .01, a score close to the 50th percentile. The score for Stamina (and the PRF score for Endurance) were also notably at variance with the scores expected for engineers. Additionally basic interest scales reflecting interpersonal interests, notably Supervision and Interpersonal Confidence, were somewhat higher than usual for engineering students.

These and other results from testing were discussed at some length with him during a second interview. He felt that there were no real discrepancies between what he thought his interests were, and what the tests showed. He stated that what the tests were measuring seemed fairly obvious to him, although upon further discussion, his impressions proved to be not quite correct. The interview initiated some self search, and as a result he decided a career in business was his first choice. (His three highest clusters were Occupations in Accounting, Banking and Finance; Sales Occupations; and Occupations in Merchandising. He stated that he had some previous doubts about his ability to survive in an engineering program. He felt that he had the ability, but was not sure he could stand the "drudgery," as described by a cousin. His test results raised further doubts. Upon follow-up, he reported that he was in a business program

Figure 2-5: Career Goal: Business

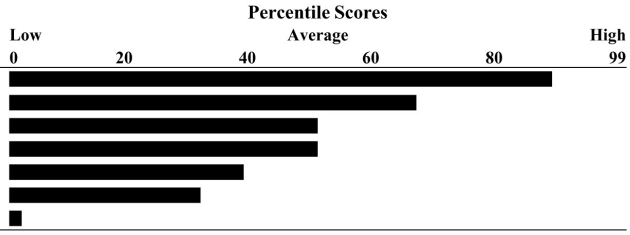
Work Roles

Basic Interest	Standard Score	Percentile
Engineering	64	92
Supervision	62	88
Finance	59	82
Mathematics	59	82
Sales	58	79
Adventure	56	73
Professional Advising	55	69
Business	52	58
Human Relations Mgt.	52	58
Office Work	52	58
Skilled Trades	51	54
Social Science	51	54
Law	50	50
Performing Arts	50	50
Family Activity	49	46
Medical Service	49	46
Teaching	49	46
Technical Writing	49	46
Elementary Education	48	42
Life Science	48	42
Personal Service	48	42
Physical Science	48	42
Creative Arts	46	34
Dominant Leadership	45	31
Nature-Agriculture	45	31
Social Service	38	12
Author-Journalism	36	8



Work Styles

Basic Interest	Standard Score	Percentile
Interpersonal Confidence	62	88
Job Security	54	66
Accountability	50	50
Planfulness	50	50
Independence	47	38
Academic Achievement	45	31
Stamina	30	2



at a major university, was doing well in all courses except accounting, and was still actively considering alternatives within business. He stated that he was hoping to obtain overseas experience.

Recurring Counseling Problems

In this section interpretive and counseling problems sometimes arising with the JVIS are reviewed and discussed. The solutions are intended simply as a guide, and not as a prescription. It is not possible, nor would it be desirable, to write a cookbook for all anticipated counseling problems. But some consideration of frequently-encountered problems might be helpful. Each paragraph reviews a different kind of problem.

A Flat JVIS Basic Interest Profile—No High or Low Points

Because there are a good many basic interest scales on the JVIS, this problem arises relatively infrequently than on other tests, but it does arise. It means that strong preferences and dislikes regarding work activities have not evolved for the person. It also

has the effect of tending to reduce the magnitude of the scores on the extended report for Similarity to College Student Groups and Similarity to Job Groups. Other things being equal, and unless there are circumstances or facts indicating a contrary decision, this kind of profile does not support the choice of highly specialized educational or occupational areas. In other words, as between the choice of a career requiring an advanced academic degree and one involving, for example, general business, the latter would be more likely to be indicated. Sometimes, people are undecided about two or more choices and hope that vocational interest test results will serve to make the decision easy. But if the indecision is based on a genuine lack of articulation of interests, the JVIS can do little more than accurately reflect this state of affairs. But there are degrees of articulation. Sometimes a relatively flat profile has some degree of shape of value in educational and career planning.

Measured Interests are Discrepant with Career Plans

This is a more common problem, one not admitting to the same simple solution applicable to all cases. The first step is to attempt to discover the cause of the discrepancy. It is one thing if the counselee expresses a preference with a great deal of doubt, and yet another if he or she expresses a great deal of certainty about previous plans and aggressively challenges the accuracy of test results. In the latter instance, while keeping in mind the fact that JVIS results may not be 100 per cent accurate, it is well to point out that the counselee has expressed preferences for activities quite different from those relevant to stated career objectives. Sometimes a review of item content is helpful in clarifying for the person the sort of activities in which a person in a given field typically engages.

Often the conflict between proposed career choice and measured interests goes beyond a differing appraisal of interests. Sometimes there is parental or other external pressure in a particular direction, as when a person's stated choice to enter engineering, for example, is an expression of a parental decision, which might have been quite different had outside influence been lacking. Most counselors under such circumstances will point out the implications that a decision to enter a career involving interests very dissimilar to measured interests might have for satisfaction and try to persuade the counselee to consider all sources of information before reaching a decision.

Sometimes there is a conflict between measured interests and extrinsic variables, such as prestige and financial rewards. A person might, for example, state a desire to enter medicine because of the impression that physicians earn a great deal of money, and enjoy the respect of the community. Extrinsic values should be considered in career choice, but not to the exclusion of other factors. These values will differ markedly in different people. Sometimes it is enough to explain how it is possible to realize values about extrinsic factors in a way that is consistent with measured interests. The individual wishing to enter medicine might be advised that certain areas of business might be equally or more remunerative, and more appropriate from

the vantage point of interests. At other times it is a matter of clarifying which values, intrinsic satisfaction or extrinsic rewards, are more important, and then seeking to achieve a compromise or resolution of the respective importance of the two.

Abilities and Interests Appear to Conflict

This is one of the most common situations encountered in counseling, although usually it is in the form of a conflict between *expressed* interests and abilities. For example, a person expresses an interest in becoming an engineer, but has modest mathematics aptitude. Such expressed interests are often regarded by counseling professionals as "unrealistic" in that the probability is low of completing engineering for a person with modest mathematics aptitude. When JVIS scores reflecting Similarity to Job Groups appear to conflict with measured abilities or with a person's past record of performance, there are a good many possible alternatives. First of all, there are many occupations contained within each cluster. Generally, these occupations require different levels of aptitude, education, and experience. It is often possible to find a set of occupations within a cluster at an appropriate level for the abilities and motivation of the counselee.

Secondly, there is no pretense that there is in general only one ideal occupation recommended by the measurement of interests. The JVIS report ranks job groups in terms of the degree of similarity between the average profile in the cluster and that of the respondent. The likelihood is that satisfaction will be higher if the person chooses an occupation from a higher-ranked cluster. Counselees should be encouraged to look at a number of the higher-ranked clusters, and to explore occupations within each of these taking into account factors in addition to interests, such as abilities and values. If particular occupations within certain clusters conflict with these other factors, other occupations should be considered. In the example, for the person who lacks the requisite mathematical aptitude or background to enter a program of training in engineering, various technology programs are alternatives, as are certain engineering programs requiring somewhat less mathematics, like industrial engineering.

Thirdly, counselees should be advised that predictions of success based on measured aptitudes or performance are not absolute, but probabilistic. Not all successful lawyers have high verbal abilities, not all successful engineers are gifted in mathematics, and a certain range of spatial ability is found among successful architects. It is true that persons high in these abilities are more likely to succeed in their respective areas, but one is dealing with probabilities, not certainties. Some people entering these fields with low relevant abilities may succeed, but their chances for success are smaller. Counselors are obliged to assist people in weighing other factors, such as motivation, in decisions of this sort.

Fourth, the relationship of abilities and predicted outcome is usually much higher in educational settings (which sometimes serve as a gate to an occupation) than they are to job performance. Thus, aptitude tests administered to premedical students will

show a considerably higher correlation with grades in the first two years of medical school than they do with clinical performance. If other factors are consistent with a certain career choice, such as high motivation, counselee's attention may be directed to an appropriate educational program consistent with his or her ability level. Persons with more modest levels of ability (or motivation) might be encouraged to consider educational programs other than the most intellectually demanding ones.

Low Reliability (R) Index for an Individual Machine-Scored Profile

When the reliability index is low (there is some cause for concern when it is below .50, and grave doubt as to the reliability of the JVIS report when it is at or below .20), the temptation is simply to disregard the results of interest measurement. Although it is true that these results may not be valid, there often remains the necessity of counseling these individuals. Although a common cause of a low reliability index is lack of motivation in completing the JVIS, this is not always the case. It is worthwhile to discover the cause particularly if the counselee protests that he or she was motivated. It might be that simple carelessness has resulted in the omission of an item and a mismatch between the numbers in the booklet and the answer card. If there is very little variation among scale scores (all scores near the middle of the scale), the reliability index has a tendency to be lower. It may also be lower among young children, among persons of below average verbal ability, and/or among persons lacking in the differentiation or articulation of interests. If there is any possibility that sheer carelessness is the cause of the low individual reliability, and the counselee is motivated to complete the JVIS a second time, this is probably the best course of action.

Basic Interest Scales Appear to Conflict with Similarity to Job Groups

There will be times when a person will obtain a high Basic Interest scale score on a particular scale like Law, and not have the cognate occupational cluster, e.g., Occupations in Law and Politics, represented among the three highest-ranked clusters. Or a certain cluster might be high ranked without a high score for the corresponding Basic Interest scale. Inevitably, respondents inquire about how this can occur and what it means. Discrepant findings of this sort do not necessarily imply conflicting information, nor need they imply that one or both of these sources of information is invalid. If it is explained that the scores on the basic interest scales reflect the number of times that a respondent has endorsed activities comprising a work sample of the actual tasks defining the scale, while the Similarity to Job Groups reflects the overall similarity of all 34 Basic Interest dimensions to those of persons working in fields subsumed by the cluster, the apparent conflict is clarified. Thus, it can be suggested that lawyers, while usually high on the Basic Interest scale for Law, also usually

show high scale scores on Technical Writing, Business, and Finance. If a respondent happened to obtain lower scores for the latter scales, this would result in a lower degree of similarity to the classification labeled Occupations in Law and Politics.

Of course, not everyone in an occupation is similar in interests to the average person in that occupation—not all lawyers are like the average lawyer. Some are not interested in business, and may go into more specialized areas of law, like criminal or family law or some other branch. This sort of possibility can be explored when the Basic Interest scale points in one direction and the Similarity to Job Groups in another. Usually, however, it is a wiser general policy to seek to fit discrepant basic interest scales to occupations within the highest-ranked job groups. Thus, a person with the Engineering and Technical Support Workers cluster highly ranked, but with high Basic Interest standard scores in Supervision and Business, might consider industrial engineering. If such a person had a high score in Sales, technical sales and marketing might be considered. The counselor knowledgeable about the nature of different occupations will undoubtedly be able to generate many more similar examples.

The Client is Considering an Occupation Which Appears Unrelated to Any of the 32 Job Groups

A large number of occupations can be subsumed within the clusters included in the JVIS. But not every occupation fits unequivocally into one and only one occupation. For example, architects are similar in interests to both engineers and to artists. Within the architect group, architects designing industrial plants will be more similar to engineers, and those concerned with residential buildings will be more similar to artists. Similarly, the profile for landscape architecture students is a compromise between the Engineering-Art composite profile and the profile for Agriculturalists. Other examples involving different combinations are possible: biostatisticians might be expected to have a profile similar both to profiles for Mathematical and Related Occupations and to Life Sciences; executive secretaries show a profile similar both to the cluster for Clerical Services and that for Personnel/Human Management. For considering occupations not falling squarely in a single cluster, a careful analysis of the relevant interest patterns is required. Some guidance may be provided by examining the profiles for each of the 32 job groups. Sound judgment is required in weighing the interest components, as well as the other factors affecting individual career satisfaction and success.

Chapter 3

Construction of the Jackson Vocational Interest Survey

Defining the Constructs of Vocational Interest

At the heart of every psychological test is a pool of items. The ultimate quality and validity of a test rests on the fidelity to which its constituent items reflect the construct or constructs in question. In the case of the JVIS, extraordinary measures were introduced to foster careful item development and selection, because it was believed that these considerations were of paramount importance in the final quality of the scales.

The first step in scale construction was to decide upon the scales to be included, i.e., the nature of the vocational interest disposition to be appraised. As was discussed in Chapter 1, the dimensions to be assessed by the JVIS were divided into two broad categories, those encompassing *work roles* and those encompassing *work styles*. Work roles involved an assessment of the family of related behaviors that is included in a particular universe of vocationally-oriented activities. Thus, an individual who was high on a dimension of Professional Advising would be expected to express a liking for item content which involved activities where the person was cast in the role of an expert, and where expert knowledge or skill might be used to offer counsel to others. The other major category, work styles, involved not so much interest in a particular family of vocationally-related dispositions, but rather, reflect a preference for working in environments where certain kinds of personal qualities are required. For example, a person endorsing many items reflecting Independence would be expected to prefer work environments characterized by a high degree of autonomy and freedom from close supervision.

Having made the distinction between work roles and work styles, a series of decisions was made regarding which dimensions were most important and most relevant to vocational choice and interests. In this venture particular reference was made to the literature on the psychology of work, and in particular to various factor analytic and rational classifications of vocational interests as reflected in item content. Following the publication of the Personality Research Form (Jackson, 1967, 1984) there was a resurgence of interest in rational and construct approaches to psychological test development, which influenced the development of the basic interest scales of the Strong Vocational Interest Blank (Campbell, 1971). The Strong basic interest scales in turn provided one of the points of departure for the selection of dimensions to be assessed by the JVIS.

After deciding upon the set of dimensions to be assessed, careful definitions were prepared for each of these. In particular, a decision was made about the scope of the universe of content, particularly where these might overlap, as, for example, between Life Science and Medical Service. Where a dimension closely paralleled a particular occupation or profession, reference was made to several standard reference works in occupational classification to identify the most relevant facets of the occupation or profession so that these could be incorporated in the definition. Initially these definitions were not fixed but were modified in the light of experience in conceptualizing a particular family of activities and in writing items.

The entire development of the JVIS can be described with a flow diagram (Figure 3-1). This flow diagram graphically illustrates the sequential steps employed in scale development, showing the multiple hurdles required before an item could be included in a final scale. Figure 3-1 may be studied meaningfully in conjunction with the text from this chapter to provide an overview of the strategy of scale development.

Development of the JVIS

The first step in JVIS scale construction was the development of an item pool, which ultimately comprised well over 3000 items and 34 scales. These scales were designed to be equally appropriate for males and for females, with items thoroughly evaluated statistically and substantively, and with a number of studies completed on the scales. Although statistical procedures are important, the most important steps in JVIS scale construction were the careful attention given to the conceptualization of the scales and the intensive substantive review devoted to identifying sets of items representative of the dimension under consideration. There is accumulating evidence that these steps are the most important ones in personality assessment (Jackson, 1971; Jackson & Paunonen, 1985).

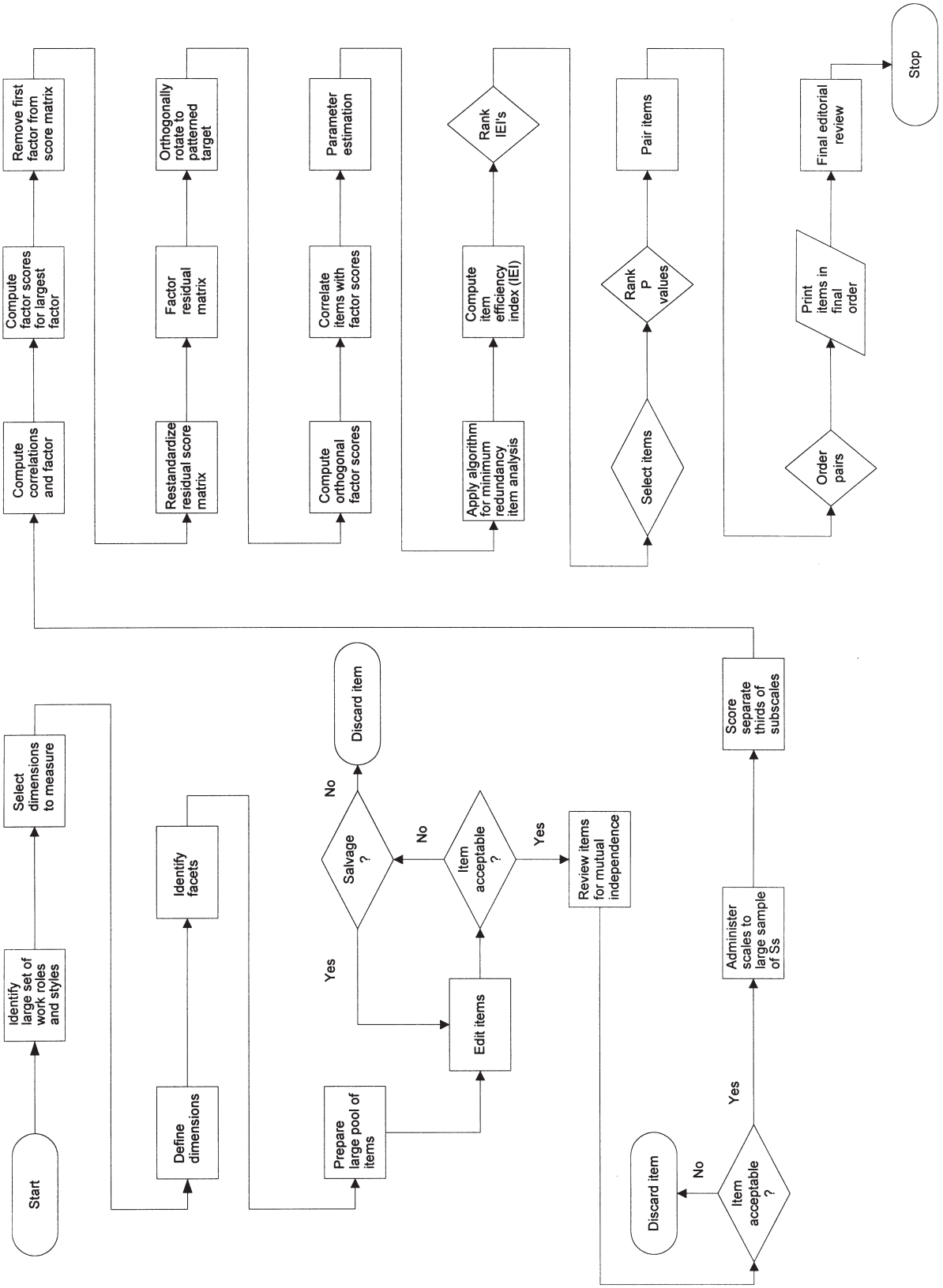
The statistical analysis and item selection procedures employed in the development of the JVIS are among the most elaborate and extensive of those used for any psychological test to date. This scale development may be divided into five phases: (a) initial factor analyses of scales; (b) suppression of response bias; (c) calculation of factor scores for individual scales; (d) item analyses and use of a special algorithm to minimize scale intercorrelations; and (e) assembling the final form through the application of a special program for pairing items in terms of scale statistics.

Initial Factor Analysis

The description of the item statistical analyses would apply strictly to the initial set of 24 scales. Item analyses for the remaining 10 scales were substantially equivalent, but were undertaken separately. (Actually, 14 scales were analyzed in the final set, 10 of them new and four repeated from the original sets so as to obtain item statistics for both sexes.)

For the initial sets of scales, 3120 items selected from a larger set were assembled for empirical analysis. These were divided into five subsets, designated forms A,

Figure 3-1: Flowchart for the JVIS Scale Development



B, C, D, and E, each comprising 600 to 720 items. To ensure that items discriminated within each sex group, items were administered and analyzed separately by sex. Items were retained only if they consistently discriminated for males and for females. This avoided the possible problems in combined sex analyses of selecting items only because they might show a mean sex difference, or only because they discriminated within one sex but not the other. The aggregate total for all groups was 2203 persons. Items comprising each of the scales were divided randomly into three sets, providing three scores for each of the hypothesized scales. For each provisional JVIS form, scales were divided randomly into three subscales. These subscales were intercorrelated and analyzed by principal components factor analysis.

Suppression of Response Bias

In all four samples there proved to be a large first factor accounting for approximately one-third of the total variance, in which all scales loaded highly and positively. Since items had been presented in a single stimulus, like-dislike format, this factor was interpreted as involving a general like-dislike response bias dimension, reflecting not a differential preference for different activities, but rather a general disposition to respond positively or negatively to stimulus materials of this type. An examination of profiles generated from some of these initial respondents indicated how serious such a response bias could be in the interpretation of individual profiles and of group data. Some individuals showed profiles elevated to the 99th percentile for all dimensions while others showed no scale scores above the 20th percentile. Since such response styles had been identified as a prominent source of variance in personality and interest questionnaires (Cronbach, 1950; Anastasi & Urbina, 1997, pp. 377-399) and in measures of vocational interest, it was considered important to undertake procedures to suppress this source of systematic bias. Two methods were employed, one statistical and one involving the use of a forced-choice format. The statistical procedure was designed to guarantee that no item was chosen because it was substantially loaded on a response bias dimension. This was accomplished by first identifying the largest factor as due to response bias, second, by calculating the component of each respondent's standardized score on each item that was attributable to the response bias factor, and third, by subtracting this component of the score due to response bias from the original standardized raw score. What remained was a residual set of standardized raw scores, with the effect of the linear component traceable to response bias partialed out. These scores had a mean of zero, a variance of somewhat less than one, and were wholly uncorrelated with the response bias factor. Thus, any further factor analyses using a function of these raw scores would not be based on the response style component. The effect of this technique for statistically holding constant the role of response bias was to reduce markedly the intercorrelations among the scales, while increasing their interpretability as reflecting the dimensions or constructs which they were designed to measure.

Calculation of Factor Scores for Individual Scales

After the component due to response bias had been identified and subtracted from the standardized raw data matrix, the residual score matrix of three sets of items for each dimension was re-intercorrelated and factored by a variant of alpha factor analysis, designed to give each variable in the matrix equal weight in the final solution. An oblique factor pattern matrix was formed using targeted rotation procedures (Horst, 1965), hypothesizing that each set of three subscales would define its own factor and that the total number of factors would equal the number of scales. Table 3-1 presents the loadings of the three targeted subscales together with that for the highest absolute irrelevant loadings for Form A. It will be noted that all hypothesized loadings are substantially higher than the highest irrelevant loading, and on absolute grounds, they are high. The next step was the calculation of Bentler's (1971) factor contribution matrix. This is the orthogonal matrix fitting the oblique factor pattern matrix best in a least squares sense.

Table 3-1: Factor Loadings and Highest Absolute Irrelevant Loadings for 22 Targeted Subscales: JVIS Derivation Sample N=400

JVIS Scale Name	Rotated Factor Loadings A	B	C	Highest Irrelevant Loading
Adventure	77	69	72	-13
Author-Journalism	66	67	76	-13
Social Science	77	85	79	-14
Business	68	73	67	-17
Creative Arts	77	71	76	-14
Engineering	65	75	73	-22
Finance	66	69	69	-19
Human Relations Management	64	66	61	-16
Law	72	79	76	-13
Life Science	63	58	63	27
Mathematics	71	71	74	-15
Medical Service	82	78	75	-11
Nature-Agriculture	72	77	80	-10
Office Work	83	84	74	-10
Performing Arts	77	77	69	-14
Physical Science	62	55	60	37
Professional Advising	67	72	74	-20
Sales	46	71	74	-12
Social Service	77	77	68	-21
Teaching	80	83	79	-17
Technical Writing	77	67	76	-15
Skilled Trades	63	75	72	-14

Note: Decimals omitted

From the orthogonal factor loading matrix, least squares factor scores (Horst, 1965) for each respondent on each of the factors were calculated. Because these factor scores were based on orthogonal factors, they intercorrelated zero and were uncorrelated with the response bias component which had previously been removed. These purified scores were considered superior to uncorrected total scores as a basis for selecting items, being substantially free from confounding irrelevant trait and method variance.

Item Analyses

Factor scores based on each scale served as the basis for calculating biserial correlations between each of the 3120 items in the five sets with the factors representing each dimension. Since a factor loading matrix can be considered a correlation between a set of attributes and a set of factor scores, the biserial correlations between items and factor scores are analogous to results obtainable from a factor analysis of items, but are computationally far more economical. In the case of Forms A and B these analyses yielded matrices of biserial correlation coefficients of 600 (items) by 22 (scales). In the cases of Forms C and D the matrices were of the order of 600 by 20. In the final set of scales the matrix was 720 (items) by 14 (scales). In these analyses the great majority of items showed the highest correlation with their own factor.

Table 3-2 presents an illustration of the method of item analysis employed. Although only 12 items and 12 factors were presented, the matrix from which these data were taken comprised 600 items and 22 factors. These item statistics were fairly typical, in that they show the appropriate and expected pattern of correlations with targeted and irrelevant scales. If any did not, the item would be immediately eliminated. Since items were correlated with uncorrelated factor scores rather than raw scores, they tend to show much lower correlations with irrelevant scales. Even though the majority of the items in the set presented show substantial correlations with their targeted scales, only a minority of the items presented were actually chosen for inclusion on the final form of the JVIS. A number of additional hurdles were still required.

Although, in general, it was desired to select items showing a high association with their own factor, recent developments in the theory of test construction required that additional considerations be taken into account. Of course, items which correlated more with irrelevant factors than with their own factor should be excluded. But, in addition, it was desired to develop scales with intercorrelations as low as possible. Low correlations between scales imply that individual scales as constructs are more distinct, that the set of scales shows lower redundancy, and that multiple correlations with criteria, other things being equal, will be higher. A method was required that would tend to suppress high correlations between final scales. A technique, identified as *minimum redundancy item analysis* (Jackson, 1984; Neill & Jackson, 1976) was employed. This technique involves a formula for taking into consideration the item's biserial correlation coefficient together with a function of the item's correlation with irrelevant scales and the scales' intercorrelations. Numerical procedures

Table 3-2: Illustrative Item Statistics from the Scale Derivation Item Analysis (N = 400)

			BISERIAL CORRELATIONS											
Item	*Scale*	$P_{(key)}$	*ADV*	*A-J*	*SCS*	*BUS*	*C-A*	*ENG*	*FIN*	*HRM*	*LAW*	*L-S*	*MAT*	*MED*
Riding a bucking bronco in a rodeo.	Adventure	34	*55*	-06	-19	00	-16	-02	06	-06	07	04	-04	-06
Writing mystery novels.	Author-Journalism	35	09	*55*	-10	-11	02	-13	-12	-10	06	08	-25	-03
Studying the influences of income on personality.	Social Science	68	-07	-14	*76*	05	-09	-03	-10	02	-01	04	-05	03
Reporting production figures and job completion dates to plant executives.	Business	28	-06	-11	-03	*51*	-22	-06	20	-10	-09	-16	-03	-10
Designing crests for schools and social organizations.	Creative Arts	29	-21	-01	-13	-10	*59*	00	-15	-04	-16	-10	06	04
Developing methods for eliminating background noise in communications systems.	Engineering	30	05	-02	04	-06	04	*63*	-19	-17	02	14	19	17
Studying to be licensed as a professional accountant	Finance	29	-22	-19	-03	01	-19	-11	*62*	-08	-01	-12	33	-02
Greeting and introducing guests at a political meeting.	Human Relations Management	34	01	01	03	-12	01	-02	05	*30*	08	-13	10	-07
Representing a youth accused of car theft in juvenile court.	Law	47	12	03	01	-02	-10	-00	02	07	*56*	-02	-14	11
Studying plant life on the ocean floor.	Life Science	58	25	-02	-04	-03	05	08	-25	-13	-17	*53*	01	10
Reviewing the proof of a complex mathematical problem	Mathematics	27	-22	-05	07	-05	09	02	07	-06	-13	01	*83*	17
Reading a newly published book on hospital procedure.	Medical Service	24	-09	-06	16	-04	-14	03	-10	-02	00	12	06	*69*

Note. Decimals omitted. $P_{(Key)}$ refers to the percentage of respondents answering in the keyed direction. Correlations are with factor scores for the scale factors.

for estimating three different weights permit an evaluation of various combinations of these parameters. In the case of JVIS scale development different combinations of weights were investigated for their effects on reducing scale intercorrelations and the best combination of these chosen for the final analysis. A computer program was written by the author, first to develop the best set of weights, secondly to compute an Item Efficiency Index taking into account the item's content saturation and minimum redundancy and finally, to select items with the highest Item Efficiency Indices for each scale and to list these items together with pertinent item and scale statistics. Following these statistical procedures, item content was reviewed to evaluate items for substantive generalizability. For example, scales having too many items representing a single facet of the hypothesized dimension were appropriately revised. The items were then ready for assembling in a final form. A more detailed presentation of minimum redundancy item analysis is presented by Neill and Jackson (1976).

Assembling Items in a Forced-Choice Format

Since it had been decided to present items in pairs in such a way that individuals might choose between two activities representing different occupational interest role or work style dimensions, and since a special format was required for convenient hand scoring, a computer program was written which would take these consider-

ations into account. The program also permitted the assignment of items to pairs in such a way that items with similar endorsement frequencies would be paired, thus enhancing item variance and scale reliability. Scales were divided into two sets of 17 scales each. Since each scale was comprised of 17 items, each of these 17 items was paired with an item from a different scale in the alternative set. Thus, each of the 17 items in the Creative Arts scale, the first scale in Set A, was paired with a different item from each of the 17 scales in Set B. This arrangement permitted the preparation of an answer sheet in such a way that choices could be arranged in a 17 by 17 matrix with scores for the 17 scales in Set A comprising the A alternatives in the rows of the matrix and scales in Set B comprising the B alternatives in the columns of the matrix. Summing the A's in the rows of this matrix yields scores for the first 17 scales in Set A; summing the B's in the columns of the matrix yields total scores for the 17 scales in Set B. Pairing the items in this way had the additional advantage of yielding two sets of JVIS scores each with a full 17 degrees of freedom. A matrix based on each subset of scores considered separately is of full rank, free from the undesirable statistical characteristics observed in certain other forced-choice ipsative tests (Anastasi & Urbina, 1997, pp. 370-371), while completely eliminating the bias of responding "like" or "dislike" identified in certain vocational interest questionnaires. The forced-choice format does, however, result in 33 degrees of freedom for the 34 scales. Applications involving the computation of an inverse, such as involved in multiple regression or factor scores, may proceed by first arbitrarily dropping one scale from the analysis or by employing an initial reduced-rank solution. After the JVIS was assembled in its final form, test development did not stop. Additional research was required to develop norms, estimate reliability, obtain occupational groups and occupational cluster profiles, study the counseling use of Basic Interest profiles, undertake judgmental studies, and collect data on characteristics of student groups.

Chapter 4

Psychometric Properties of the Jackson Vocational Interest Survey

Item Characteristics and Scale Development

The strategy used in scale development as outlined in Chapter 3 was designed to optimize certain psychometric properties of scales. The characteristics optimized included (a) high content saturation of items with the factor measured by the scale; (b) representativeness of item content of the domain represented by the scale; (c) minimum redundancy among scales, and thus optimal information among the set of scales. It was expected that these psychometric properties would lead to (d) better discrimination between criterion groups; and (e) meaningful patterns of high and low scores for criterion groups.

These characteristics represent a departure in a number of important respects from the traditional wisdom of vocational interest testing, as developed over the period 1925-1963 in the pioneering work of Edward K. Strong, Jr. First, the basic unit of measurement is the scale rather than the item. Second, an explicit stand was taken regarding the content and theory of what was to be measured by scales. Third, modern test theory and factor analytic developments have been incorporated in the rationale for scale development.

Advantages of Basic Scales over Empirical Item Keying

Traditionally, items that discriminated criterion groups from people in general were combined to form scales usually bearing an occupational name. From the viewpoint of treating scales as measures of basic dimensions of vocational interests, such a procedure has a number of serious limitations: (a) Item statistics reflecting criterion differentiation are unstable. Those chosen on the basis of one set of criterion data might not be chosen if a second sample of the same criterion group is analyzed. Sometimes items are chosen due to chance; (b) Scales based on criterion groups frequently represent heterogeneous congeries of items reflecting no unified set of psychological characteristics and hence admitting of no clear psychological interpretation; (c) Criterion-oriented scale development usually results in scales with much item overlap between scales, i.e., the same items are scored on two or more scales. The effects of this are high and spurious correlations among scales due to correlated error, which can adversely affect criterion group differentiation; (d) Items are unreliable as indices of individual differences; (e) Because items are frequently chosen on grounds other than scale homogeneity, what internal consistency reliability they possess is often due largely to response biases, again leading to possibly

suboptimal criterion group discrimination, spurious estimates of reliability, and excessive interscale correlations.

On the other hand, items chosen on the basis of rational considerations, or on the basis of a combination of construct and internal consistency criteria, have been demonstrated to be more stable after replication (Goldberg & Slovic, 1967) and to show higher levels of empirical validity (Anastasi & Urbina, 1997, p. 374). But, apart from empirical validity, a major consideration in psychological measurement and particularly in vocational interest measurement is that scores based on constructs are interpretable in terms of characteristics of people (Loevinger, 1957; Jackson, 1971; Jackson & Paunonen, 1985). Empirical scales only permit probability statements regarding group membership; strictly speaking, inferences cannot be made regarding characteristics of respondents. But in the case of vocational interest measurement, it is extremely important to be in a position to make a statement to an advisee such as, "Your profile suggests that you are strongly interested in mathematics." This is obviously quite different from saying that the advisee's profile resembles the profile of mathematicians. Criterion groups comprised of mathematicians, while sharing an interest in mathematics, tend to have other characteristics irrelevant psychologically to this interest. For example, criterion groups of mathematicians are often chosen from teachers of mathematics, and hence they show a relation to teaching interest. But there is no necessary link between an interest in teaching and an interest in mathematics.

In addition to allowing inferences to be made regarding the interest dimensions of respondents, the use of basic interest scales permits the analysis of group data, and thus provides a basis for the study of the psychological foundations of vocational interests. Although it should come as little surprise that farmers show a high scale score in Nature-Agriculture, it is perhaps noteworthy that some groups of dentists, in addition to elevations in Medical Service and Life Science, also show an elevation in Creative Arts. A deeper understanding of the precise way in which occupations vary in measured interests will not only be an aid to the fitting of profiles of individual advisees to those of occupational clusters, but will in addition broaden our understanding of the sources of motivation for different kinds of work.

Multivariate Approach to Vocational Interest Measurement

On purely psychometric grounds, a number of important advances have been made during the twentieth century. The idea that a set of responses to an item or scale can be conceptualized as due to a number of identifiable components, some of which should be enhanced, and some of which should be minimized, opens the door to new techniques for scale development. Multivariate analysis, once considered an esoteric set of procedures primarily the domain of those specialists willing to undertake arduous hand computations, has developed into a flexible technique, readily adaptable to problems of multiscale test construction. In the case of the JVIS, factor analytic and related multivariate techniques were employed: (a) to confirm the

existence of reliable factors for each scale; (b) to identify and remove a response bias component from the matrix of item responses prior to item analysis; (c) to develop uncorrelated factor scores for each scale; (d) to rotate vocational interest factors so that they would maximally be associated with defining scale scores, while retaining the restriction of orthogonality; (e) to weight each scale equally in the item analysis; (f) to identify the degree of irrelevant scale variance associated with each item, and to weight this variance using a series of matrix procedures in such a way that scale intercorrelations would be optimally reduced in relation to relevant scale variance; and (g) to establish a basis for selecting and pairing acceptable items. The intermediate statistics obtained as a result of these steps are quite voluminous and are perhaps beyond the scope of a test manual. Nevertheless, the data presented in Tables 3-1 and 3-2 in the previous chapter illustrate item and scale psychometric properties. All factor loadings calculated in scale derivation samples were highest for scales on their appropriate factor. All items selected for inclusion in the JVIS also correlated highest with their own factor.

Biserial Correlations with Total Scales

It is also of interest to survey the biserial correlations between each item and their respective orthogonal factor. Table 4-1 lists the 34 scales together with the average item-factor correlation for the selected items from the derivation sample. Although these item-total correlations were examined in scale development, the primary basis for item selection was the Item Efficiency Index, as described in Chapter 3, which incorporated not only item-total scale correlations, but the entire pattern of an item's correlations with all factors. In addition, the highest correlation between an item and the set of irrelevant scales was calculated and averaged. It proved to be .11, which supports the interpretation that scales were independent, and that selected items were predominantly associated with only a single factor.

Appendix contains a set of item statistics, including endorsement proportions (p-values) for each item for males and for females and item-total point biserial correlations derived from a sample based on 2500 individuals with characteristics similar to those of the current normative sample. Also presented are the correlations between the items with the relevant factor from the scale derivation sample and from the sample of 2500 individuals.

Reliability

First, it should be noted that the great majority of reliability coefficients for the longer provisional scales developed for item analyses were above .90, a finding encouraging further work with these scales.

There are a number of aspects to JVIS reliability to be considered in some detail in this section, namely, test-retest stability and consistency on a single occasion for Basic Interest scales and for General Occupational Themes; and individual reliability, reflecting the consistency over occasions with which a single respondent has

Table 4-1: Average Item-Factor Biserial Correlation

	Average Biserial Correlation
Creative Arts	70
Performing Arts	69
Mathematics	99
Physical Science	67
Engineering	65
Life Science	79
Social Science	64
Adventure	66
Nature-Agriculture	72
Skilled Trades	72
Personal Service	62
Family Activity	58
Medical Science	90
Dominant Leadership	61
Job Security	51
Stamina	62
Accountability	78
Teaching	54
Social Science	69
Elementary Education	62
Finance	79
Business	57
Office Work	89
Sales	65
Supervision	55
Human Relations Management	53
Law	71
Professional Advising	46
Author-Journalism	69
Academic Achievement	62
Technical Writing	63
Independence	64
Planfulness	60
Interpersonal Confidence	63

Note. Decimals omitted.

completed the JVIS; and the reliability of the pattern contained in the entire profile for a single individual.

Reliability of JVIS Basic Interest Scales

Test-retest coefficients are presented in Table 4-2 for two distinct samples. The first sample was a group of 172 university students who completed the JVIS one week apart, as part of introductory psychology research participation requirements. These test-retest reliabilities range from .91 for Social Service to .72 for Independence, with a median of .84.

The second sample is from a study by Berk (1988) assessing dimensions of person reliability in the context of vocational assessment. A group of 95 first year university

Table 4-2: Test-Retest and Internal Consistency Reliability Indices

	Test-retest: 1 week apart (N = 172)	Test-retest: 4-6 week apart (N = 95)[1]	Coefficient Theta[2] (N = 1573)	Coefficient Alpha (N = 3500)
Creative Arts	88	86	85	81
Performing Arts	84	84	83	80
Mathematics	87	89	89	88
Physical Science	90	86	90	86
Engineering	87	87	89	83
Life Science	88	83	89	84
Social Science	85	76	76	69
Adventure	86	87	91	84
Nature-Agriculture	90	83	87	82
Skilled Trades	84	78	86	77
Personal Service	84	75	74	64
Family Activity	83	81	82	72
Medical Service	89	89	91	88
Dominant Leadership	81	78	77	72
Job Security	77	76	76	66
Stamina	74	72	75	64
Accountability	77	75	70	56
Teaching	86	81	80	72
Social Service	91	92	91	83
Elementary Education	89	85	89	81
Finance	90	90	84	81
Business	84	82	71	57
Office Work	77	81	82	69
Sales	82	82	78	67
Supervision	84	80	80	67
Human Relations Management	87	83	76	67
Law	85	84	83	77
Professional Advising	83	81	70	54
Author-Journalism	86	80	83	77
Academic Achievement	73	69	74	60
Technical Writing	78	83	72	62
Independence	72	69	73	56
Planfulness	76	79	75	65
Interpersonal Confidence	76	71	76	67

Note. Decimals omitted. [1] After Berk (1988). [2] Coefficient theta is a dimension-free lower-bound internal consistency reliability estimate (Bentler, 1972).

students, 43 men and 52 women, completed the JVIS on two occasions separated by four to six weeks. Test-retest reliabilities range from .92 for Social Service to .69 for Independence and Academic Achievement, with a median of .82

Internal consistency coefficients for JVIS Basic Interest scales are also presented in Table 4-2. Coefficients in the third column are based on a sample of 1573 high school students, 799 males and 774 females, who were administered the JVIS during school hours. These values range from .70 to .91, with a median of .81.

Listed in the fourth column of Table 4-2 are reliability coefficients (coefficients alpha) for the normative sample of 1750 males and 1750 females. Coefficient alpha values range from .88 for Mathematics and Medical Services to .54 for Professional

Advising with a median of .72. Lower values are indicative of scales assessing a number of facets.

Reliability of JVIS General Occupational Theme Scales

Internal consistency reliabilities for the 10 General Occupational Themes based on the normative sample are presented in the first column of Table 4-3. These have a median value of .875. Also contained in the second and third columns of Table 4-3 are test-retest reliabilities two respondent samples, with respective median values of .885 and .895.

Reliability of Individual JVIS Profiles

Reliability has traditionally been employed to describe tests or scales, not individuals. But in counseling decisions the question of the reliability of a single individual's responses is just as much a matter of concern as is the question of the reliability of the test being completed. Accordingly, a method was devised (Jackson, 1976) for appraising individual reliability that has been incorporated into computer scoring. It is simply an odd-even reliability computed on a single individual across many scales, rather than the more usual odd-even reliability coefficient calculated on a single scale across many individuals. Thus, items in each scale were ranked in order and numbered sequentially. The total scores received by an individual for the odd-numbered items on each of the 34 scales were assigned to the x variable and the total score received for the even-numbered items to the y variable. A product moment correlation ***(R)*** is then calculated across the 34 scales and corrected by the Spearman-Brown formula. Berk and Fekken (1990) administered the JVIS to a sample of 95 university students on two occasions separated by four to six weeks. The mean reliability of individual profiles (corrected by the Spearman-Brown formula) was .84 on the first occasion and .87 on the retest occasion.

Table 4-3: Test-Retest and Internal Consistency Reliability of General Occupational Themes

General Occupational Themes	Coefficient Alpha (N = 3500)	Test-retest 1-week apart (N =54)	Test-retest: 4-6 weeks apart (N = 95)[1]
Expressive	86	90	86
Logical	93	87	92
Inquiring	89	91	90
Practical	91	89	89
Assertive	72	82	83
Socialized	70	85	83
Helping	90	88	90
Conventional	86	86	91
Enterprising	92	90	93
Communicative	81	92	83

Note. Decimals omitted. [1] After Berk (1988).

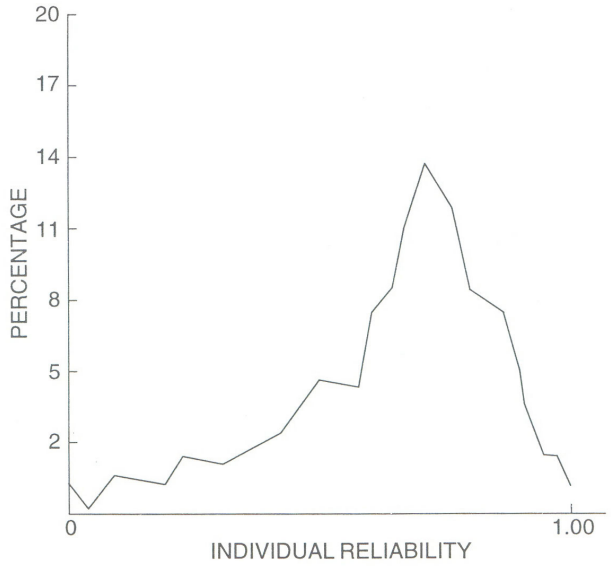
Figure 4-1 presents the obtained values for individual reliability coefficients for a large sample of high school students. In contrast to Figure 4-1, the theoretical expected value of purely random responding, confirmed by Monte Carlo studies, is 0.00, as mentioned in Chapter Three, with a standard deviation of about .18. Given the distributions of real and of random individual reliability coefficients, one can reasonably assume that individuals on whom a value of less than .20 is obtained can be categorized as probably primarily attributable to careless, non-purposeful, and/or inarticulated responding. The higher the individual ***R*** coefficient, the more confidence one can have in the reliability of the profile.

Unfortunately, with hand scoring there is no convenient way to calculate this coefficient, short of obtaining half scores and proceeding with hand or machine calculation of the product moment correlation, which few will wish to undertake. In the absence of a convenient way of obtaining ***R*** by hand, the user is advised to supervise especially carefully the administration of JVIS records to be hand scored.

Stability of JVIS Profiles

In addition to the test-retest stability of individual JVIS scales, the question arises as to whether or not the entire configuration contained in the JVIS Basic Interest scale profile is stable when assessed over two or more occasions. If the highest-ranked scale changed slightly to become the second highest-ranked scale, the situation would not be too serious, but if the highest-ranked scale became the lowest-ranked scale, it would indeed be serious. For 54 university students taking the JVIS on two occasions separated by two weeks, the intercorrelation for each person of the 34 JVIS scales

Figure 4-1: Frequency Distribution of Individual Reliability Coefficients Based upon 1706 Male and Female High School Students



was obtained. (Obviously motivation to follow directions is important here—two individuals whose very low individual internal consistency data indicated they were responding non-purposefully were eliminated.) The range for the individual profile stability coefficients for the 54 individuals, 34 females and 20 males, was .59 to .96 with a median of .87. Fewer than 20 per cent had profile test-retest stabilities of less than .80. In the sample of 172 college students taking the JVIS one week apart, the median profile stability was .88. Over a longer period 102 medical school applicants taking the JVIS first as part of application procedures and six months later as medical students showed a median profile stability coefficient of .84, which is interesting, because their motivation to make a good impression was different at the time of application and after admission, and, in the months between the test and retest, they had accepted a commitment of what is for most a lifelong career.

The stability of the General Occupational Themes profile was also calculated for each of the 54 persons completing the JVIS on two occasions. The mean individual profile stability coefficient for General Occupational Themes was .94.

The Internal Structure of the JVIS

JVIS Intercorrelations

The intercorrelations between JVIS basic scales are presented in Table 4-4, with males in the lower left triangle and females in the upper right triangle. These data were based on a sample of 1250 males and 1250 females. There is some tendency for the first 17 scales to cluster together and for the second 17 scales similarly to cluster. This is only partially due to the slight negative correlation between the two sets resulting from the forced-choice format opposing items from the two sets. In fact, this format affects the correlations only to the extent of an average correlation of .04. A more important source of negative correlation between the first and second sets of scales is the fact that, because of the organization of the profile, similar scales tend to be grouped together and dissimilar scales hence appear on separate halves. There is thus a predominance of science-related scales on the first half and business-oriented scales on the second half. Also, the first set of scales tends to emphasize interest in abstract ideas and the mastery of non-interpersonal aspects of the environment, while the second set involves either more concrete activities or interpersonal activities, or both.

In any event, the overall magnitude of the correlations and the absence of a unipolar general factor provides some encouragement to the view that a number of relatively independent interests are being assessed. The average absolute correlation reported in Table 4-4 is .28 for males and .24 for females. Lower scale correlations contribute to better occupational discrimination.

Table 4-4: JVIS Basic Interest Scale Intercorrelations

	Creative Arts	Performing Arts	Mathematics	Physical Science	Engineering	Life Science	Social Science	Adventure	Nature/Agriculture	Skilled Trades	Personal Service	Family Activity	Medical Service	Dominant Leadership	Job Security	Stamina	Accountability	Teaching	Social Service	Elementary Education	Finance	Business	Office Work	Sales	Supervision	Human Relations Mgmt.	Law	Professional Advising	Author/Journalism	Academic Achievement	Technical Writing	Independence	Planfulness	Interpersonal Confidence
Creative Arts		38	05	17	21	28	15	33	49	44	33	48	05	-13	01	-01	-02	-28	-11	-06	-48	-35	-28	-28	-48	-39	-43	-38	-05	-32	-29	-16	-34	-26
Performing Arts	34		-04	05	06	15	09	37	29	20	30	24	02	-06	-07	-12	-12	-23	-13	-08	-29	-18	-22	-16	-40	-21	-22	-26	19	-32	-20	-11	-39	-14
Mathematics	10	-10		54	48	32	09	10	08	07	-15	-04	20	04	05	24	13	-31	-26	-24	-06	-32	-24	-39	-28	-26	-23	-21	-30	01	-16	-24	-07	-25
Physical Science	28	-02	60		64	71	36	27	36	14	-13	01	38	03	01	17	07	-42	-34	-40	-25	-49	-39	-53	-50	-39	-34	-36	-25	-06	-10	-31	-30	-40
Engineering	37	01	48	68		49	23	30	34	29	-04	03	31	-01	00	15	05	-41	-33	-38	-20	-35	-39	-47	-41	-37	-29	-29	-21	-16	-15	-32	-27	-37
Life Science	34	13	38	71	50		45	44	51	15	03	13	51	02	03	10	06	-40	-17	-30	-45	-57	-52	-53	-61	-42	-43	-49	-22	-22	-20	-35	-40	-38
Social Science	21	14	15	38	20	47		23	25	-03	-02	02	16	-03	-04	04	00	-21	-06	-24	-25	-39	-41	-33	-39	-12	-24	-20	02	-06	06	-17	-34	-21
Adventure	36	34	06	27	36	37	14		48	19	32	31	33	05	-07	03	-05	-41	-17	-31	-29	-34	-47	-36	-51	-32	-27	-39	-11	-43	-32	-27	-50	-25
Nature/Agriculture	50	26	05	32	34	45	20	43		45	29	44	24	-09	03	05	07	-38	-22	-21	-51	-42	-34	-41	-54	-46	-54	-47	-18	-35	-26	-26	-37	-33
Skilled Trades	46	15	17	30	42	26	01	28	59		36	42	10	01	22	07	10	-32	-18	-08	-37	-25	07	-18	-26	-52	-38	-43	-31	-36	-38	-19	-08	-39
Personal Service	31	30	-12	-05	07	06	-03	34	37	43		57	07	-02	15	-06	-01	-18	-05	04	-28	-05	-07	02	-19	-36	-27	-24	-19	-47	-42	-21	-24	-16
Family Activity	48	27	01	08	21	18	01	36	52	51	56		09	-08	23	06	14	-24	-16	02	-40	-25	-07	-16	-32	-45	-42	-39	-23	-41	-45	-22	-17	-21
Medical Service	13	10	28	41	36	48	16	31	26	20	09	14		16	07	19	10	-32	-04	-27	-27	-40	-36	-39	-38	-34	-19	-44	-31	-27	-26	-34	-26	-26
Dominant Leadership	-07	-05	07	07	09	10	-04	15	02	12	05	02	20		20	17	08	-14	-15	-21	00	-10	-10	-08	07	-01	07	-15	-26	-09	-21	-03	01	03
Job Security	09	-04	10	11	14	09	-06	04	16	34	21	27	12	20		21	43	-22	-23	-13	-10	-13	14	-06	-06	-37	-17	-24	-34	-11	-32	-14	22	-13
Stamina	14	-11	29	29	30	21	05	07	17	21	01	15	21	21	28		45	-25	-19	-28	-14	-28	-14	-25	-16	-20	-19	-25	-33	10	-18	-09	14	-10
Accountability	08	-12	19	18	21	09	05	01	13	18	04	19	09	12	44	48		-24	-23	-21	-10	-21	02	-19	-12	-27	-21	-23	-32	00	-20	-12	30	00
Teaching	-32	-17	-34	-51	-49	-41	-16	-42	-37	-46	-21	-32	-39	-26	-26	-33	-29		38	55	10	29	23	29	43	45	21	36	27	26	31	21	16	26
Social Service	-15	-07	-30	-39	-45	-24	01	-27	-22	-34	-08	-24	-16	-26	-29	-31	-27	47		47	-02	05	05	19	16	25	16	10	10	-01	07	06	03	14
Elementary Education	-11	01	-26	-44	-48	-33	-15	-29	-22	-27	00	-08	-30	-30	-20	-31	-24	56	57		-05	16	25	28	21	18	03	13	15	00	06	06	13	15
Finance	-53	-32	-16	-31	-29	-48	-32	-30	-54	-42	-28	-42	-28	-07	-20	-22	-18	19	02	-01		53	28	36	49	38	50	53	07	19	22	12	22	18
Business	-44	-21	-42	-57	-46	-59	-42	-36	-47	-37	-13	-32	-46	-14	-25	-37	-29	37	20	23	58		42	53	59	41	40	55	21	09	18	18	20	26
Office Work	-35	-21	-22	-36	-36	-46	-39	-39	-27	01	-03	-14	-34	-07	11	-21	-07	19	01	18	32	44		45	49	07	20	23	-03	14	11	20	46	11
Sales	-37	-17	-40	-54	-47	-54	-38	-28	-35	-22	-02	-22	-41	-14	-19	-35	-28	30	21	24	44	63	45		48	35	34	41	15	07	11	20	21	25
Supervision	-53	-40	-34	-51	-41	-60	-42	-45	-53	-37	-26	-41	-42	03	-19	-27	-18	41	17	18	56	67	43	51		45	43	51	04	23	20	24	39	33
Human Relations Mgmt.	-50	-24	-33	-50	-51	-49	-20	-38	-53	-62	-36	-52	-37	-13	-42	-37	-30	55	41	30	45	54	16	44	59		45	58	31	30	37	27	08	39
Law	-53	-22	-31	-46	-42	-50	-33	-28	-56	-48	-30	-42	-27	-02	-27	-34	-29	31	18	12	60	56	30	48	55	55		40	23	17	22	19	16	23
Professional Advising	-49	-29	-30	-46	-43	-53	-28	-44	-51	-54	-34	-47	-45	-17	-34	-33	-26	47	24	20	57	59	26	46	60	68	54		28	30	38	24	17	28
Author/Journalism	-09	26	-34	-32	-36	-22	03	-14	-24	-40	-19	-25	-27	-28	-37	-33	-34	32	25	27	04	21	-02	16	07	33	24	27		19	49	22	-15	11
Academic Achievement	-33	-30	02	-14	-26	-24	-01	-46	-43	-49	-51	-44	-25	-20	-17	-01	-04	34	12	10	27	16	08	06	29	36	21	38	20		46	33	36	24
Technical Writing	-29	-12	-19	-23	-33	-24	10	-38	-35	-46	-41	-44	-29	-29	-38	-31	-30	40	29	21	26	27	13	17	23	42	32	42	50	44		20	09	11
Independence	-23	-08	-24	-31	-35	-32	-14	-22	-27	-30	-30	-29	-28	-01	-18	-13	-18	22	13	12	19	24	11	18	27	30	27	31	24	27	19		25	34
Planfulness	-33	-36	-12	-29	-29	-40	-33	-45	-33	-15	-27	-19	-29	-03	15	08	23	17	03	07	28	25	36	21	39	17	21	24	-10	38	08	18		28
Interpersonal Confidence	-33	-09	-33	-49	-48	-45	-20	-27	-42	-49	-20	-30	-35	-10	-16	-18	-06	35	20	24	28	36	13	30	42	48	35	40	27	32	16	38	29	

Note. Correlation matrix for males (N = 1250) is in the lower left triangle. The matrix for females (N = 1250) is in the upper right triangle. Decimals have been omitted.

Factor Analysis

Data for 1163 male and 1292 female high school students were separately factored by principal components. Ten factors were retained for the male group and 10 for the female group. These were rotated first by varimax and then to an orthogonal procrustes solution. Below are listed the parallel factors for males and for females with loadings for at least one sex above .40, male loadings to the left of the scale name, and corresponding female loadings to the right. Decimals have been omitted.

Factor I

Males		Females
70	Professional Advising	63
65	Human Relations Management	67
65	Finance	69
56	Law	55
54	Supervision	43
54	Business	56
50	Sales	38
40	Interpersonal Confidence	26

This factor highlights the practical arts of day-to-day interaction with people in a context in which persuasive motives predominate. Individuals high on this factor enjoy meeting the public and seeking to influence them in some fashion. These individuals are "people oriented" not in a social service sense, but rather in terms of modifying their thinking and decision making in a particular direction.

Factor II

Males		Females
82	Performing Arts	82
42	Creative Arts	37
40	Author-Journalism	42

Each of the three salient scales on this factor highlight the use of abstract symbols for communication. People high on this factor prefer roles in which they seek to create a certain impression upon others through artistic expression or otherwise. Other people are important, but their role is that of serving as an audience.

Factor III

Males		Females
71	Office Work	74
52	Sales	54
50	Business	55
37	Supervision	48

This factor emphasizes conventional interests valued in commerce. People with high scores on this factor prefer orderly environments often in large organizations where expectations about their work and behavior are predictable and relatively

stable. They thrive on detail, avoid intense or highly charged work environments, and those requiring creativity or prolonged intellectual inquiry.

Factor IV

Males		Females
73	Social Science	60
58	Life Science	52
32	Medical Science	46

People high on this factor show a good deal of intellectual curiosity, particularly about the world of living things, social organizations and institutions, people, and biological organisms. They express an interest in learning about the complexities of how social and biological systems are organized. This interest may be intense enough to motivate a person in the direction of a career of scientific inquiry, but more often it is a manifestation of diverse interests in learning about these facets of the environment.

Factor V

Males		Females
78	Technical Writing	80
64	Author-Journalism	62
61	Academic Achievement	61

Clearly, this factor reflects interest in manipulating words in written expression to convey purposeful ideas. People with elevations here enjoy writing, particularly if the purpose of the writing is to present information. They value intellectual understanding and accomplishment, and prefer environments where they are exposed to and can express ideas on serious topics.

Factor VI

Males		Females
69	Nature-Agriculture	52
56	Family Activity	59
50	Creative Arts	48
41	Skilled Trades	33
33	Personal Service	47

This factor highlights the traditional practical and interpersonal interests related to the outdoors, family, appreciation of and mastery of the physical environment, and direct service to others. People high on this factor less frequently seek advanced education, and tend to be more satisfied in occupations in which they can come to terms directly with their environments, and maintain close family and community ties. They tend to avoid environments in which subtle or complex social and interpersonal interaction is the norm or in which abstract ideas predominate.

Factor VII

Males		Females
72	Mathematics	72
62	Physical Science	61
57	Engineering	61

Here the focus is on interest in activities requiring logical thought, problem solving, and quantitative reasoning. People represented by this factor value precision and prefer to deal with issues quantitatively rather than verbally. They prefer working in contexts in which their performance is evaluated in terms of its technical adequacy or excellence, rather than in terms of their social behavior. Many show a willingness to undertake prolonged intellectual activity.

Factor VIII

Males		Females
79	Accountability	80
65	Job Security	63
47	Stamina	50
42	Planfulness	50

This factor represents a cluster of work style scales reflecting a number of desirable personal qualities. Persons high on this factor could be characterized, as well, as socialized in the sense that they prefer well-ordered environments in which their responsibilities are clearly spelled out. They tend to see themselves as reliable, faithful workers who abide by rules and who value a sense of responsibility and obligation to employers and fellow employees. They tend not to prefer environments emphasizing quick thinking and adapting to rapidly changing circumstances.

Factor IX

Males		Females
82	Elementary Education	84
78	Social Service	59
64	Teaching	65

This cluster highlights teaching and social service activities. People salient on this factor seek out situations in which they can lead and direct others in a nurturing, instructional, or advisory role, where the focus is on helping the other person to achieve some goal. Interpersonally, such people are often ascendent, without necessarily being "bossy," and derive satisfaction from intrinsic role-related behavior, rather than primarily from extrinsic rewards such as prestige or money.

Factor X

Males		Females
63	Independence	47
50	Dominant Leadership	73
48	Interpersonal Confidence	37

This is a cluster of work styles highlighting both a desire to work in environments free from close supervision and an enjoyment of directing others. Such people at times might be seen by others as abrasive interpersonally, but see themselves as effective in applying leadership to get a job done. They tend to be forceful, are not reluctant to call attention to themselves or to meet strangers, and enjoy the traditional role of leader. People high on this factor enjoy working with other people in environments in which lines of authority are clearly defined and in which they have an ascendent role.

Implications of factor-analytic findings. The results from the factor analysis of JVIS scales have at least two important implications for interpretation. First, they suggest that there are characteristic patterns of JVIS scores, and the counselor will ordinarily expect to see these typical patterns. Secondly, the emergence of these patterns permits the identification of higher-order General Occupational Themes, which provide a profile for summarizing more globally a respondent's pattern of interests.

Occupational Profiles for the JVIS

Two general strategies have been employed for obtaining JVIS occupational profiles: (a) beginning with the Strong Vocational Interest Blank (SVIB)-JVIS correlation matrix, modern multivariate multiple regression procedures were employed to predict JVIS occupational profiles from the SVIB basic interest profiles originally reported for a large number of occupations; and (b) obtaining new data based on volunteers comprising particular groups.

Scale scores for the SVIB basic interest scales for men were obtained for 189 male occupational groups and for 89 female occupational groups. The total number of respondents in these two sets was well over 50,000 persons. These matrices comprised the matrix of "predictor" scores for a multivariate prediction problem, the JVIS basic interest profile being the "criterion." The SVIB intercorrelation matrix and the matrix of correlations between the SVIB and the JVIS were also obtained separately for males and for females. In order to reduce the influence of measurement error in the SVIB intercorrelation matrix, this matrix was factored and factors accounting for 80 per cent of the variance were retained. These data were employed together with multivariate multiple regression procedures (Horst, 1965, Chapter 23) to predict the JVIS basic interest scale scores. When the latter are standardized, they yield an indication of the expected profile shape of each of the 278 groups on whom SVIB data were originally available. This technique illustrates how it is possible to employ data accumulated over time in a manner that permits their incorporation into new instruments.

Profiles Based on Job Groups

It is not practical to encompass all or even a majority of occupations in a set of occupational scales. The number is too large, and its presentation too bewildering. Furthermore, our work, as well as that of others, supports the conclusion that

there are many fewer profile types than there are occupations. Stated another way, the proliferation of a large number of occupational keys and scales involves much redundancy, as in the reported correlation between the SVIB keys for Chemist and Physicist of .95 and in the author's unpublished finding of a correlation between Kuder occupational scales for Social Worker and Dean of Women of .99.

For these reasons, efforts were directed at uncovering the basic structure underlying profile similarity. Work at The University of Western Ontario has produced a technique known as *modal profile analysis*, designed to identify replicable profile patterns in a larger set. Our initial study on vocational interest profiles, described in Chapter 5, demonstrated that it was possible to identify cogent "families" of occupational clusters based on interest patterns. It remained to undertake additional analyses using combined male and female groups. Unlike approaches which depend on occupational keys, profile shapes for related male and female occupational groups are quite similar after profiles have been standardized within sex. This fact permits the combined analysis of males and females. The result of these analyses was the identification of 32 occupational clusters and their corresponding profiles.

After the 32 clusters were identified, salient occupations within each cluster were noted and employed to derive the average weights for each cluster from which individual similarity coefficients are obtained. Thus, each of the 32 clusters are defined by the JVIS profiles based on the classification analysis of the 278 occupational groups already described. The original clustering, as indicated, yielded 32 clusters. One of these clusters, *Military Officers*, has been replaced by *Occupations in Computer Science*. The main reason for this change was the growing importance and influence of information technology on the workplace and labor market. Furthermore, changes in the complexity and diversity of military occupations have rendered the use of a global military occupations cluster obsolete.

A description of the 32 occupational clusters is presented below. Figure 4.2 presents the corresponding JVIS profiles for the 32 occupational clusters. There are few, if any, surprises regarding which scales are high and low. In fact the use of a number of occupational groups to define a particular cluster tends to reduce markedly statistical artifacts and to insure stability and generality of the cluster weights. Thus, the clusters are designed not only to reflect the interest profiles of occupations statistically defining the cluster, but as well, the interest profiles of other similar occupations.

Medical Diagnosis and Treatment Occupations. This cluster was defined by Physicians, Surgeons, Osteopaths, Neurological Surgeons, and Radiologists. Individuals in this cluster show high interests in Medical Service, Life Science, Physical Science, Nature-Agriculture, and Mathematics. This cluster is similar and related empirically to Health Service Workers. Both encompass the healing arts, but the former is defined primarily by physicians and medical specialists and the latter by allied professions or others in the healing arts. Although the two profiles are similar, the profile for Medical Diagnosis and Treatment Occupations emphasizes the basic

sciences more and the business and service areas somewhat less than does the profile for Health Service Workers.

Sales Occupations. This cluster was defined by Salesmen/Saleswomen, Sales Managers, and Salesmen/Saleswomen in the areas of Life Insurance, Automobile Sales, Real Estate, Steel, and Computers. Individuals in the sales occupations tend to show high interests in Sales, Finance, Business, Supervision, and Professional Advising.

Public Service/Protective Service Occupations. This cluster was defined by Police Officers, County Sheriffs, and YMCA Staff. Individuals in this cluster show high interests in Adventure, Skilled Trades, Dominant Leadership, Engineering, and Law. It appropriately describes persons in police and fire control work, and in related areas. Thus, "public service" should not be given a broader interpretation, as it is not intended to include, for example, people in general government service, nor those in welfare work.

Occupations in Writing. This cluster was defined by Authors, Journalists, Lawyers, Newsmen/Newswomen, and Pulitzer Prize Winners. Occupations in Writing involve the writing of technical, dramatic, editorial, news or creative materials to be published in printed format. Many other jobs make use of writing skills in connection with their specific types of work. Individuals in these areas tend to show high Basic Interest scores on the Author/Journalism, Technical Writing, Performing Arts, Independence, and Social Science.

Occupations in Accounting, Banking, and Finance. Included in this cluster were Bankers, Accountants, Business Professors, and Purchasing Agents. This cluster describes individuals involved in office work and financial record keeping, and overseeing the control of assets, securities, receipts and expenditures of money. Individuals in this cluster tend to show high interests in Office Work, Finance, Business, Supervision, and Law.

Mathematical Occupations and Related Fields. This cluster was defined entirely by Mathematicians. Individuals achieving a high rank for this cluster should recognize that opportunities in pure mathematics are quite limited, but a number of other areas require individuals with interests and skills in mathematics. These include, but are not limited to, careers in the physical, life, and social sciences (particularly economics), in accounting and finance, in the insurance industry, and in government. Individuals in this cluster obtain high scores on the Mathematics, Physical Science, Engineering, Stamina, and Life Science.

Occupations in Law and Politics. Included in this cluster were Governors, Lawyers, Legislators, Chamber of Commerce Executives. Individuals interested in this area tend to show high interests in Law, Finance, Human Relations Management, Technical Writing, and Supervision. Jobs in this cluster involve presiding over legal gatherings, preparing legal documents, providing legal advice services, and other law-related tasks.

Health Service Workers. Included in this cluster were Dentists, Medical Technologists, Pharmacists, Optometrists, Veterinarians, Funeral Directors, Physical Therapists, Occupational Therapists, and Registered Nurses. This group differs from physicians by the more concrete nature of their tasks, for example, special therapies, preparation of medications, x-rays, laboratory tests, and use of specialized equipment and knowledge to supplement medical and dental services. These individuals tend to have high Basic Interest scores on the Medical Service, Life Science, and Nature-Agriculture.

Counselors/Student Personnel Workers. Included in this cluster were Career Counselors and High School Counselors. People in this area assist others in understanding and overcoming individual and social problems. They organize information about careers for individuals and integrate this information in a way that is meaningful and helpful to the person seeking assistance. These people tend to have high interests in Teaching, Human Relations Management, Social Service, Supervision, and Professional Advising.

Engineering and Technical Support Workers. This cluster included Engineers, Petroleum Engineers, Production Managers, Astronauts, and Air Force Officers. Members of this cluster show a variety of interests, but share common high interests in Engineering, Mathematics, and Skilled Trades. Jobs in these groups involve activities such as research, design, development, application, consultations, and production and technical support services.

Occupations in Social Science. This cluster included Anthropologists, Sociologists, Economists, and Political Scientists. People in these groups are involved in research and the accumulation of knowledge in different branches of the social sciences and the application of principles discovered in these studies. Such people tend to obtain high Basic Interest scores on the Author-Journalism, Technical Writing, Teaching, Independence, Interpersonal Confidence, and Social Science.

Human Resources Management. This cluster included several groups of Personnel and Human Resources Managers. These individuals deal with the management-related occupations in which people are active in recruiting, selecting, and training employees, maintaining current information on them, and mediating disputes between employers and employees. Individuals in this group express high interests in Professional Advising, Business, Human Relations Management, Finance, and Law.

Occupations in the Physical Sciences. Included in this cluster were Physicists, Chemists, Pathologists, Distinguished Scientists, Mathematicians, and Astronomers. Jobs in this cluster involve researching and applying scientific principles in specific fields such as chemistry, physics, and geology. Individuals working in these areas tend to obtain high scores on the Mathematics, Physical Science, Stamina, Life Science, and Engineering.

Construction/Skilled Trades. This cluster included Carpenters and Skilled Tradespeople. Individuals in this cluster tend to show relatively high interests in Skilled Trades, Engineering, Family Activity, Adventure, and Nature-Agriculture.

Occupations in Religion. Included in this cluster were Priests and Ministers. The JVIS does not assess religious belief or commitment. However, in spite of that fact, groups of religious workers do show common interest patterns. A high ranking for this cluster means that the respondent has a profile similar to that computed for this cluster. Obviously, a career in religious work requires not only an appropriate pattern of interests, but a certain set of values and beliefs as well. Those respondents with a profile similar to the one for Occupations in Religion who do not wish to consider this area might be encouraged to look at other clusters with high ranks. Related clusters include Counselors/Student Personnel Workers, Teaching and Related Occupations, Occupations in Social Welfare, and Occupations in Preschool and Elementary Teaching. Individuals in this cluster tend to show high interests in Social Service, Elementary Education, Teaching, Human Relations Management, and Author-Journalism.

Occupations in Social Welfare. Included in this cluster were Psychologists, Psychiatrists, Social Workers, Speech Pathologists and Rehabilitation Counselors. Persons in these professions are involved in certain kinds of helping relationships, collaboration with other professionals, and a variety of interventions directed at behavior change. They organize and provide activities and services on both individual and community bases. Such people tend to obtain high scores on the Social Service, Teaching, Social Science, Technical Writing, and Human Relations Management.

Agriculturalists. Included in this cluster were Farmers, Foresters, and Veterinarians. Individuals in this cluster tend to show high scores on the Nature-Agriculture, Family Activity, Skilled Trades, Life Science, Personal Service, and Accountability.

Sport and Recreation Occupations. This cluster included Football Coaches, High School Physical Education Teachers, and Physical Therapists. People in this cluster tend to obtain high scores on the Medical Service, Adventure, Life Science, Nature-Agriculture, and Dominant Leadership.

Occupations in Merchandising. Included in this cluster were Buyers, Printers, Advertisers, and Purchasing Agents. Individuals in this cluster tend to show high interests in Office Work, Business, Sales, Finance, and Professional Advising.

Occupations in Entertainment. Included in this cluster were Actors, Entertainers, and College Professors. Individuals in this cluster are distinguished by their high interests in the areas of Creative and Performing Arts and Author-Journalism.

Teaching and Related Occupations. This cluster included School Superintendents, Elementary Teachers, and Teachers in the areas of Business Education, Mathematics-Science, Social Science, Music, English, Language, and Home Economics. There is a distinction between the two occupational clusters—Teaching and Related Occupations, and Occupations in Preschool and Elementary Teaching. These do, of course, represent related families of occupations, but their differences are instructive. Teaching and Related Occupations has its highest point in Teaching, while Occupations in Preschool and Elementary Teaching has its highest point in Elementary Education.

The latter also has higher scores for Social Service, Personal Service, and Office Work. The former places somewhat greater emphasis on subject matter, while the latter emphasizes to a greater degree, service activities. At the extreme, teachers at more advanced levels, like college professors, are typically more identified with a subject matter area than they are with their role as teacher.

Occupations in Music. Included in this category were Musicians, Music Teachers, and Symphony Members. Individuals in the musical field tend to show high scores in Performing and Creative Arts.

Occupations in Commercial Art. This cluster included Interior Decorators, Architects, and Photographers. Individuals in this cluster tend to obtain high scores on the Creative Arts, Performing Arts, Author-Journalism, and Physical Science.

Occupations in Fine Art. This cluster included Artists and Art Teachers. Individuals in this cluster are creatively involved in representation, design, and personal expression through different types of media; for example, painting and sculpture. They tend to obtain high scores on the Creative Arts, Performing Arts, Nature-Agriculture, Life Science, and Author-Journalism.

Occupations in Instrument and Small Product Assembly. This category included Instrument Assemblers, and Sewing Machine Operators. This cluster highlights interests similar to those of workers in manufacturing occupations requiring a good deal of attention to detail. Individuals in this cluster tend to obtain high scores on the Office Work, Personal Service, and Job Security.

Service Occupations. This cluster included Beauticians and Telephone Operators. Individuals in this area express interests in Personal Service, Office Work, and Family Activity. People in these occupational groups provide a variety of services for the physical and social comfort of others on either an individual or group basis.

Occupations in Life Science. Included in this cluster were Food Scientists, Biologists, and Laboratory Technicians. People in this occupational cluster are noted for their expressed interests in Life Science, Medical Service, Physical Science, and Nature Agriculture.

Clerical Services. Included in this cluster were Office Workers, Credit Managers, Public Administrators, Business Education Teachers, and Secretaries. People in this cluster tend to obtain high scores on the Office Work, Business, Professional Advising, Finance, and Supervision.

Administrative and Related Occupations. This cluster included School Superintendents and Public Administrators. People in this category tend to obtain high scores on the Law, Human Relations Management, Supervision, Finance, Business, and Professional Advising.

Machining/Mechanical and Related Occupations. This cluster included Electricians, Tool and Die Makers, Machinists, and Printers. People in this cluster tend to have high interests in Skilled Trades, Engineering, Mathematics, Creative Arts,

and Physical Science. Jobs in this category include the cutting, fitting, and shaping of materials according to required specifications. They also cover a wide variety of mechanically-oriented occupations.

Occupations in Preschool and Elementary Teaching. Included in this category were Elementary Teachers and School Directors. People in this cluster tend to show high interests in Elementary Education, Teaching, and Social Service.

Occupations in Computer Science. The computer science cluster was developed from different university student groups majoring in computer science after graduation and after they entered the workforce.

Validation of Occupational Cluster Profiles

There are two lines of evidence bearing on the validation of JVIS Occupational Cluster Profiles, one judgmental and one empirical. The judgmental evidence stems from Blair's findings, reported in Chapter 5, to the effect that judges can accurately infer the profiles of a number of occupations. Further substantive information bearing on this may be obtained from an examination of Figure 4-2. In every case the highest standard scores for a given cluster are Basic Interest scales bearing a meaningful link to the cluster.

Creative Arts is the high point for Occupations in Fine Art, Mathematics for Mathematical and Related Occupations, and so on. Taken as a whole, these provide impressive support for the clusters, especially when it is recalled that the computation of these values was completed entirely empirically.

A second line of evidence bearing on the validity of occupational clusters is derived from groups tested with the JVIS, whose average profiles have been compared with the entire set of occupational cluster profiles. The question arises, are new empirically-derived occupational group profiles similar to clusters defined by the classification analysis? When indices of association are computed between empirical and cluster profiles, do the clusters rank themselves as expected, with the highest ranked cluster closely linked to the empirical cluster? Group profiles for chemists, guidance counselors, elementary teachers, ministers, real estate agents, and personnel executives were correlated with each of the 32 occupational cluster weights. Below are listed these groups with the five highest ranked clusters, where the ranking is the same index of profile similarity used in the generation of the computer report.

The results are clear. There is a marked tendency for appropriate clusters to be highly ranked, a finding that adds credibility to the clusters derived using multivariate multiple regression procedures based on the 278 occupational groups. The results to date encourages the continued use of the job clusters.

Table 4-5 provides mean data for empirically-derived groups. The relation of these empirically-derived occupational groups with the occupational clusters is described above. An examination of the patterns of high and low basic interest scales suggests that high and low scores are meaningfully associated with job duties and requirements.

Figure 4-2: JVIS Profiles for 32 Job Groups

Jackson Vocational Interest Survey
Medical Diagnosis and Treatment Occupations

Scale	Standard Score	Percentile
Creative Arts	57	76
Performing Arts	51	54
Mathematics	61	86
Physical Science	65	93
Engineering	62	88
Life Science	70	98
Social Science	60	84
Adventure	59	82
Nature-Agriculture	64	92
Skilled Trades	55	69
Personal Service	49	46
Family Activity	55	69
Medical Service	71	98
Dominant Leadership	50	50
Job Security	53	62
Stamina	58	79
Accountability	52	58
Teaching	46	34
Social Service	47	38
Elementary Education	45	31
Finance	40	16
Business	36	8
Office Work	38	12
Sales	37	10
Supervision	38	12
Human Relations Mgt.	38	12
Law	39	14
Professional Advising	39	14
Author-Journalism	39	14
Academic Achievement	49	46
Technical Writing	46	34
Independence	44	27
Planfulness	46	34
Interpersonal Confidence	40	16

Percentile Scores: Low / Average / High (0 10 20 30 40 50 60 70 80 90 99)

Jackson Vocational Interest Survey
Sales Occupations

Scale	Standard Score	Percentile
Creative Arts	39	14
Performing Arts	47	38
Mathematics	38	12
Physical Science	35	7
Engineering	42	21
Life Science	33	4
Social Science	39	14
Adventure	48	42
Nature-Agriculture	36	8
Skilled Trades	49	46
Personal Service	53	62
Family Activity	44	27
Medical Service	41	18
Dominant Leadership	54	66
Job Security	46	34
Stamina	38	12
Accountability	47	38
Teaching	44	27
Social Service	48	42
Elementary Education	47	38
Finance	66	95
Business	66	95
Office Work	60	84
Sales	70	98
Supervision	64	92
Human Relations Mgt.	63	90
Law	62	88
Professional Advising	64	92
Author-Journalism	55	69
Academic Achievement	47	38
Technical Writing	50	50
Independence	54	66
Planfulness	55	69
Interpersonal Confidence	57	76

Percentile Scores: Low / Average / High (0 10 20 30 40 50 60 70 80 90 99)

Jackson Vocational Interest Survey
Public Service / Protective Occupations

Scale	Standard Score	Percentile
Creative Arts	40	16
Performing Arts	36	8
Mathematics	36	8
Physical Science	41	18
Engineering	62	88
Life Science	43	24
Social Science	45	31
Adventure	73	99
Nature-Agriculture	53	62
Skilled Trades	71	98
Personal Service	57	76
Family Activity	56	73
Medical Service	53	62
Dominant Leadership	65	93
Job Security	56	73
Stamina	42	21
Accountability	52	58
Teaching	32	4
Social Service	57	76
Elementary Education	44	27
Finance	57	76
Business	47	38
Office Work	50	50
Sales	46	34
Supervision	58	79
Human Relations Mgt.	52	58
Law	61	86
Professional Advising	54	66
Author-Journalism	42	21
Academic Achievement	44	27
Technical Writing	34	5
Independence	39	14
Planfulness	53	62
Interpersonal Confidence	48	42

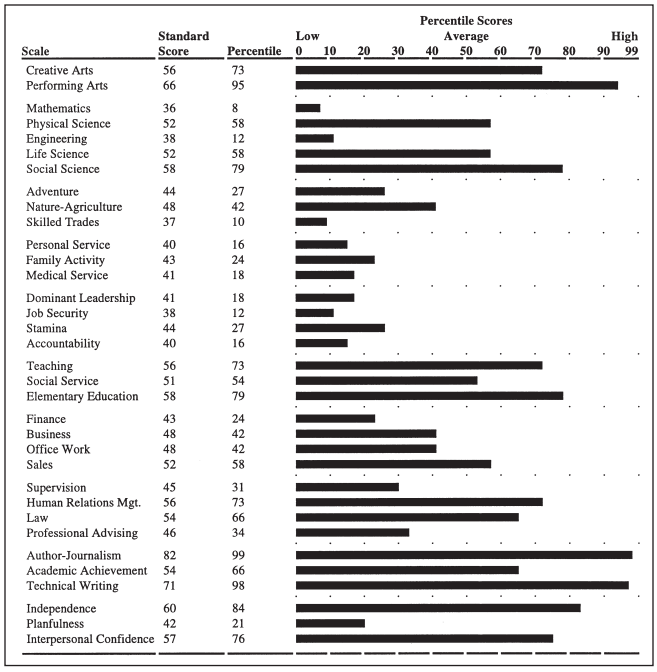
Percentile Scores: Low / Average / High (0 10 20 30 40 50 60 70 80 90 99)

Jackson Vocational Interest Survey
Occupations in Computer Science

Scale	Standard Score	Percentile
Creative Arts	57	76
Performing Arts	56	73
Mathematics	80	99
Physical Science	68	96
Engineering	71	98
Life Science	51	54
Social Science	44	27
Adventure	60	84
Nature-Agriculture	48	42
Skilled Trades	60	84
Personal Service	50	50
Family Activity	52	58
Medical Service	48	42
Dominant Leadership	51	54
Job Security	57	76
Stamina	62	88
Accountability	52	58
Teaching	44	27
Social Service	34	5
Elementary Education	43	24
Finance	53	62
Business	40	16
Office Work	44	27
Sales	35	7
Supervision	43	24
Human Relations Mgt.	37	10
Law	47	38
Professional Advising	44	27
Author-Journalism	41	18
Academic Achievement	46	34
Technical Writing	42	21
Independence	45	31
Planfulness	48	42
Interpersonal Confidence	46	34

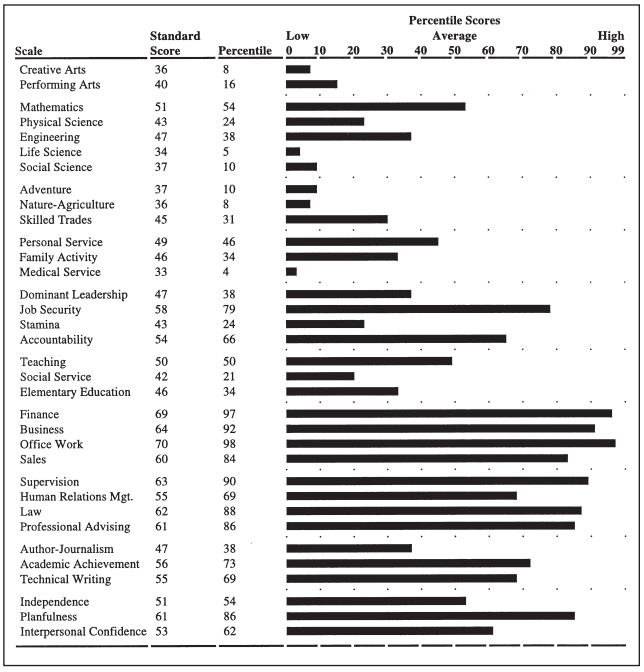
Percentile Scores: Low / Average / High (0 10 20 30 40 50 60 70 80 90 99)

Jackson Vocational Interest Survey
Occupations in Writing



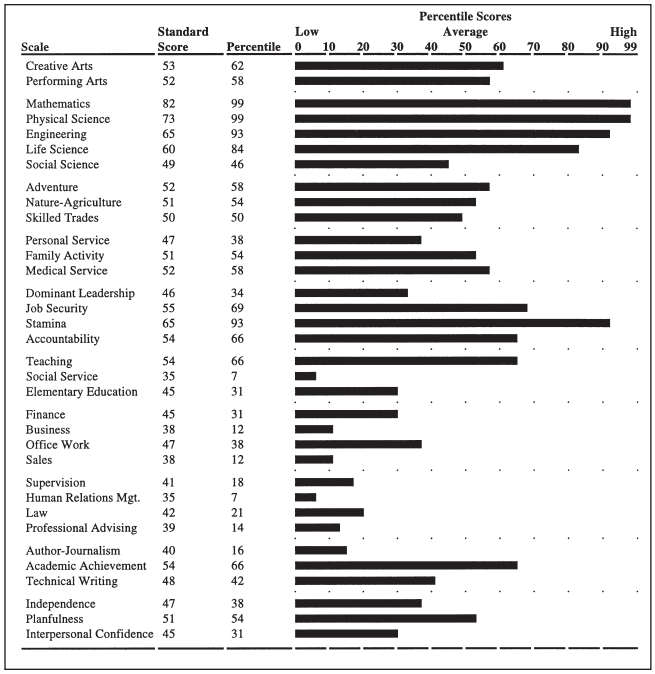
Scale	Standard Score	Percentile
Creative Arts	56	73
Performing Arts	66	95
Mathematics	36	8
Physical Science	52	58
Engineering	38	12
Life Science	52	58
Social Science	58	79
Adventure	44	27
Nature-Agriculture	48	42
Skilled Trades	37	10
Personal Service	40	16
Family Activity	43	24
Medical Service	41	18
Dominant Leadership	41	18
Job Security	38	12
Stamina	44	27
Accountability	40	16
Teaching	56	73
Social Service	51	54
Elementary Education	58	79
Finance	43	24
Business	48	42
Office Work	48	42
Sales	52	58
Supervision	45	31
Human Relations Mgt.	56	73
Law	54	66
Professional Advising	46	34
Author-Journalism	82	99
Academic Achievement	54	66
Technical Writing	71	98
Independence	60	84
Planfulness	42	21
Interpersonal Confidence	57	76

Jackson Vocational Interest Survey
Occupations in Accounting, Banking and Finance



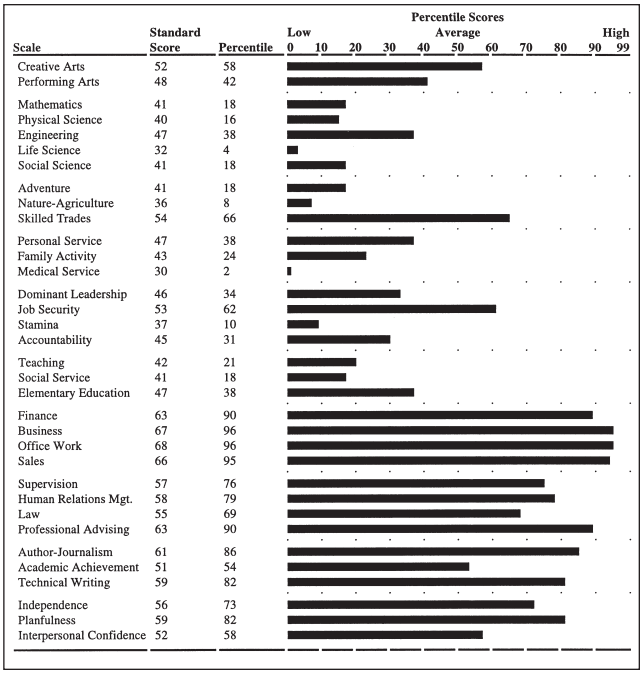
Scale	Standard Score	Percentile
Creative Arts	36	8
Performing Arts	40	16
Mathematics	51	54
Physical Science	43	24
Engineering	47	38
Life Science	34	5
Social Science	37	10
Adventure	37	10
Nature-Agriculture	36	8
Skilled Trades	45	31
Personal Service	49	46
Family Activity	46	34
Medical Service	33	4
Dominant Leadership	47	38
Job Security	58	79
Stamina	43	24
Accountability	54	66
Teaching	50	50
Social Service	42	21
Elementary Education	46	34
Finance	69	97
Business	64	92
Office Work	70	98
Sales	60	84
Supervision	63	90
Human Relations Mgt.	55	69
Law	62	88
Professional Advising	61	86
Author-Journalism	47	38
Academic Achievement	56	73
Technical Writing	55	69
Independence	51	54
Planfulness	61	86
Interpersonal Confidence	53	62

Jackson Vocational Interest Survey
Mathematical and Related Occupations



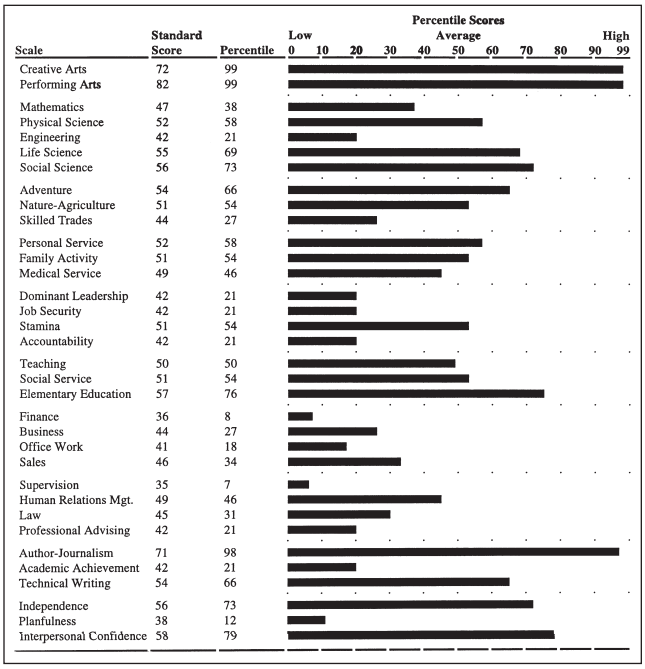
Scale	Standard Score	Percentile
Creative Arts	53	62
Performing Arts	52	58
Mathematics	82	99
Physical Science	73	99
Engineering	65	93
Life Science	60	84
Social Science	49	46
Adventure	52	58
Nature-Agriculture	51	54
Skilled Trades	50	50
Personal Service	47	38
Family Activity	51	54
Medical Service	52	58
Dominant Leadership	46	34
Job Security	55	69
Stamina	65	93
Accountability	54	66
Teaching	54	66
Social Service	35	7
Elementary Education	45	31
Finance	45	31
Business	38	12
Office Work	47	38
Sales	38	12
Supervision	41	18
Human Relations Mgt.	35	7
Law	42	21
Professional Advising	39	14
Author-Journalism	40	16
Academic Achievement	54	66
Technical Writing	48	42
Independence	47	38
Planfulness	51	54
Interpersonal Confidence	45	31

Jackson Vocational Interest Survey
Occupations in Merchandising



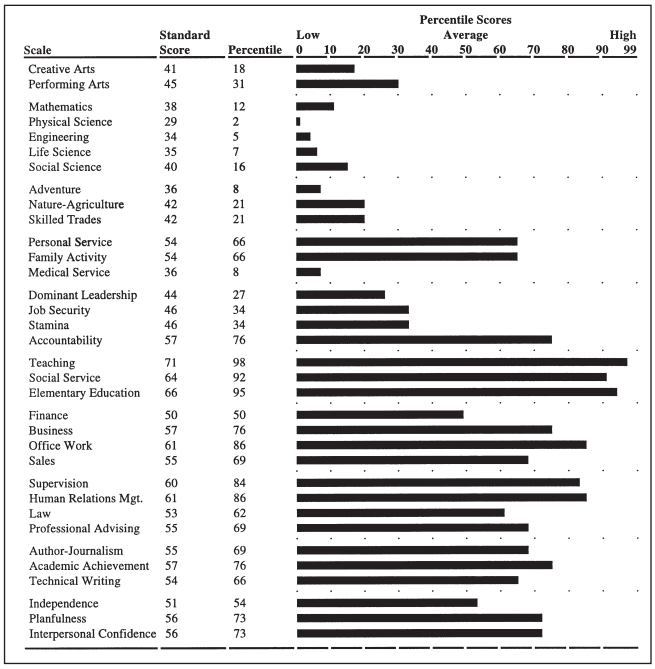
Scale	Standard Score	Percentile
Creative Arts	52	58
Performing Arts	48	42
Mathematics	41	18
Physical Science	40	16
Engineering	47	38
Life Science	32	4
Social Science	41	18
Adventure	41	18
Nature-Agriculture	36	8
Skilled Trades	54	66
Personal Service	47	38
Family Activity	43	24
Medical Service	30	2
Dominant Leadership	46	34
Job Security	53	62
Stamina	37	10
Accountability	45	31
Teaching	42	21
Social Service	41	18
Elementary Education	47	38
Finance	63	90
Business	67	96
Office Work	68	96
Sales	66	95
Supervision	57	76
Human Relations Mgt.	58	79
Law	55	69
Professional Advising	63	90
Author-Journalism	61	86
Academic Achievement	51	54
Technical Writing	59	82
Independence	56	73
Planfulness	59	82
Interpersonal Confidence	52	58

Jackson Vocational Interest Survey
Occupations in Entertainment



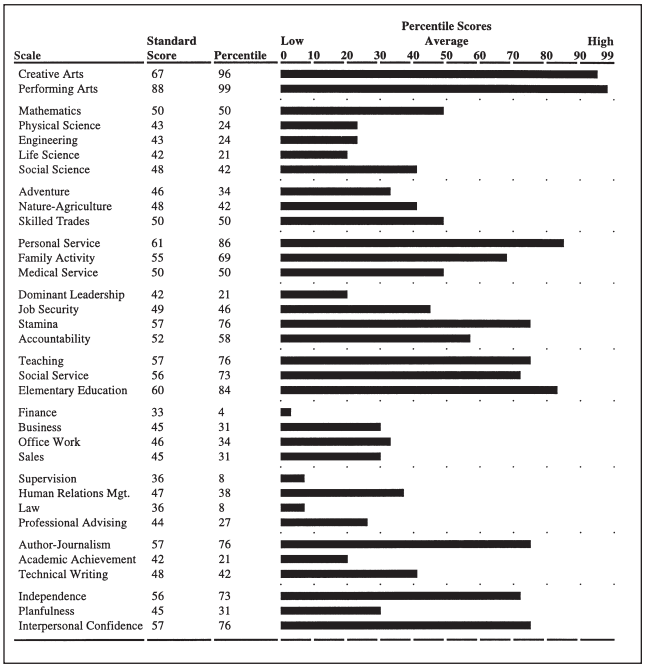
Scale	Standard Score	Percentile
Creative Arts	72	99
Performing Arts	82	99
Mathematics	47	38
Physical Science	52	58
Engineering	42	21
Life Science	55	69
Social Science	56	73
Adventure	54	66
Nature-Agriculture	51	54
Skilled Trades	44	27
Personal Service	52	58
Family Activity	51	54
Medical Service	49	46
Dominant Leadership	42	21
Job Security	42	21
Stamina	51	54
Accountability	42	21
Teaching	50	50
Social Service	51	54
Elementary Education	57	76
Finance	36	8
Business	44	27
Office Work	41	18
Sales	46	34
Supervision	35	7
Human Relations Mgt.	49	46
Law	45	31
Professional Advising	42	21
Author-Journalism	71	98
Academic Achievement	42	21
Technical Writing	54	66
Independence	56	73
Planfulness	38	12
Interpersonal Confidence	58	79

Jackson Vocational Interest Survey
Teaching and Related Occupations



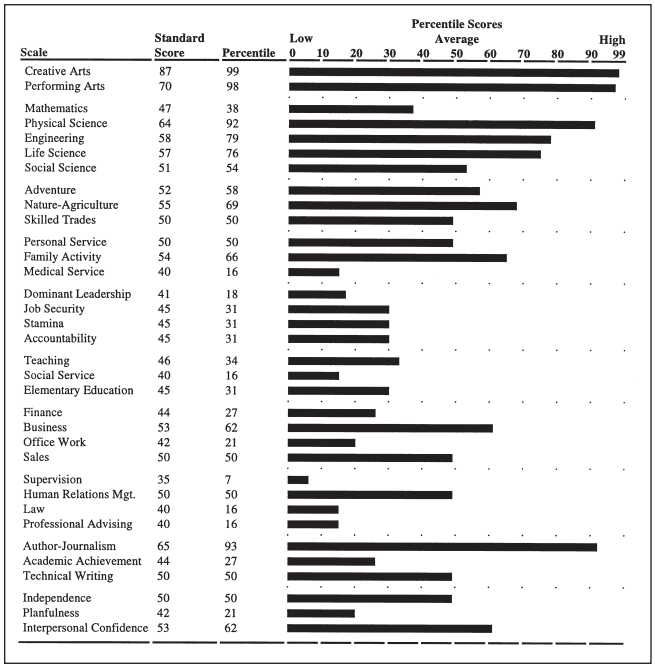
Scale	Standard Score	Percentile
Creative Arts	41	18
Performing Arts	45	31
Mathematics	38	12
Physical Science	29	2
Engineering	34	5
Life Science	35	7
Social Science	40	16
Adventure	36	8
Nature-Agriculture	42	21
Skilled Trades	42	21
Personal Service	54	66
Family Activity	54	66
Medical Service	36	8
Dominant Leadership	44	27
Job Security	46	34
Stamina	46	34
Accountability	57	76
Teaching	71	98
Social Service	64	92
Elementary Education	66	95
Finance	50	50
Business	57	76
Office Work	61	86
Sales	55	69
Supervision	60	84
Human Relations Mgt.	61	86
Law	53	62
Professional Advising	55	69
Author-Journalism	55	69
Academic Achievement	57	76
Technical Writing	54	66
Independence	51	54
Planfulness	56	73
Interpersonal Confidence	56	73

Jackson Vocational Interest Survey
Occupations in Music



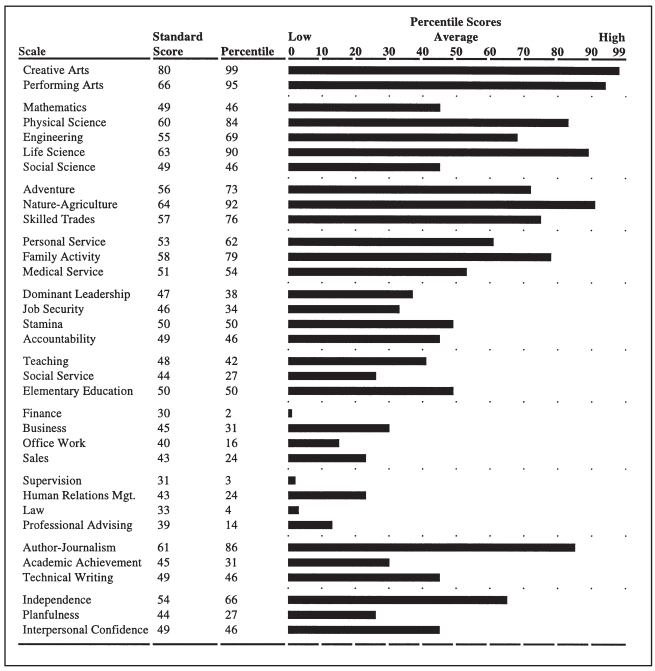
Scale	Standard Score	Percentile
Creative Arts	67	96
Performing Arts	88	99
Mathematics	50	50
Physical Science	43	24
Engineering	43	24
Life Science	42	21
Social Science	48	42
Adventure	46	34
Nature-Agriculture	48	42
Skilled Trades	50	50
Personal Service	61	86
Family Activity	55	69
Medical Service	50	50
Dominant Leadership	42	21
Job Security	49	46
Stamina	57	76
Accountability	52	58
Teaching	57	76
Social Service	56	73
Elementary Education	60	84
Finance	33	4
Business	45	31
Office Work	46	34
Sales	45	31
Supervision	36	8
Human Relations Mgt.	47	38
Law	36	8
Professional Advising	44	27
Author-Journalism	57	76
Academic Achievement	42	21
Technical Writing	48	42
Independence	56	73
Planfulness	45	31
Interpersonal Confidence	57	76

Jackson Vocational Interest Survey
Occupations in Commercial Art



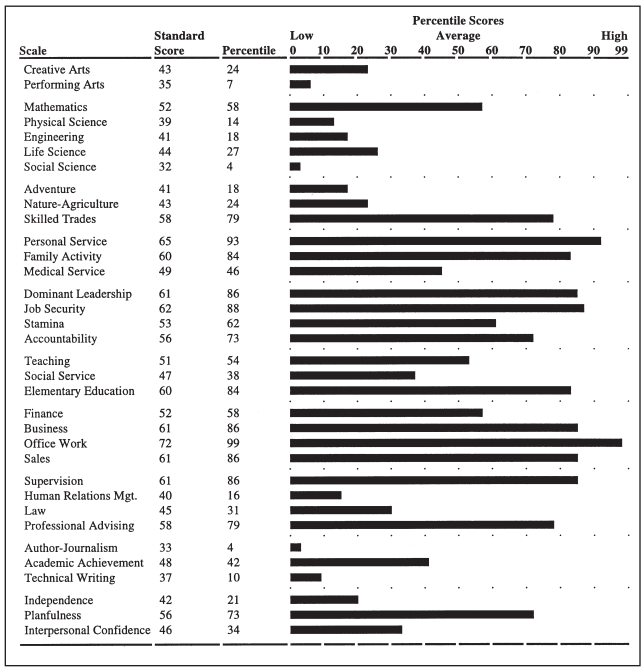
Scale	Standard Score	Percentile
Creative Arts	87	99
Performing Arts	70	98
Mathematics	47	38
Physical Science	64	92
Engineering	58	79
Life Science	57	76
Social Science	51	54
Adventure	52	58
Nature-Agriculture	55	69
Skilled Trades	50	50
Personal Service	50	50
Family Activity	54	66
Medical Service	40	16
Dominant Leadership	41	18
Job Security	45	31
Stamina	45	31
Accountability	45	31
Teaching	46	34
Social Service	40	16
Elementary Education	45	31
Finance	44	27
Business	53	62
Office Work	42	21
Sales	50	50
Supervision	35	7
Human Relations Mgt.	50	50
Law	40	16
Professional Advising	40	16
Author-Journalism	65	93
Academic Achievement	44	27
Technical Writing	50	50
Independence	50	50
Planfulness	42	21
Interpersonal Confidence	53	62

Jackson Vocational Interest Survey
Occupations in Fine Art



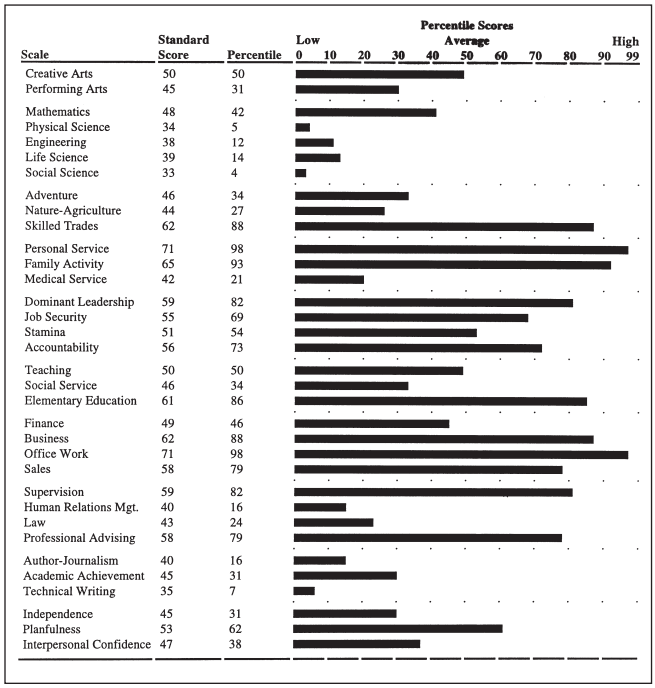
Scale	Standard Score	Percentile
Creative Arts	80	99
Performing Arts	66	95
Mathematics	49	46
Physical Science	60	84
Engineering	55	69
Life Science	63	90
Social Science	49	46
Adventure	56	73
Nature-Agriculture	64	92
Skilled Trades	57	76
Personal Service	53	62
Family Activity	58	79
Medical Service	51	54
Dominant Leadership	47	38
Job Security	46	34
Stamina	50	50
Accountability	49	46
Teaching	48	42
Social Service	44	27
Elementary Education	50	50
Finance	30	2
Business	45	31
Office Work	40	16
Sales	43	24
Supervision	31	3
Human Relations Mgt.	43	24
Law	33	4
Professional Advising	39	14
Author-Journalism	61	86
Academic Achievement	45	31
Technical Writing	49	46
Independence	54	66
Planfulness	44	27
Interpersonal Confidence	49	46

Jackson Vocational Interest Survey
Assembly Occupations/Instruments & Small Products



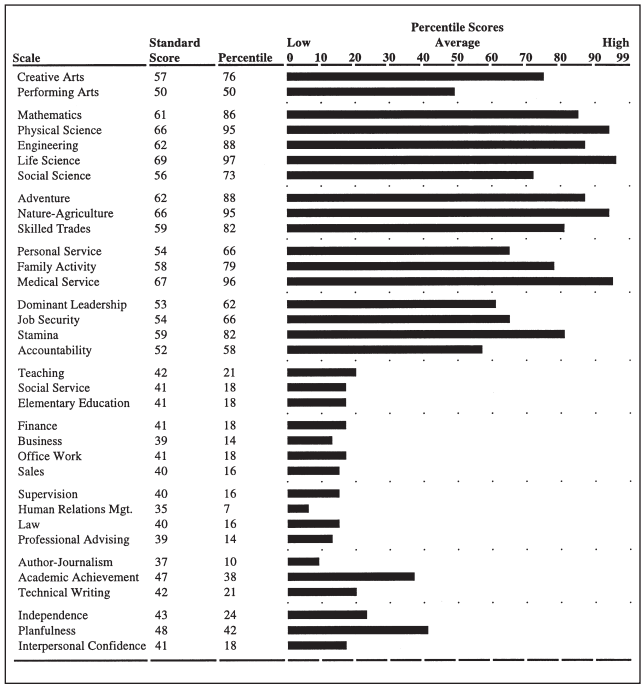
Scale	Standard Score	Percentile
Creative Arts	43	24
Performing Arts	35	7
Mathematics	52	58
Physical Science	39	14
Engineering	41	18
Life Science	44	27
Social Science	32	4
Adventure	41	18
Nature-Agriculture	43	24
Skilled Trades	58	79
Personal Service	65	93
Family Activity	60	84
Medical Service	49	46
Dominant Leadership	61	86
Job Security	62	88
Stamina	53	62
Accountability	56	73
Teaching	51	54
Social Service	47	38
Elementary Education	60	84
Finance	52	58
Business	61	86
Office Work	72	99
Sales	61	86
Supervision	61	86
Human Relations Mgt.	40	16
Law	45	31
Professional Advising	58	79
Author-Journalism	33	4
Academic Achievement	48	42
Technical Writing	37	10
Independence	42	21
Planfulness	56	73
Interpersonal Confidence	46	34

Jackson Vocational Interest Survey
Service Occupations



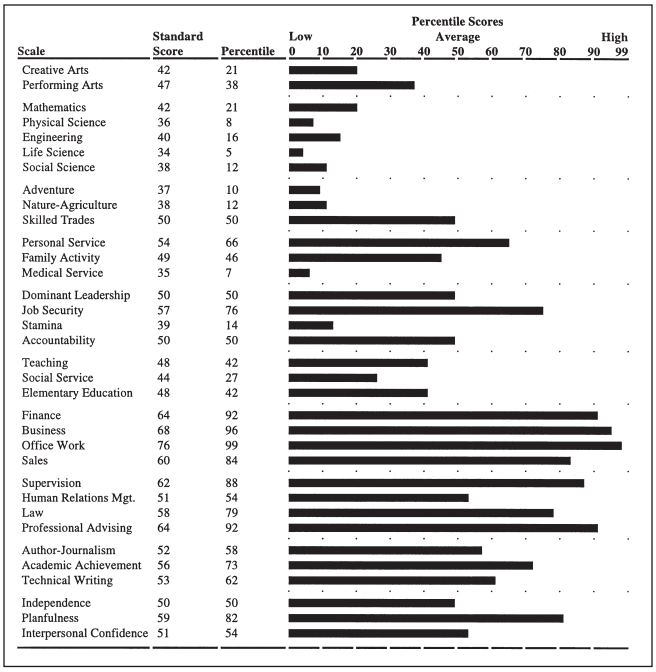
Scale	Standard Score	Percentile
Creative Arts	50	50
Performing Arts	45	31
Mathematics	48	42
Physical Science	34	5
Engineering	38	12
Life Science	39	14
Social Science	33	4
Adventure	46	34
Nature-Agriculture	44	27
Skilled Trades	62	88
Personal Service	71	98
Family Activity	65	93
Medical Service	42	21
Dominant Leadership	59	82
Job Security	55	69
Stamina	51	54
Accountability	56	73
Teaching	50	50
Social Service	46	34
Elementary Education	61	86
Finance	49	46
Business	62	88
Office Work	71	98
Sales	58	79
Supervision	59	82
Human Relations Mgt.	40	16
Law	43	24
Professional Advising	58	79
Author-Journalism	40	16
Academic Achievement	45	31
Technical Writing	35	7
Independence	45	31
Planfulness	53	62
Interpersonal Confidence	47	38

Jackson Vocational Interest Survey
Occupations in the Life Science



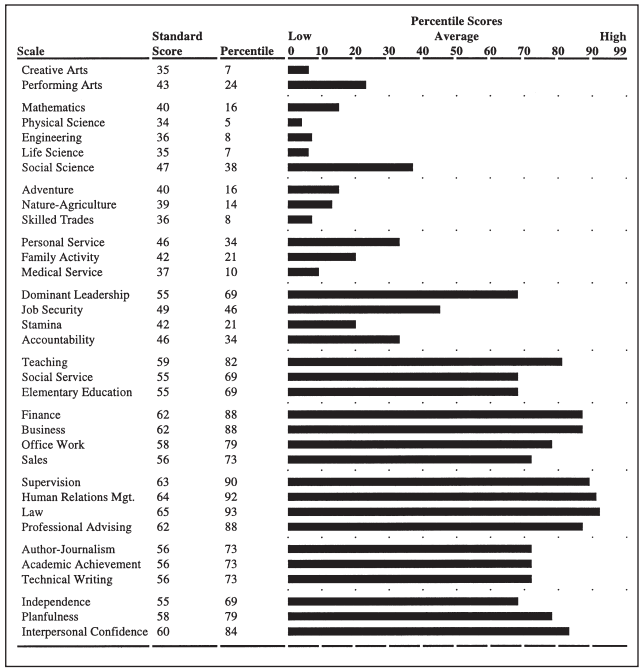
Scale	Standard Score	Percentile
Creative Arts	57	76
Performing Arts	50	50
Mathematics	61	86
Physical Science	66	95
Engineering	62	88
Life Science	69	97
Social Science	56	73
Adventure	62	88
Nature-Agriculture	66	95
Skilled Trades	59	82
Personal Service	54	66
Family Activity	58	79
Medical Service	67	96
Dominant Leadership	53	62
Job Security	54	66
Stamina	59	82
Accountability	52	58
Teaching	42	21
Social Service	41	18
Elementary Education	41	18
Finance	41	18
Business	39	14
Office Work	41	18
Sales	40	16
Supervision	40	16
Human Relations Mgt.	35	7
Law	40	16
Professional Advising	39	14
Author-Journalism	37	10
Academic Achievement	47	38
Technical Writing	42	21
Independence	43	24
Planfulness	48	42
Interpersonal Confidence	41	18

Jackson Vocational Interest Survey
Clerical Services



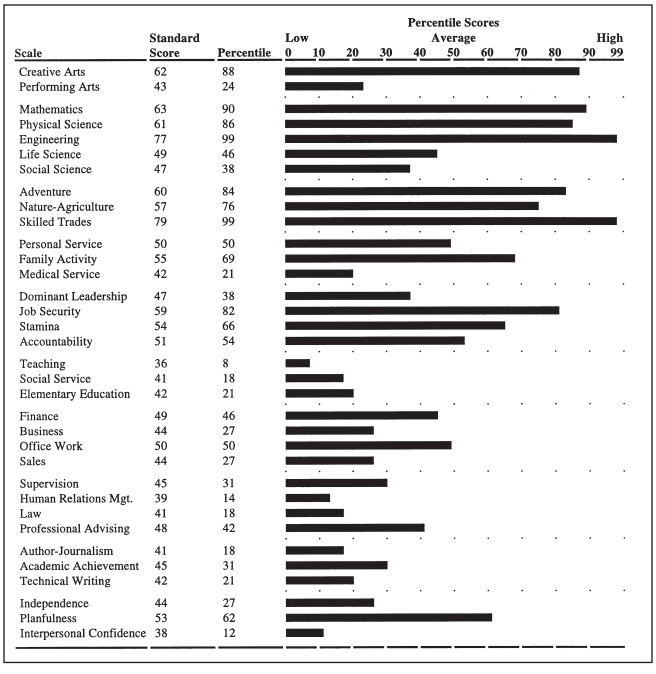
Scale	Standard Score	Percentile
Creative Arts	42	21
Performing Arts	47	38
Mathematics	42	21
Physical Science	36	8
Engineering	40	16
Life Science	34	5
Social Science	38	12
Adventure	37	10
Nature-Agriculture	38	12
Skilled Trades	50	50
Personal Service	54	66
Family Activity	49	46
Medical Service	35	7
Dominant Leadership	50	50
Job Security	57	76
Stamina	39	14
Accountability	50	50
Teaching	48	42
Social Service	44	27
Elementary Education	48	42
Finance	64	92
Business	68	96
Office Work	76	99
Sales	60	84
Supervision	62	88
Human Relations Mgt.	51	54
Law	58	79
Professional Advising	64	92
Author-Journalism	52	58
Academic Achievement	56	73
Technical Writing	53	62
Independence	50	50
Planfulness	59	82
Interpersonal Confidence	51	54

Jackson Vocational Interest Survey
Administrative and Related Occupations



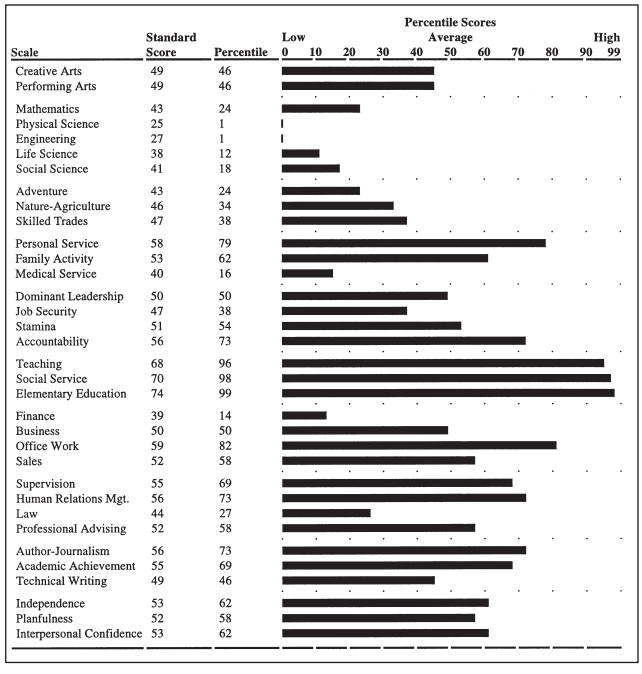
Scale	Standard Score	Percentile
Creative Arts	35	7
Performing Arts	43	24
Mathematics	40	16
Physical Science	34	5
Engineering	36	8
Life Science	35	7
Social Science	47	38
Adventure	40	16
Nature-Agriculture	39	14
Skilled Trades	36	8
Personal Service	46	34
Family Activity	42	21
Medical Service	37	10
Dominant Leadership	55	69
Job Security	49	46
Stamina	42	21
Accountability	46	34
Teaching	59	82
Social Service	55	69
Elementary Education	55	69
Finance	62	88
Business	62	88
Office Work	58	79
Sales	56	73
Supervision	63	90
Human Relations Mgt.	64	92
Law	65	93
Professional Advising	62	88
Author-Journalism	56	73
Academic Achievement	56	73
Technical Writing	56	73
Independence	55	69
Planfulness	58	79
Interpersonal Confidence	60	84

Jackson Vocational Interest Survey
Machining/Mechanical and Related Occupations



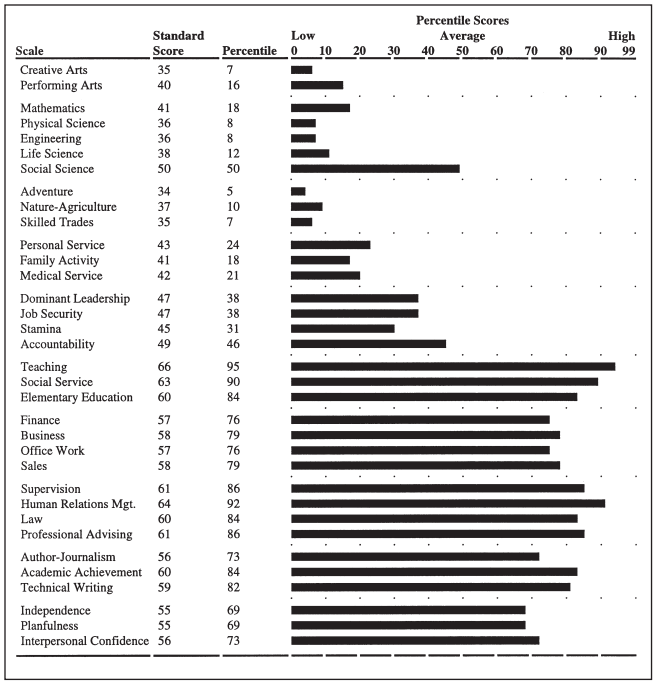
Scale	Standard Score	Percentile
Creative Arts	62	88
Performing Arts	43	24
Mathematics	63	90
Physical Science	61	86
Engineering	77	99
Life Science	49	46
Social Science	47	38
Adventure	60	84
Nature-Agriculture	57	76
Skilled Trades	79	99
Personal Service	50	50
Family Activity	55	69
Medical Service	42	21
Dominant Leadership	47	38
Job Security	59	82
Stamina	54	66
Accountability	51	54
Teaching	36	8
Social Service	41	18
Elementary Education	42	21
Finance	49	46
Business	44	27
Office Work	50	50
Sales	44	27
Supervision	45	31
Human Relations Mgt.	39	14
Law	41	18
Professional Advising	48	42
Author-Journalism	41	18
Academic Achievement	45	31
Technical Writing	42	21
Independence	44	27
Planfulness	53	62
Interpersonal Confidence	38	12

Jackson Vocational Interest Survey
Occupations in Pre-school and Elementary Teaching



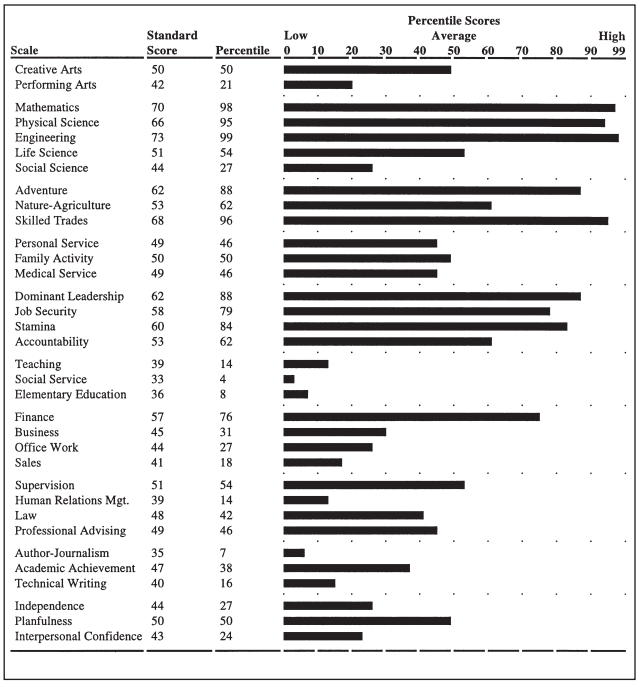
Scale	Standard Score	Percentile
Creative Arts	49	46
Performing Arts	49	46
Mathematics	43	24
Physical Science	25	1
Engineering	27	1
Life Science	38	12
Social Science	41	18
Adventure	43	24
Nature-Agriculture	46	34
Skilled Trades	47	38
Personal Service	58	79
Family Activity	53	62
Medical Service	40	16
Dominant Leadership	50	50
Job Security	47	38
Stamina	51	54
Accountability	56	73
Teaching	68	96
Social Service	70	98
Elementary Education	74	99
Finance	39	14
Business	50	50
Office Work	59	82
Sales	52	58
Supervision	55	69
Human Relations Mgt.	56	73
Law	44	27
Professional Advising	52	58
Author-Journalism	56	73
Academic Achievement	55	69
Technical Writing	49	46
Independence	53	62
Planfulness	52	58
Interpersonal Confidence	53	62

Jackson Vocational Interest Survey
Counselors / Student Personnel Workers



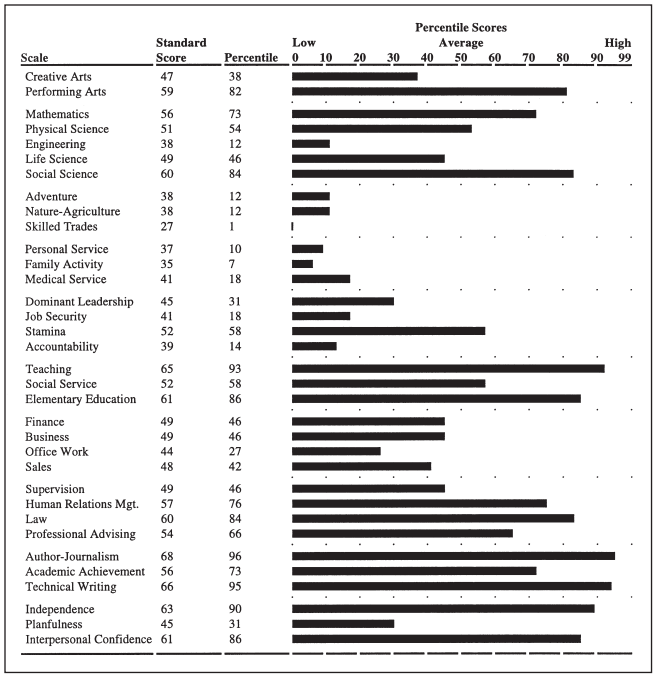
Scale	Standard Score	Percentile
Creative Arts	35	7
Performing Arts	40	16
Mathematics	41	18
Physical Science	36	8
Engineering	36	8
Life Science	38	12
Social Science	50	50
Adventure	34	5
Nature-Agriculture	37	10
Skilled Trades	35	7
Personal Service	43	24
Family Activity	41	18
Medical Service	42	21
Dominant Leadership	47	38
Job Security	47	38
Stamina	45	31
Accountability	49	46
Teaching	66	95
Social Service	63	90
Elementary Education	60	84
Finance	57	76
Business	58	79
Office Work	57	76
Sales	58	79
Supervision	61	86
Human Relations Mgt.	64	92
Law	60	84
Professional Advising	61	86
Author-Journalism	56	73
Academic Achievement	60	84
Technical Writing	59	82
Independence	55	69
Planfulness	55	69
Interpersonal Confidence	56	73

Jackson Vocational Interest Survey
Engineering and Technical Support Workers



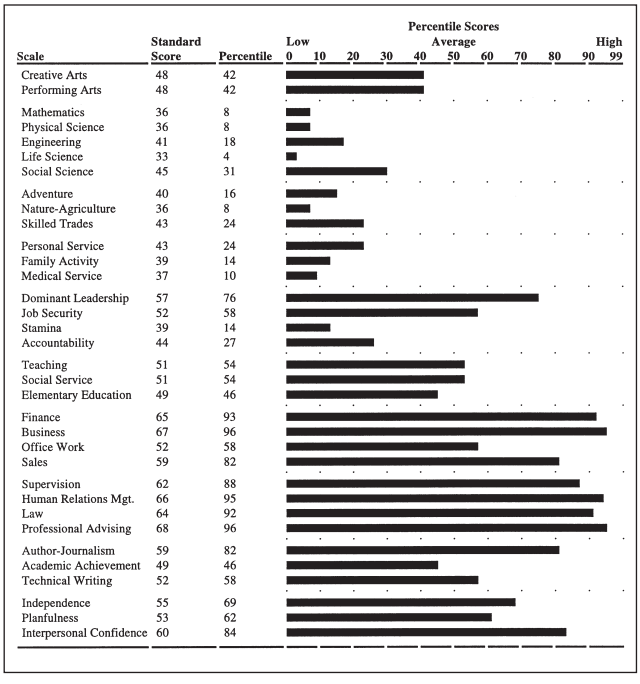
Scale	Standard Score	Percentile
Creative Arts	50	50
Performing Arts	42	21
Mathematics	70	98
Physical Science	66	95
Engineering	73	99
Life Science	51	54
Social Science	44	27
Adventure	62	88
Nature-Agriculture	53	62
Skilled Trades	68	96
Personal Service	49	46
Family Activity	50	50
Medical Service	49	46
Dominant Leadership	62	88
Job Security	58	79
Stamina	60	84
Accountability	53	62
Teaching	39	14
Social Service	33	4
Elementary Education	36	8
Finance	57	76
Business	45	31
Office Work	44	27
Sales	41	18
Supervision	51	54
Human Relations Mgt.	39	14
Law	48	42
Professional Advising	49	46
Author-Journalism	35	7
Academic Achievement	47	38
Technical Writing	40	16
Independence	44	27
Planfulness	50	50
Interpersonal Confidence	43	24

Jackson Vocational Interest Survey
Occupations in Social Science



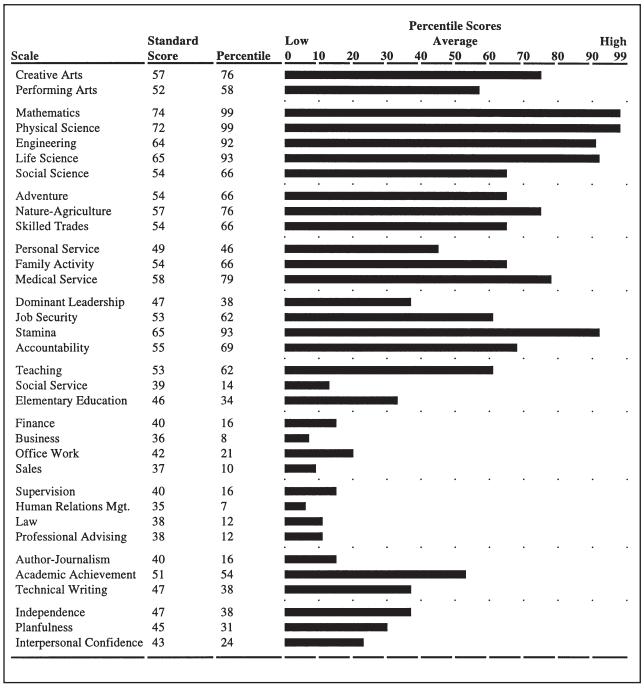
Scale	Standard Score	Percentile
Creative Arts	47	38
Performing Arts	59	82
Mathematics	56	73
Physical Science	51	54
Engineering	38	12
Life Science	49	46
Social Science	60	84
Adventure	38	12
Nature-Agriculture	38	12
Skilled Trades	27	1
Personal Service	37	10
Family Activity	35	7
Medical Service	41	18
Dominant Leadership	45	31
Job Security	41	18
Stamina	52	58
Accountability	39	14
Teaching	65	93
Social Service	52	58
Elementary Education	61	86
Finance	49	46
Business	49	46
Office Work	44	27
Sales	48	42
Supervision	49	46
Human Relations Mgt.	57	76
Law	60	84
Professional Advising	54	66
Author-Journalism	68	96
Academic Achievement	56	73
Technical Writing	66	95
Independence	63	90
Planfulness	45	31
Interpersonal Confidence	61	86

Jackson Vocational Interest Survey
Personnel / Human Management



Scale	Standard Score	Percentile
Creative Arts	48	42
Performing Arts	48	42
Mathematics	36	8
Physical Science	36	8
Engineering	41	18
Life Science	33	4
Social Science	45	31
Adventure	40	16
Nature-Agriculture	36	8
Skilled Trades	43	24
Personal Service	43	24
Family Activity	39	14
Medical Service	37	10
Dominant Leadership	57	76
Job Security	52	58
Stamina	39	14
Accountability	44	27
Teaching	51	54
Social Service	51	54
Elementary Education	49	46
Finance	65	93
Business	67	96
Office Work	52	58
Sales	59	82
Supervision	62	88
Human Relations Mgt.	66	95
Law	64	92
Professional Advising	68	96
Author-Journalism	59	82
Academic Achievement	49	46
Technical Writing	52	58
Independence	55	69
Planfulness	53	62
Interpersonal Confidence	60	84

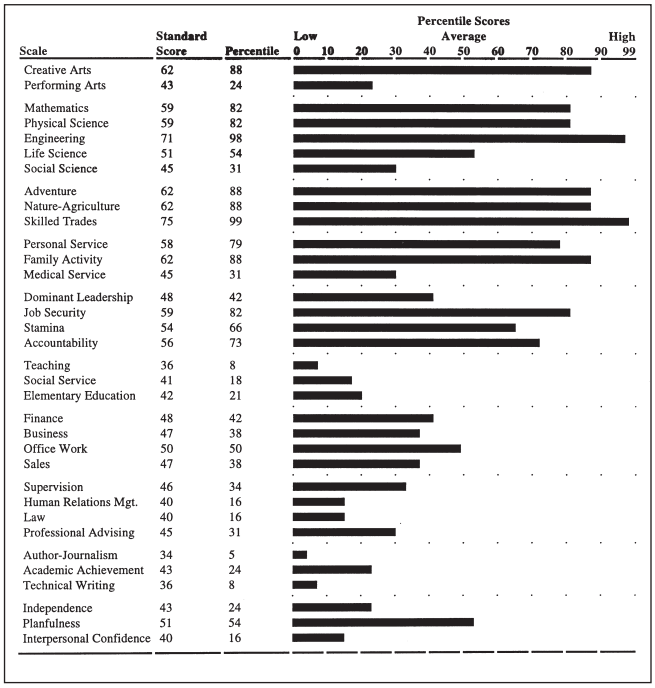
Jackson Vocational Interest Survey
Occupations in the Physical Sciences



Scale	Standard Score	Percentile
Creative Arts	57	76
Performing Arts	52	58
Mathematics	74	99
Physical Science	72	99
Engineering	64	92
Life Science	65	93
Social Science	54	66
Adventure	54	66
Nature-Agriculture	57	76
Skilled Trades	54	66
Personal Service	49	46
Family Activity	54	66
Medical Service	58	79
Dominant Leadership	47	38
Job Security	53	62
Stamina	65	93
Accountability	55	69
Teaching	53	62
Social Service	39	14
Elementary Education	46	34
Finance	40	16
Business	36	8
Office Work	42	21
Sales	37	10
Supervision	40	16
Human Relations Mgt.	35	7
Law	38	12
Professional Advising	38	12
Author-Journalism	40	16
Academic Achievement	51	54
Technical Writing	47	38
Independence	47	38
Planfulness	45	31
Interpersonal Confidence	43	24

Percentile Scores: Low, Average, High; 0 10 20 30 40 50 60 70 80 90 99

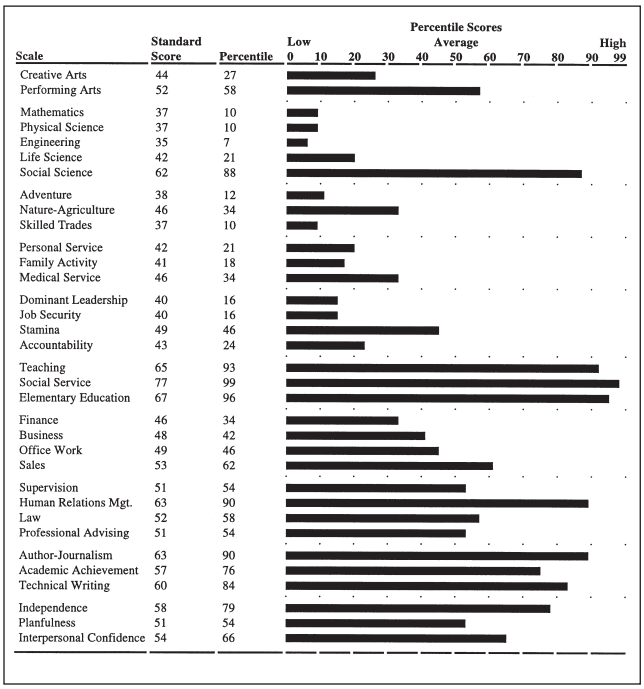
Jackson Vocational Interest Survey
Construction / Skilled Trades



Scale	Standard Score	Percentile
Creative Arts	62	88
Performing Arts	43	24
Mathematics	59	82
Physical Science	59	82
Engineering	71	98
Life Science	51	54
Social Science	45	31
Adventure	62	88
Nature-Agriculture	62	88
Skilled Trades	75	99
Personal Service	58	79
Family Activity	62	88
Medical Service	45	31
Dominant Leadership	48	42
Job Security	59	82
Stamina	54	66
Accountability	56	73
Teaching	36	8
Social Service	41	18
Elementary Education	42	21
Finance	48	42
Business	47	38
Office Work	50	50
Sales	47	38
Supervision	46	34
Human Relations Mgt.	40	16
Law	40	16
Professional Advising	45	31
Author-Journalism	34	5
Academic Achievement	43	24
Technical Writing	36	8
Independence	43	24
Planfulness	51	54
Interpersonal Confidence	40	16

Percentile Scores: Low, Average, High; 0 10 20 30 40 50 60 70 80 90 99

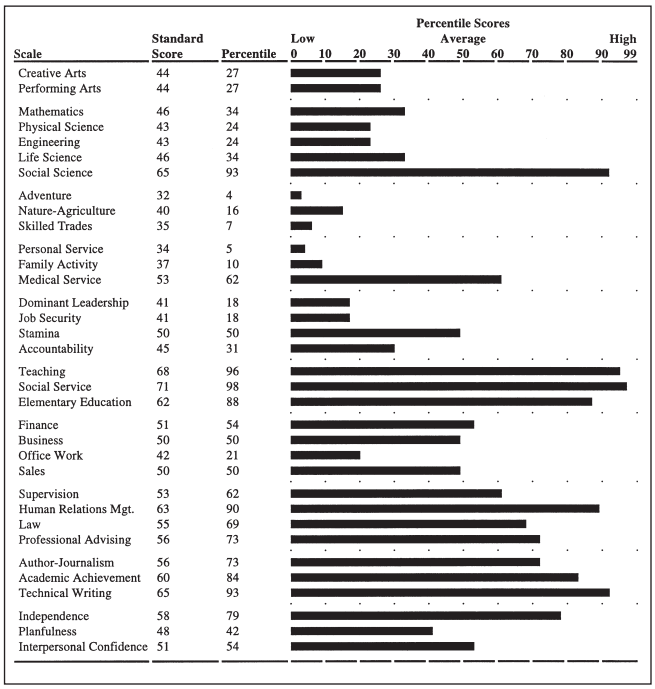
Jackson Vocational Interest Survey
Occupations in Religion



Scale	Standard Score	Percentile
Creative Arts	44	27
Performing Arts	52	58
Mathematics	37	10
Physical Science	37	10
Engineering	35	7
Life Science	42	21
Social Science	62	88
Adventure	38	12
Nature-Agriculture	46	34
Skilled Trades	37	10
Personal Service	42	21
Family Activity	41	18
Medical Service	46	34
Dominant Leadership	40	16
Job Security	40	16
Stamina	49	46
Accountability	43	24
Teaching	65	93
Social Service	77	99
Elementary Education	67	96
Finance	46	34
Business	48	42
Office Work	49	46
Sales	53	62
Supervision	51	54
Human Relations Mgt.	63	90
Law	52	58
Professional Advising	51	54
Author-Journalism	63	90
Academic Achievement	57	76
Technical Writing	60	84
Independence	58	79
Planfulness	51	54
Interpersonal Confidence	54	66

Percentile Scores: Low, Average, High; 0 10 20 30 40 50 60 70 80 90 99

Jackson Vocational Interest Survey
Occupations in Social Welfare



Scale	Standard Score	Percentile
Creative Arts	44	27
Performing Arts	44	27
Mathematics	46	34
Physical Science	43	24
Engineering	43	24
Life Science	46	34
Social Science	65	93
Adventure	32	4
Nature-Agriculture	40	16
Skilled Trades	35	7
Personal Service	34	5
Family Activity	37	10
Medical Service	53	62
Dominant Leadership	41	18
Job Security	41	18
Stamina	50	50
Accountability	45	31
Teaching	68	96
Social Service	71	98
Elementary Education	62	88
Finance	51	54
Business	50	50
Office Work	42	21
Sales	50	50
Supervision	53	62
Human Relations Mgt.	63	90
Law	55	69
Professional Advising	56	73
Author-Journalism	56	73
Academic Achievement	60	84
Technical Writing	65	93
Independence	58	79
Planfulness	48	42
Interpersonal Confidence	51	54

Percentile Scores: Low, Average, High; 0 10 20 30 40 50 60 70 80 90 99

Jackson Vocational Interest Survey
Agriculturalists

Scale	Standard Score	Percentile
Creative Arts	48	42
Performing Arts	40	16
Mathematics	43	24
Physical Science	52	58
Engineering	58	79
Life Science	62	88
Social Science	49	46
Adventure	61	86
Nature-Agriculture	80	99
Skilled Trades	66	95
Personal Service	62	88
Family Activity	70	98
Medical Service	56	73
Dominant Leadership	49	46
Job Security	54	66
Stamina	55	69
Accountability	62	88
Teaching	39	14
Social Service	49	46
Elementary Education	41	18
Finance	43	24
Business	44	27
Office Work	46	34
Sales	46	34
Supervision	47	38
Human Relations Mgt.	40	16
Law	42	21
Professional Advising	42	21
Author-Journalism	35	7
Academic Achievement	43	24
Technical Writing	41	18
Independence	43	24
Planfulness	49	46
Interpersonal Confidence	42	21

Percentile Scores: Low / Average / High — 0 10 20 30 40 50 60 70 80 90 99

Jackson Vocational Interest Survey
Sport and Recreation Occupations

Scale	Standard Score	Percentile
Creative Arts	51	54
Performing Arts	48	42
Mathematics	52	58
Physical Science	45	31
Engineering	45	31
Life Science	68	96
Social Science	56	73
Adventure	71	98
Nature-Agriculture	67	96
Skilled Trades	55	69
Personal Service	56	73
Family Activity	53	62
Medical Service	72	99
Dominant Leadership	62	88
Job Security	56	73
Stamina	50	50
Accountability	51	54
Teaching	45	31
Social Service	60	84
Elementary Education	54	66
Finance	32	4
Business	40	16
Office Work	42	21
Sales	42	21
Supervision	40	16
Human Relations Mgt.	46	34
Law	36	8
Professional Advising	46	34
Author-Journalism	37	10
Academic Achievement	49	46
Technical Writing	33	4
Independence	44	27
Planfulness	53	62
Interpersonal Confidence	44	27

Percentile Scores: Low / Average / High — 0 10 20 30 40 50 60 70 80 90 99

Jackson Vocational Interest Survey
Occupations in Law and Politics

Scale	Standard Score	Percentile
Creative Arts	33	4
Performing Arts	45	31
Mathematics	39	14
Physical Science	43	24
Engineering	42	21
Life Science	39	14
Social Science	54	66
Adventure	42	21
Nature-Agriculture	39	14
Skilled Trades	35	7
Personal Service	41	18
Family Activity	37	10
Medical Service	39	14
Dominant Leadership	49	46
Job Security	44	27
Stamina	40	16
Accountability	44	27
Teaching	54	66
Social Service	55	69
Elementary Education	50	50
Finance	65	93
Business	57	76
Office Work	54	66
Sales	58	79
Supervision	62	88
Human Relations Mgt.	65	93
Law	69	97
Professional Advising	58	79
Author-Journalism	61	86
Academic Achievement	56	73
Technical Writing	64	92
Independence	57	76
Planfulness	51	54
Interpersonal Confidence	59	82

Percentile Scores: Low / Average / High — 0 10 20 30 40 50 60 70 80 90 99

Jackson Vocational Interest Survey
Health Service Workers

Scale	Standard Score	Percentile
Creative Arts	54	66
Performing Arts	42	21
Mathematics	54	66
Physical Science	56	73
Engineering	56	73
Life Science	67	96
Social Science	56	73
Adventure	58	79
Nature-Agriculture	62	88
Skilled Trades	57	76
Personal Service	56	73
Family Activity	59	82
Medical Service	80	99
Dominant Leadership	55	69
Job Security	56	73
Stamina	56	73
Accountability	56	73
Teaching	44	27
Social Service	52	58
Elementary Education	46	34
Finance	41	18
Business	42	21
Office Work	42	21
Sales	42	21
Supervision	42	21
Human Relations Mgt.	40	16
Law	37	10
Professional Advising	41	18
Author-Journalism	30	2
Academic Achievement	48	42
Technical Writing	39	14
Independence	44	27
Planfulness	53	62
Interpersonal Confidence	37	10

Percentile Scores: Low / Average / High — 0 10 20 30 40 50 60 70 80 90 99

Table 4-5: Mean Scores for Occupational Groups

	Real Estate Sales		Ministers	Elementary Teachers		Chemists	Counselors	Rec. Policy & Program Directors		Human Resource Executives	
	Males (N=286)	Females (N=212)	Males (N=229)	Males (N=52)	Females (N=108)	Males (N=276)	Males (N=256)	Males (N=170)	Females (N=133)	Males (N=207)	Females (N=78)
Creative Arts	5.38	6.92	7.04	8.96	10.74	9.48	6.43	8.45	10.02	5.80	7.06
Performing Arts	5.39	5.23	6.10	6.96	6.77	5.88	5.85	6.94	7.54	6.01	5.73
Mathematics	5.32	4.51	3.95	7.62	5.59	11.28	5.74	6.03	5.45	4.81	4.86
Physical Science	5.32	3.96	4.54	6.92	5.28	12.86	5.44	6.47	5.59	4.87	4.56
Engineering	6.38	4.14	5.22	6.87	5.24	11.88	5.87	7.27	5.42	5.99	4.82
Life Science	4.21	4.22	4.78	7.33	7.44	11.08	5.89	6.68	6.80	4.17	5.03
Social Science	7.37	8.37	10.73	9.96	10.24	9.54	10.04	8.46	8.86	6.97	8.14
Adventure	7.43	5.54	7.68	8.67	7.16	8.90	7.89	9.94	9.64	7.92	5.97
Nature-Agriculture	5.31	4.77	7.52	7.98	7.70	9.19	6.97	7.56	7.46	6.03	5.58
Skilled Trades	2.62	1.95	3.27	3.69	4.33	4.98	3.11	3.89	3.43	3.12	2.17
Personal Service	6.16	7.54	5.85	7.15	9.05	5.32	6.77	6.96	8.24	5.88	7.32
Family Activity	6.27	8.44	8.22	9.39	11.78	8.95	8.05	7.91	8.96	7.17	8.42
Medical Service	4.22	4.24	6.67	6.21	4.98	8.05	5.28	6.05	5.89	4.71	3.36
Dominant Leadership	6.01	4.50	4.46	6.58	4.39	6.05	5.06	6.92	5.78	8.38	6.69
Job Security	6.48	6.98	4.51	6.52	6.84	6.78	5.61	6.09	5.80	5.49	5.64
Stamina	9.12	9.61	8.39	8.27	8.65	10.80	8.41	8.72	8.77	8.84	8.63
Accountability	11.12	11.45	9.91	11.40	11.39	11.02	10.08	10.20	10.35	10.31	9.94
Teaching	10.16	10.66	12.92	12.17	12.17	9.69	12.65	10.81	10.65	10.91	10.87
Social Service	8.53	10.56	13.64	9.10	11.34	5.68	11.82	10.20	12.50	8.59	10.50
Elementary Education	7.19	8.58	10.51	11.29	12.52	6.90	10.43	8.60	10.38	7.86	8.68
Finance	12.45	10.74	7.71	7.10	6.28	7.00	8.31	8.65	7.56	11.20	9.76
Business	12.36	11.31	10.08	9.19	9.15	7.50	10.18	10.19	9.87	11.72	11.50
Office Work	6.82	7.86	6.53	5.14	7.55	4.20	5.89	5.88	6.56	6.16	7.12
Sales	12.65	11.77	8.90	7.25	7.55	5.30	8.98	8.19	7.60	9.68	8.71
Supervision	12.31	11.12	10.17	10.48	8.42	8.82	11.56	10.55	9.77	13.44	12.59
Human Relations Management	12.90	11.98	13.35	11.35	8.89	9.22	13.07	11.91	10.86	14.25	13.69
Law	12.51	11.67	9.57	8.69	7.51	6.87	10.50	9.19	8.48	12.19	11.56
Professional Advising	12.41	11.92	11.21	9.83	9.22	9.10	11.60	10.55	9.62	12.76	12.60
Author-Journalism	9.03	10.15	11.21	9.35	9.45	7.67	9.66	9.03	9.72	9.70	10.78
Academic Achievement	11.13	12.01	11.37	8.92	10.49	10.84	10.31	9.98	10.08	11.00	11.54
Technical Writing	8.46	9.30	10.36	7.23	8.32	8.29	8.38	7.79	8.08	8.62	9.24
Independence	11.37	11.05	10.95	9.77	9.84	10.69	11.16	10.56	10.41	11.44	11.77
Planfulness	10.83	11.16	8.85	9.42	9.76	8.06	8.65	9.26	9.41	9.24	9.78
Interpersonal Confidence	13.11	13.49	12.38	11.75	12.72	10.36	13.05	12.08	12.56	13.51	14.08

Group	Highest Ranked Job Groups
Chemists	Occupations in the Physical Sciences Mathematical and Related Occupations Medical Diagnosis and Treatment Occupations Occupations in Social Welfare Life Science
High School Counselors	Counselors and Student Personnel Workers Teaching and Related Occupations Administrative and Related Occupations Occupations in Religion Occupations in Law and Politics
Elementary Teachers	Occupations in Preschool and Elementary Teaching Teaching and Related Occupations Occupations in Religion Counselors and Student Personnel Workers Occupations in Social Welfare

Ministers	Occupations in Religion Counselors/Student Personnel Workers Teaching and Related Occupations Administrative and Related Occupations
Real Estate Agents	Administrative and Related Occupations Counselors and Student Personnel Workers Human Resource Management Sales Occupations
Human Resources Executive	Human Resource Management Administrative and Related Occupations Occupations in Law and Politics Counselors and Student Personnel Workers Teaching and Related Occupations

Correlations of the JVIS Basic Interest Scales with Measures of Scholastic Aptitude

As part of its pre-admission testing program, the Pennsylvania State University administered the Educational Testing Service Scholastic Aptitude Test, Verbal and Quantitative subtests (SAT-V, SAT-Q) to a total of 2154 entering students, approximately equally divided between males and females. Table 4-6 lists the correlations (with decimals omitted) obtained for this group between SAT scores and JVIS Basic Interest scales. The .05 and .01 significance levels for a sample of this size are .06 and .08, respectively. Among the relatively higher correlations in this set are the correlations between SAT-Q and JVIS Mathematics, Physical Science and Engineering scales, and those between SAT-V and JVIS Author-Journalism, Technical Writing, and Independence scales. In general, however, it is clear that a major portion of the variance on the JVIS is independent of measured scholastic aptitude.

The JVIS and Successful Real Estate Sales

In general, vocational interest test scores are predictive of job satisfaction, not success. Although many investigators have explored a possible link between interests and job performance, their efforts have not, with but few exceptions (e.g., Strong, 1934) been singularly successful. But there are areas, such as life insurance and real estate sales, for which there is both a very clear criterion of success and a generally acknowledged role of the relevance of interest, motivation, and personality to performance.

A group of real estate agents, 286 males and 212 females, was tested through the cooperation of a real estate board. These respondents were divided into three groups, linked to three earning levels. Scale mean differences for the 34 scales for the two extreme income groups were subjected to analysis of variance. For males, there were highly significant profile differences between high- and low-earning groups. Four scales individually were also significantly different: Mathematics (higher for lower earners), Business, Sales, and Professional Advising. For females, the number in the top earning groups was only 14. Although the overall profile differences were significantly different for females, the individual scales did not reach significance. In general, these results suggest that groups who have high real estate sales perfor-

Table 4-6: Correlations Between SAT Scores and JVIS Basic Interest Scales

JVIS Basic Interest Scales	SAT-V	SAT-Q
Creative Arts	02	-02
Performing Arts	08	00
Mathematics	-04	37
Physical Science	04	24
Engineering	-02	28
Life Science	03	06
Social Science	10	-09
Adventure	00	12
Nature-Agriculture	06	-01
Skilled Trades	-11	11
Personal Service	-12	-06
Family Activity	-08	-03
Medical Service	03	03
Dominant Leadership	-06	02
Job Security	-24	-01
Stamina	-05	10
Accountability	-11	05
Teaching	03	-18
Social Service	00	-24
Elementary Education	-02	-19
Finance	-03	09
Business	-08	-09
Office Work	-14	-02
Sales	-09	-10
Supervision	-04	00
Human Relations Management	07	-11
Law	05	-05
Professional Advising	07	-06
Author-Journalism	21	-17
Academic Achievement	13	-06
Technical Writing	20	-17
Independence	19	00
Planfulness	-17	-07
Interpersonal Confidence	03	-11

Note. Decimals omitted

mance records can be differentiated from those with lower performance records at a statistically significant level. Comparable results were obtained for experienced and inexperienced real estate agents, which would be expected, since less successful persons tend to drop out of the field. These results should not be generalized to other occupations without further research. Separate studies are required to validate the use of vocational interest test scores to predict job performance for each new occupational setting.

Chapter 5

Research with the Jackson Vocational Interest Survey

The past 50 years has witnessed an accumulating and distinguished body of research concerned with vocational interests, vocational satisfaction, and the psychology of vocational choice. A great deal has been learned about the conditions under which vocational interest test scores are predictive of reported satisfaction, of occupational change, and of initial choice of a career, to name just a few areas. The Jackson Vocational Interest Survey has been designed not only as a means of serving students and others in a counseling situation, but also as a means of contributing to the understanding of the nature of vocational interests and to the psychology of vocational decision making. In particular, the emphasis upon Basic Interest scales is consistent with Loevinger's (1957) conceptualization of psychological tests as instruments of psychological theory. The emphasis is upon the assessment of the basic underlying components of vocational interest leading to satisfaction or dissatisfaction. By studying the properties of such dimensions a more precise idea of the way in which these operate should be forthcoming. Although a great deal has been learned in the past from empirical occupational scales, the emphasis on Basic Scales has the advantage that the constructs underlying interest in work may be better understood. Thus, with accumulating knowledge about the underlying dimensions represented in the scales, predictions become possible regarding new problems and new situations. Not only will predictability be enhanced, but progress will be made in the scientific understanding of underlying processes descriptive of the motivational dimensions of work as well. A number of studies have been conducted bearing upon the interpretability of scales and upon the JVIS' utility in counseling and multivariate classification situations. This research provides useful insights about the JVIS. The studies described in this section are presented both to provide further insight into the properties of the scales and to suggest avenues of possible further research.

Vocational Interest Profiles of Students in Different Academic Major Fields

The JVIS was administered to 10,134 entering freshman students at the Pennsylvania State University (Jackson, Holden, Locklin, & Marks, 1984). Students completed the JVIS after their university acceptance but while still in high school. Analyses were based on 8,610 students (4,889 males and 3,721 females) who had reached their senior year and identified a major. What is remarkable about this study is the fact that students did not see their JVIS results at any time, and thus made career decisions independently of their JVIS results. This methodology prevented contamination of

the selection of majors and thus allowed for a more appropriate investigation of the relationships between JVIS Basic Interest scales and majors. Mean scores on each of the 34 JVIS Basic Interest scales were computed for 131 academic major fields. The matrix of JVIS Basic Interest scales by majors was subjected to a singular value decomposition. A set of 17 clusters was retained for interpretation. These clusters represent distinct groups of academic majors. It should be noted that male and female groups entered into the definition of every cluster.

The 17 clusters are modal profiles of JVIS basic scale scores. Each profile has a series of high and low JVIS Basic Interest scale scores. The 131 university majors had a projection on each of the 17 dimensions. These projections are analogous to factor loadings between the JVIS profile for a particular major and the general modal profile constituting the cluster as a whole.

Table 5-1 lists the 17 clusters with associated educational majors. Note that only majors with projections on the respective typal dimension exceeding .30 for at least one gender are listed. The two JVIS scales with the highest standard scores for that cluster are presented in parentheses next to the cluster name.

The following section describes the major significant findings in this study.

1. Most of the academic majors could be classified into at least one of the 17 clusters.
2. The clusters were consistent with intuitive expectations based on content similarities between major areas.
3. The highest JVIS Basic Interest scales were consistent with the majors defining the cluster. In fact, the two Basic Interest scales most highly related to a cluster were those most highly related to the predominant major reflected in each cluster. For example, the predominant majors defining the cluster Environmental Resource Management are Wildlife Technology and Recreation and Parks. The Basic Interest scales most highly related to the cluster were Life Science and Nature-Agriculture. These two scales were also the ones (out of the 34 Basic Interest scales) most highly related to the majors, Wildlife Technology and Recreation and Parks. These results lend support to the construct validity of the JVIS.

One advantage of using cluster profiles instead on individual major group profiles is the increased reliability that clusters afford. Sometimes the weights for a single group can be unstable due to sampling fluctuations. As with job groups the aggregation of a number of groups to define a cluster increase the reliability of scoring weights and the confidence that one can place on results.

The Genetic and Environmental Influences on Career Interests

One of the most powerful research designs used to disentangle genetic from environmental factors contributing to the development of human characteristics and

Table 5-1: Academic Major Groups Defining JVIS Profile Types (N=8610)

		Males	Females
1.	Agribusiness and Economics (Nature/Agriculture; Social Science)[a]		
	Agricultural Economics and Rural Sociology	60	45
	Agricultural Business Management	47	43
	Food Service and Housing Administration	19	41
2.	Environmental Resource Management (Life Science; Nature/Agriculture)		
	Wildlife Technology	34	53
	Recreation and Parks	48	32
	Environmental Resource Management	36	47
	Forest Science and Technology	31	30
	Horticulture	29	31
	Health and Physical Education	30	10
	Agricultural Business Management	41	[b]
	Agriculture	39	29
3.	Education (Elementary Education; Teaching)		
	Secondary Education	45	38
	Music Education	39	28
	Education	24	38
	Elementary and Kindergarten Education	35	32
4.	Health, Physical Education, and Recreation (Personal Service; Nature/Agriculture)		
	Health and Physical Education	54	50
	Recreation and Parks	36	50
5.	Mathematical Sciences (Mathematics; Physical Science)		
	Mathematics	52	39
	Physics	33	[b]
	Engineering Science	01	31
6.	Engineering (Engineering; Mathematics)		
	Engineering	38	50
	Industrial Engineering	36	46
	Architectural Engineering	42	38
	Mechanical Engineering	35	42
	Civil Engineering	40	40
	Chemical Engineering	30	36
	Electrical Engineering	25	31
7.	Food Science (Life Science; Medical Service)		
	Animal Production	42	29
	Nutrition	[b]	39
	Horticulture	37	25
	Food Science	31	37
	Agriculture	29	32
	Nursing	[b]	31
	Animal Science	30	25
8.	Art and Architecture (Creative Arts; Engineering)		
	Art	36	59
	Landscape Architecture	58	45
	Architecture	53	47
	Architectural Engineering	50	43
	Art Education	[b]	34
9.	Communication Arts (Author/Journalism; Technical Writing)		
	Theatre Arts	39	64
	Modern Languages	32	56
	English	38	53
	Journalism	30	43
	Advertising	38	42
	Speech Communication	30	41
	Liberal Arts	34	29

Continued on next page

Table 5-1: Academic Major Groups Defining JVIS Profile Types (cont.) (N=8610)

		Males	Females
10.	Science (Physical Science; Engineering)		
	Science	37	53
	Premedicine	29	41
	Chemistry	30	37
	Engineering Science	15	32
	Chemical Engineering	32	21
	Biochemistry, Biophysics, and Microbiology	29	32
	Biology	17	31
11.	Health Services and Sciences (Medical Service; Life Science)		
	Health Planning and Administration	53	41
	Premedicine	53	47
	Nursing	[b]	42
	Biochemistry, Biophysics, and Microbiology	38	37
12.	Business (Finance; Business)		
	Finance	52	48
	Food Service and Housing Administration	46	50
	Industrial Engineering	49	40
	Accounting	44	39
	Business, Administration, and Management	43	39
	Health Planning and Administration	40	23
	Agricultural Business Management	33	17
13.	Behavioral Science (Social Service; Human Relations Management)		
	Psychology	43	42
	Individual and Family Studies	43	31
	Law Enforcement and Correction	37	38
	Sociology	24	34
14.	Social Science, Law, and Politics (Law; Technical Writing)		
	Prelaw	26	53
	History	28	43
	Political Science	35	35
	Law Enforcement and Correction	29	35
15.	Performing Arts (Performing Arts; Author/Journalism)		
	Music Education	61	57
	Theatre Arts	30	52
16.	Computer Science (Mathematics; Engineering)		
	Computer Science	38	55
	Two Year Computer Science	47	38
17.	Human Services (Social Service; Elementary Education)		
	Social Welfare	50	20
	Education of Exceptional Children	[b]	45
	Psychology	23	35
	Speech Pathology and Audiology	[b]	34
	Individual and Family Studies	28	34
	Rehabilitation Education	[b]	31

Note: All academic major groups with projections of at least .30 for at least one gender are listed under each profile cluster. Decimals omitted.

[a] The JVIS scale names appearing in parentheses refer to the two JVIS scale names with the highest standard scores for that cluster.

[b] The number of persons of the designated sex enrolled in this academic major was insufficient for analysis.

behavior is the comparison of monozygotic to dizygotic twins reared apart (MZA and DZA twins). Monozygotic (MZ) twins are genetically identical, while dizygotic (DZ) twins have only 50 percent of their genes in common. When MZ twins are more similar on a characteristic than are DZ twins, we may be tempted to conclude that the similarities are attributable to genetic factors. For example, twin studies show higher correlations of height for pairs of MZ twins (around .90) than for pairs of DZ twins (around .45) (Plomin, 1994). In this case the higher correlation for MZ twins than for DZ twins is attributable to genetic similarity. For other characteristics, a similar pattern of correlations may be attributable to a greater similarity of the environment for MZ than DZ twins. For example, MZ twins are more likely than DZ twins to dress the same and be treated in a similar manner. One way to control for the confounding environmental sources of resemblance is to study MZ and DZ twins reared apart. Twins reared apart are less likely to have similar environments than twins reared together. Although samples of such individuals are difficult to find, there have been a few studies. One of these is summarized below.

Moloney, Bouchard, and Segal (1991) conducted a study investigating career interest heritability based on 52 pairs of monozygotic twins reared apart (MZA) and 27 pairs of dizygotic twins reared apart (DZA). The JVIS and the Strong Vocational Interest Blank or the Strong Campbell Interest Inventory (SVIB-SCII) were administered to the participants. The sample consisted mainly of women with an approximate age of 40 years. In general, twins were separated early in life and reunited only in middle adulthood. The mean MZA correlation based on the 34 JVIS scales was .43 while the mean DZA correlation was .11. The average estimated heritability was .44. The authors suggested that approximately 45-50% of the variance across a wide range of career interests can be attributed to genetic variation. They also reported that for 20 of the 34 JVIS scales, the purely environmental model could be rejected. Similar results were found with the SVIB-SCII.

What are the implications of these findings? If career interests are genetically influenced, this would suggest that they are somewhat "hard-wired" and partly determined at birth. Lykken, Bouchard, McGue, and Tellegen (1993) suggested that genetic predispositions of more global characteristics such as temperament, aptitude, and personality, which are also influenced by genetic factors, may be responsible for the genetic influence that we observe in career interests. Our personality, aptitudes, and temperament likely influence our preferences for certain activities, experiences, and interests.

Multivariate Classification of Occupational Groups

This study was undertaken to identify major groups of vocational interest profiles, and to interpret these as consistent generic clusters of occupational interest types having implications for vocational interest counseling and research. The focus of the study was upon the issue of a numerical taxonomy (Sneath & Sokal, 1973) or clustering of occupations for the purpose of identifying a number of sets of occupa-

tions. Such clusters have many potential uses. They may be investigated with the aim of establishing generalizations regarding their nature. They may also be employed to provide a more parsimonious basis for interpreting vocational interest patterns than is possible with separate profiles based on a large number of distinct groups. Thus, the use of occupational clusters avoids the potential confusion inherent in the reporting of a large number of redundant occupational scales. If it can be established that the one or two hundred occupational group scores can be summarized in a much smaller number of clusters, such information will provide a framework for more interpretable and economical representation of the individual's position with respect to occupations represented as interest patterns.

This study employed a series of multivariate procedures, first, for interfacing the Jackson Vocational Interest Survey with the vast body of research regarding occupational interests available from research with the Strong Vocational Interest Blank. Secondly, a technique was developed for clustering profiles. This technique was employed to classify the vocational interest profiles from 189 occupational groups comprising in excess of 47,000 respondents. These clusters are presented below and provided a foundation for further clustering studies which ultimately resulted in the interpretation of the JVIS profile in terms of similarity to occupational groups. By a kind of statistical "bootstrapping" it is possible to predict the JVIS profile for each of these occupational groups, which in turn can be classified and the resulting classification evaluated in terms of the cogency of the clusters.

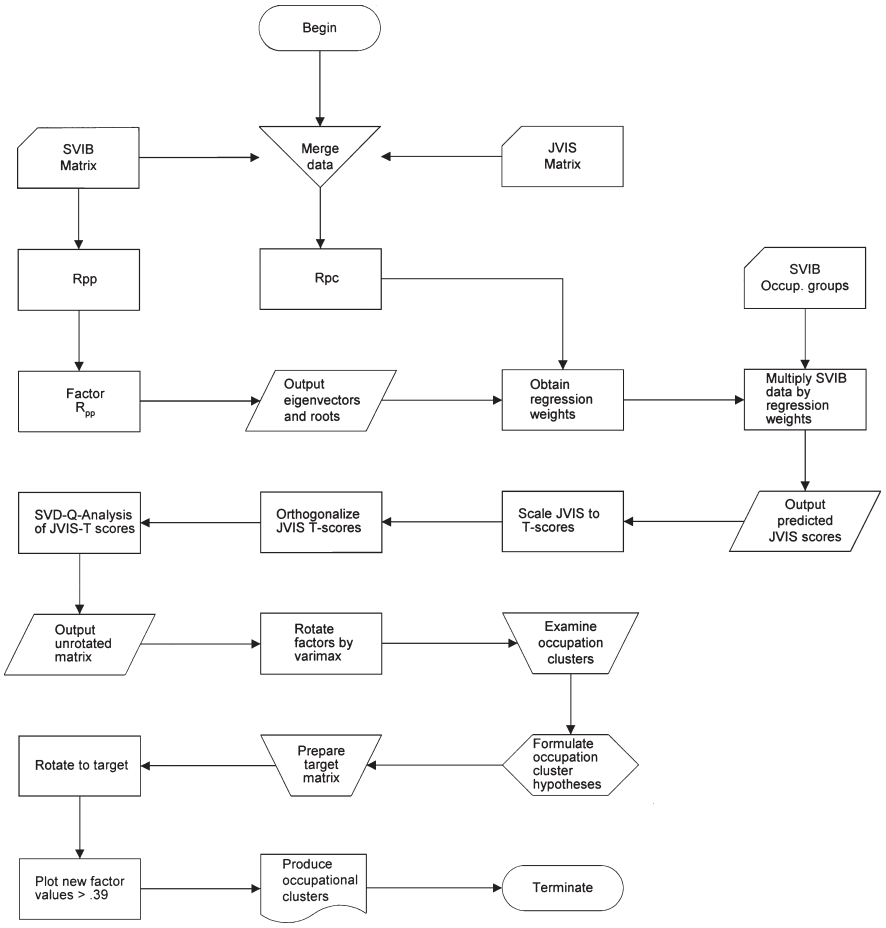
A Method for Statistical "Bootstrapping" and Clustering of Vocational Interest Profiles

A total of 538 males comprising a portion of the entering freshmen class at the Pennsylvania State University was administered the JVIS and the SVIB for men (T399). This yielded scores for JVIS and SVIB Basic Interest scales. These data provided the basis for analytic treatment of data and for the occupational interest classification.

The first step in the analysis was to obtain a best least squares estimate of the JVIS profiles for each of the 189 occupational groups upon whom mean scores were available for each of these 22 SVIB basic scales using multivariate factor analytically based prediction procedures. These are outlined in the flow chart in Figure 5-1. Basically this is analogous to a multiple prediction problem with the SVIB basic scales as a predictor and the JVIS scales forming the criterion.

The SVIB scales were intercorrelated and factored. Factors associated with eigenvalues comprising 80 per cent of the total variance were retained. This has the effect of eliminating small factors probably due to error. These factors were utilized in conjunction with the correlation matrix between the JVIS and the SVIB to obtain regression weights for use in prediction. The matrix of occupational groups from SVIB basic scale scores was multiplied by this matrix of weights to yield a matrix of predicted JVIS profiles for each of the 189 occupational groups. These JVIS profiles

Figure 5-1: Flowchart for Multivariate Classification of Occupational Types



were standardized so as to yield the usual T scores and were also orthogonalized, so that JVIS scale scores were uncorrelated. The next step was to perform a procedure which has come to be known as modal profile analysis. Since factoring intercorrelations among profiles would have necessitated the analysis of an 189 x 189 correlation matrix, an alternate procedure permitting direct analysis of the data matrix and yielding identical results, was employed. This procedure, termed singular value decomposition (Dobson & Hepper, 1974), yields both R- and Q-type factors directly from the data matrix. The resulting matrix was first rotated by varimax, hypotheses formed on the basis of the initial rotated results, and final occupational clusters produced by further rotation using an hypothesized target matrix in conjunction with an orthogonal procrustes rotation. The salient factor loadings were interpreted as clusters of related occupations. Although very similar to the clusters obtained by the varimax procedure, these clusters were somewhat more clearly defined after the final rotation.

Below are listed the names of the clusters identified.

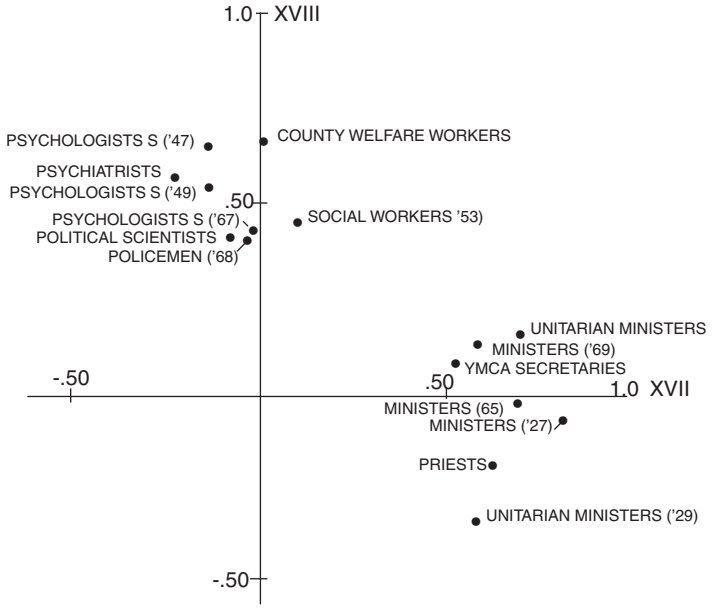
Cluster I	Physicians
Cluster II	Salespersons
Cluster III	Public Service Personnel
Cluster IV	Military Personnel
Cluster V	Authors
Cluster VI	Accountants and Financial and Office Workers
Cluster VII	Mathematicians
Cluster VIII	Lawyers and Politicians
Cluster IX	Medical Service Workers
Cluster X	Counseling and Guidance
Cluster XI	Engineers and Technical Personnel
Cluster XII	Social Scientists
Cluster XIII	Managers of Personnel
Cluster XIV	Scientists
Cluster XV	Skilled Tradespersons
Cluster XVI	Skilled Semiprofessionals
Cluster XVII	Ministers and Religious Workers
Cluster XVIII	Social Service Workers
Cluster XIX	Agriculturalists
Cluster XX	Physical Educators
Cluster XXI	Merchandisers
Cluster XXII	Performing Artists
Cluster XXIII	School Teachers
Cluster XXIV	Musicians
Cluster XXV	Architects and Interior Decorators
Cluster XXVI	Artists

Implications of Clustering Findings

One cannot but be struck with the high level of homogeneity and cogency of the clusters. This is illustrated in Figure 5-2, which presents two of the clusters.

The finding that it was possible to reduce 189 occupational interest profiles to just 26 distinct types has implications for the reporting of occupational interests in a counseling situation, as well as for research. In the past, the problem has been one of uncertainty regarding the basis for including or excluding scales representing apparently distinct but actually highly related occupational groups. The present study

Figure 5-2: JVIS Profile Clusters for Ministers and Religious Workers and for Social Service Workers



provided a foundation for categorizing profiles into families and for interpreting these clusters more broadly than is possible with single occupations. For example, it is difficult to relate a key for Credit Manager to a broader set of interpretive constructs of salient vocational interests. However, knowing that Credit Manager defines a cluster with Bankers and Accountants and relating this information to high scale scores for Office Work, Business, and Finance provides a clear basis for interpretation. Such an approach is capable of providing a much more solid foundation for developing a theory of occupational interest classes than heretofore possible. The use of hierarchical classification techniques together with a well-founded conception of dimensions of occupational behavior appear to be a promising direction for further research.

As mentioned, this study provided the foundation for the additional clustering studies based on both males and females. It was believed that when the problem is one of assigning persons to classes, as in the case of counseling decision-making or vocational choice, it is possible to treat the issue analytically as one of relating a particular configuration of scores or qualitative data to the configurations present in a discrete number of predefined occupational types or classes. Thus, certain of the analytical steps employed in the classification could be adapted for computerized interpretation of individual scores. These analytic steps provided the foundations for computerized appraisal of Similarity to Occupational Classifications, a step that was introduced subsequent to the completion of this study and the additional classification studies of JVIS profiles.

Predicting Choice of Academic College from JVIS Scores

This study is one of a series of large-scale unpublished studies undertaken at the Pennsylvania State University under the direction of Ralph H. Locklin and Edmond Marks. It comprises an investigation of a rather large sample of male and female entering freshmen who had been administered the Jackson Vocational Interest Survey, as well as quantitative (Q) and verbal (V) subtests of the Scholastic Aptitude Test (SAT). This study investigated the degree to which the 34 JVIS scales and the SAT subtests predicted initial choice of an academic college. These data are the subject of more extensive research reports (Locklin, 1976). Grateful acknowledgment is expressed to Dr. Locklin for his permission to report these findings in the JVIS Manual.

It is of some importance to investigate the degree to which results from a vocational interest assessment device can accurately predict such choices as the selection of an academic college. Of course, a number of factors militate against a perfect correspondence between test scores and college choice. If perfect correspondence did exist, one might infer that individuals are entirely capable of making appropriate choices without regard to their knowledge of vocational interest scores, thus calling into question the values of such scores. But, of course, such perfect correspondence does not exist (Athanasou & Cooksey, 1993). An analysis of the influences determining selection of an academic college and a review of previous research indicates that there is a reasonable basis for expecting some degree of relationship between the choice of an academic college and vocational interest scores, but that empirically the degree to which the scores actually classify such persons has met with partial and varying success. It was conjectured that because the JVIS was developed with a greater number of basic scales than previous devices and that these scales were designed to be minimally intercorrelated, these properties might permit a more differentiated classification of college majors and thus provide a foundation for a demonstration of higher predictive efficiency than realized heretofore. The present study was undertaken, therefore, to evaluate the hypothesis that there would be a relationship between interests measured at the time of entrance and choice of a college major. The justification for such an hypothesis rests both with the theoretical basis for JVIS scales and upon previous research results with other measures of vocational interests.

The JVIS was administered during orientation week to 1,054 men and 845 women entering the Pennsylvania State University as freshmen. Of these, 991 men and 797 women were admitted to one of 10 academic colleges of the University. These colleges included: Arts and Architecture, Agriculture, Business, Earth and Mineral Science, Education, Health and Physical Education, Engineering, Human Development, Liberal Arts, and Science. As mentioned, also administered for comparison purposes were SAT V and Q subtests. Because mean scores for a few JVIS scales differed for males and for females, and because males and females did not elect to go to different academic colleges in equal proportions, the analyses were separately undertaken on males and on females.

Means for Academic Colleges

It should be noted that at the Pennsylvania State University, as well as at other institutions, there is substantial overlap in the programs of study offered within the different academic colleges. For example, one may study sociology in the College of Agriculture, as well as in the College of Liberal Arts. One may study architecture either in the College of Engineering or in the College of Arts and Architecture. But since students do not decide on a specific major at the time of entrance, the election of an academic college was used as the basis for classification. The 34 JVIS scales for males and for females for students in the various colleges were similar to those reported in Chapter 1 for the larger sample of entering first year Pennsylvania State University students. It is clear from a perusal of the data that there are substantial mean differences between individuals enrolled in different colleges. The highest score for engineering students on the JVIS, for example, is the Engineering scale, followed closely by Mathematics and Physical Science. Not surprisingly, agriculture students received the highest score of any group on Nature-Agriculture on the JVIS. Education students were by far the highest on the Elementary Education scale of the JVIS, while business students were substantially higher than other groups on JVIS scales for Finance, Business, and Supervision, as well as for Law. Each academic college demonstrated its own characteristic profile. But the question remained, could these apparent differences in profile shape be represented statistically and could they be employed to classify individuals reliably into discrete groups? Locklin (1976) employed a stepwise discriminant analysis to investigate the extent to which JVIS scores contributed to the differentiation of the groups. Academic college chosen by the student when admitted comprised the dependent variable, while the 34 JVIS scales and the SAT -V and Q scores represented the initial independent variable set. The results from the stepwise discriminant analysis permitted an identification of a subset of the independent variables that significantly contributed to separation of the groups. The results from the discriminant analysis indicated that 23 steps were required to identify the 23 variables contributing to the discrimination among the colleges for males, and 22 steps were required to identify 20 variables for females. The discrimination among colleges is quite good as evidenced by Wilks' Lambda of .20 for both males and females. The fact that 20 or more variables were required to distinguish the groups indicated that a majority of JVIS scales contained independent valid variance with regard to the criterion of academic college selection. The data also indicate that vocational interests are more predictive of academic college choice than are ability or aptitude measures.

Another indication of the degree to which JVIS scores distinguished individuals selecting different colleges is presented in Table 5-2. Table 5-2 presents the values of the generalized distance measure (D^2) of the vector of means for each of the pairs of colleges. Among the males, the Engineering and Liberal Arts students are two very distinct groups, with large differences occurring between Liberal Arts on the one hand and Agriculture and Business on the other. Science students are also

Table 5-2: Generalized Distance Measures (D^2) Between each Pair of Colleges Expressed as F Statistics

Males[a]

College	Ag	AA	Bus	EMS	Ed-HPE	Engr	HDev	LA
Agriculture								
Arts & Architecture	5.12							
Business	13.17	5.28						
Earth & Mineral Science	7.07	5.19	10.57					
Education-Health & Physical Education	5.34	2.94	4.69	5.35				
Engineering	13.51	4.76	14.86	5.20	6.39			
Human Development	3.22	2.89	2.80	3.92	1.88	5.50		
Liberal Arts	13.14	6.00	8.25	13.09	3.01	29.98	2.48	
Science	8.27	8.11	17.28	6.28	6.07	18.15	4.61	16.98

Females[b]

College	Ag	AA	Bus	EMS	Ed-HPE	Engr	HDev	LA
Agriculture								
Arts & Architecture	9.98							
Business	9.42	6.61						
Earth & Mineral Science, Engineering	8.86	6.27	7.34					
Education	10.03	6.86	5.23	10.63				
Health & Physical Education	4.12	2.92	3.58	4.90	1.28[c]			
Human Development	9.05	6.37	3.43	11.49	3.49	1.35[c]		
Liberal Arts	15.17	8.63	5.08	15.44	7.68	3.80	5.44	
Science	5.61	11.95	9.24	6.81	12.12	4.88	14.41	28.51

[a] All F statistics have 23 and 960 degrees of freedom and are calculated using the 23 variables selected in the stepwise discriminant analysis. All values are significant beyond the .01 level.

[b] All F statistics have 20 and 769 degrees of freedom and are calculated using the 20 variables selected in the stepwise discriminant analysis.

[c] Not statistically significant. All other values are statistically significant beyond the .01 level.

clearly differentiated from students in Business, Engineering and Liberal Arts. Female students in the various colleges were also markedly differentiated, particularly between Science and Liberal Arts, but also between the latter and Agriculture, Earth and Mineral Sciences, and Engineering.

In addition to the above analyses, Locklin also calculated classification functions for each group to be used in predicting group membership. His classification functions contained a number of components including a constant adjusting for group deviations from the grand mean for each included variable, for the prior probability of group membership based on the proportion of the sample in each college, and for variance and covariance with respect to the other variables in the function. Each academic college defines one function, and nine such functions were computed for each individual based on his or her JVIS profile. The individual was classified into the college identified as being the most probable. This prediction using discriminant weights and the other components can thus be compared with the individual's actual choice of an academic college. Locklin used a jackknife procedure, which involves the calculation of weights with the individual's own scores excluded from the weights in a manner similar to cross replication. But, unlike traditional cross replication, this

technique avoids the inefficiency of basing the calculation of weights on only one half of the sample (Mosteller & Tukey, 1968, p.154).

In reviewing Locklin's results, it is clear that a substantial number of students can be classified into the appropriate academic college using only information contained in psychological test scores. Over 60 per cent of male students were correctly classified, a percentage which dropped only to 56.4 using the jackknife procedure, indicating that the data were quite stable in a cross validational sense. Similarly, for females, the overall percentage of correct predictions was 60 per cent. Success was most notable in males for the Engineering group with 82 per cent correctly classified, and for Liberal Arts students in the female group, where 77.4 per cent were correctly classified. Hit rates were lowest for the colleges with smaller enrolments, reflecting both the heterogeneity of the groups comprising, for example, Arts and Architecture, and Earth and Mineral Sciences, as well as the fact that the classification functions were oriented in the direction of weighting the probability of classification in a college as a function of its size.

The results from Locklin's study, particularly those derived from the stepwise discriminant procedure and from the classification analysis, both exceeding chance levels by very considerable amounts, support the validity and predictive efficiency of JVIS scales in the context of college and career choice. Even though there is considerable overlap between college programs, and even though other things besides interests undoubtedly enter into the choice of an academic college, it is clear that JVIS profiles can play a considerable role in predicting initial choice. These findings, although limited to freshmen at a single, albeit diverse and fairly representative university, support the interpretation that the JVIS is potentially useful in helping career-oriented individuals to choose educational programs.

Inferring Vocational Interests from Occupational Titles and Descriptions

Blair (1977) conducted a study investigating the degree to which individuals could infer accurately the pattern of JVIS vocational interests when given the name of the occupational group alone or the name and a brief description of the job. This study thus evaluated a basic assumption in the counseling use of vocational interest scores, particularly Basic Interest scale scores, namely, that counselors and individuals receiving counseling can infer correctly the relationship between the counselees' measured interests and those of individuals already employed in various occupations.

Three major questions were examined: (a) Do groups of judges arrive at reliable and accurate inferences regarding the interests of individuals employed in a variety of occupations; (b) Do individual judges demonstrate reliable differences in the degree to which they are sensitive to the patterning of interests in various occupational groups and in their readiness to attribute differential interests to these groups; and (c) Can a significant relationship be identified between a judge's inference and

(i) the interest area being inferred; (ii) the amount of information given about the occupational group for which interests are being inferred; (iii) the gender of the individual making the inference.

One hundred judges received a written description of six target persons, each representing a different occupation: gas welder, elementary school teacher, stenographer, real estate agent, fighter pilot, and Protestant minister. Each judge received either a short or long description. The short description comprised only the occupational title, while the longer description included the title and a paragraph containing a brief job description. Judges rated each of the six targets in terms of the degree of interest that the target would have in each of 34 areas corresponding to the 34 JVIS scales. In addition to gathering judgment data, Blair also obtained criterion responses for five of the six groups (gas welders were not readily obtainable for administration of the JVIS).

These results indicated extremely high consensus reliabilities for the inferential judgments (Table 5-3). The values reported, based on the separation of judges into random halves, are all significant substantially beyond the .001 level. The conclusion is that in the aggregate judges of no greater than average sophistication regarding the world of work are capable of drawing highly reliable inferences regarding the patterning of interests in a range of occupations. In addition, all group consensus means correlated significantly ($p < .01$) with the pattern of actual obtained means of the five occupational groups for which data were available. The product moment correlations (with decimals removed) for the five targets were:

Elementary School Teacher	60
Stenographer	48
Real Estate Agent	69
Pilot	36
Minister	47

The results indicated that, although the group consensus was highly reliable and quite valid, individuals varied over a wide range both in their sensitivity to the appropriate patterning of JVIS profiles for the occupational groups and in their readiness to ascribe differential interests to various occupational groups. This tendency on the part of individual judges to be accurate or inaccurate proved to be quite reliable across all six targets. Additional analyses indicated that males and females did not differ in terms of their inferences, and that for some targets (gas welder and fighter pilot) the complete job description, as opposed to the job title alone, did affect the inferences significantly. Also, the particular set of JVIS scales or interest areas highlighted by judges for different occupations proved to be a highly significant factor for every occupational target in the study. That is, for different targets the role of particular vocational interests was differentially important. For example, Performing Arts and Author-Journalism were more important than other scales for judgments of the interests of Protestant ministers.

Table 5-3: Reliability of the Group Consensus for Six Targets

Target	Number of Judges	Split-Half Reliability	Corrected Reliabilities
Welder	100	.98	.99
Teacher	100	.97	.99
Stenographer	100	.98	.99
Real Estate Agent	100	.98	.99
Pilot	100	.98	.99
Minister	100	.99	.99

A number of implications can be drawn from Blair's study. First, the data do lend support to the assumption that counselors are both capable of drawing accurate inferences about the patterning of vocational interests in different occupations and of using this information in counseling. Second, it is clear from these results that individuals taken from a population not characterized by having had specialized training in the psychology of work or in occupational information can draw reliable and valid inferences from occupational interest scales. This would lend support to the view that many individuals who might complete the JVIS and receive their results are capable of intelligently interpreting them. Third, the finding that individuals differed reliably in their sensitivities regarding inferential accuracy implies that both counselors and counselees vary in the degree to which they can employ information about occupations and occupational interests effectively. These results also point the direction to more effective training for counselors in this regard. Fourth, the findings indicate that Basic Interest scales are relatively meaningful to individuals. Finally, a possibly fruitful direction for further work is in the investigation of the use and interpretation of group consensus values regarding occupational interest profiles. Where actual members of an occupation are difficult to test, one might investigate the degree to which group consensus judgments provide a useful intermediate criterion for occupational norms.

Judgment of Vocational Interests

This study was designed to further the findings of Blair by appraising the extent to which individuals (a) could arrive at a reliable consensus regarding exemplar occupations derived from each of the 32 occupational clusters; (b) could accurately infer the patterning of the interests of each of these exemplars, using the mean JVIS profile for each cluster as the criterion.

Job Descriptions, based on the *Dictionary of Occupational Titles* (1965) and other sources were prepared for each one of the 32 occupations, previously chosen to represent one of the 32 occupational clusters. Thus, the occupation, nuclear physicist, was chosen to represent Occupations in the Physical Sciences, bricklayer for Construction Trades, and medical laboratory technician for Health Service Workers.

The set of 32 occupations was divided into subsets of 11, 11, and 10 and administered to separate groups of 37, 45, and 10, respectively. This was done to permit judges to complete the task within a reasonable time period. Judges, generally first or second year college students, were instructed to rate each occupation in their set of 10 or 11 in terms of each of the 34 JVIS Basic Interest scales and to record their rating on a nine-point scale.

The corrected split-half reliabilities of the judgment consensus were .80, .96, and .69 for the three sets. The variation was attributable in part to the different numbers of judges in each set, but generally support the hypothesis that the consensus judgment is reliable. The median validity of the consensus judgments, using the mean JVIS occupational cluster profile as a criterion, was .56. The range of these correlations was from .16 (for the occupation, Coach) to .83 (for Musician). Twenty-eight of 34 correlations were significant at the .05 level, using a two-tailed test.

The import of these results, like those of Blair, indicate that Basic Interest scales are interpretable by persons without special training in occupational psychology, and that the link between these Basic Interest scales and occupations are perceived with a degree of accuracy. Of course, individuals differ in the extent to which they achieve accuracy. Their perception undoubtedly can be sharpened by counseling and by information about specific occupations and more generally about the world of work. But the results are nevertheless encouraging.

Comparison of JVIS Scale Scores with Ratings of Interest

It is of some theoretical and practical interest to know the degree to which JVIS scale scores are associated with simple ratings for the 34 dimensions. To investigate this question the 34 JVIS scale names, together with a brief description of the scale, were assembled in a booklet. Adjacent to each scale name and description was a seven-point scale ranging from "Extremely Uninterested" to "Extremely Interested." Subjects were given an example involving an interest in marine science together with the following instructions:

> *The task is to determine to what degree each description is characteristic of the type of occupation you would enjoy. The person making the rating in this example felt he would find a job in marine science to be moderately uninteresting.*
>
> *Please rate the work areas listed on the following pages. Try to work quickly and do not spend too much time on any one description.*

Ratings were obtained from 169 male and 190 female 11th and 12th grade high school students.

Correlations were, in general, in the moderate range, with a median of .38 for females and .33 for males. Of course, if correlations were so high as to approach

the reliability of measured interests, it would lead to the possibility that these simple ratings could be substituted for a vocational interest inventory. But this is not the case. Indeed, correlations such as these are attenuated by the modest reliability frequently observed in single ratings, by the difficulty of capturing the meaning of a JVIS dimension with a single phrase, and by the tendency to produce ratings in a desirable direction. For example, three dimensions which did not consistently yield significant correlations were Personal Service, Family Activity, and Accountability. In all three cases, individuals, males in particular, expressed a high degree of interest in their ratings, but not in measured interests as assessed by responses reflecting preferences for particular activities. In general, however, the degree of association between measured and rated interest in occupational areas is close to expectations. For females 28 of 34 ratings showed the highest correlation with the targeted JVIS scale; for males the corresponding value was 25 of 34. This indicates a degree of convergent and discriminant validity of the JVIS in the context of self ratings. Correlations are highest for areas like Mathematics (.71 for males and .63 for females) or Medical Service (.65 for males and .61 for females), in which it is reasonable to suppose that individuals have had a high level of exposure. Lower values were obtained for work style dimensions, where rating biases such as the tendency to respond desirably were likely to be operating. The general conclusion from these results is that, in conformity with previous research, rated interest and measured interests converge to a moderate extent, but that self-expressed or rated interests are not accurate substitutes for measured interests.

Correlations between the Jackson Vocational Interest Survey and the Basic Scales of the Strong Vocational Interest Blank

It is of some interest to know the relationships between the 34 JVIS scales and the basic scales developed for the Strong Vocational Interest Blank and carried forward to the Strong Interest Inventory. Table 5-4 reports these data for males and Table 5-5 reports similar data for females. In general, these data speak for themselves. When there is a clear and obvious relationship between the scales, or when the two scale names are the same, a substantial correlation is usually present. For example, the female data show a correlation of .75 between the respective Medical Service scales, and a correlation of .74 between the two scales designated Physical Science. Not all correlations of related activities are that high, however. No doubt this is due to differences in the content of the items comprising the two sets of scales, as well as the differences in item format, and differences in the conceptualization of the content underlying the scales. But there is a substantial degree of relationship, given that the scales were developed using entirely different item pools. Unlike the SVIB, the JVIS employs only descriptions of activities, and not such item types as occupational titles and school subjects.

Table 5-4: Correlations between the JVIS and the Strong Vocational Interest Blank (SVIB) (N - 159 males)

	Public Speaking	Law/Politics	Business Management	Sales	Merchandising	Office Practices	Military Activities	Technical Supervision	Mathematics	Science	Mechanical	Nature	Agriculture	Adventure	Recreation Leadership	Medical Service	Social Service	Religious Activities	Teaching	Music	Art	Writing
Creative Arts	-32	-38	-44	-37	-35	-21	-04	-25	03	10	24	31	14	-01	-28	-18	-29	-06	-24	04	47	-01
Performing Arts	08	-22	-32	-17	-23	-17	04	-33	-10	-21	-16	01	-01	01	-15	-21	-08	06	-05	35	26	16
Mathematics	-30	-10	-22	-29	-25	-05	-11	-14	72	43	29	-12	-12	-04	-09	03	-13	-11	-04	00	-13	-29
Physical Science	-28	-15	-31	-32	-35	-24	-03	-22	46	59	28	00	-06	01	-17	17	-25	-13	-17	-04	-03	-21
Engineering	-38	-20	-32	-21	-29	-28	03	-06	37	43	47	02	07	18	02	02	-28	-21	-31	-23	-15	-41
Life Science	-25	-14	-32	-33	-33	-34	-06	-29	23	38	00	14	00	04	-14	27	-22	-16	-08	03	06	-12
Social Science	02	-01	-14	-06	-11	-22	-04	-15	00	-02	-12	07	02	09	-11	03	04	-07	-03	16	24	15
Adventure	-22	-12	-25	-15	-24	-33	06	-09	00	00	10	16	35	46	27	-04	-10	-11	-18	-18	-03	-09
Nature/Agriculture	-35	-40	-37	-22	-33	-28	12	-05	-12	00	15	46	52	09	-01	-05	-27	-01	-28	-12	01	-16
Skilled Trades	-32	-41	-23	-14	-20	-03	-04	08	04	-07	29	02	19	-13	-09	-16	-27	07	-26	-07	-11	-36
Personal Service	-31	-30	-06	-00	-00	05	-07	01	-07	-24	-04	19	26	-00	03	-12	-08	-05	-11	-09	09	-13
Family Activity	-29	-32	-32	-27	-26	-10	-01	-15	02	-02	09	38	26	-00	-07	-10	-23	02	-15	-02	21	-15
Medical Service	00	10	-06	-14	-11	-15	13	-03	11	32	10	19	16	09	01	61	00	08	03	03	00	-06
Dominant Leadership	08	11	09	04	04	-07	30	09	03	02	04	-04	-00	16	-03	04	-14	-18	-16	-07	-14	02
Job Security	-26	-29	-07	-14	09	-07	01	05	-04	-15	05	03	05	-21	-12	-20	-25	-08	-21	-17	-17	-34
Stamina	-09	00	-08	-18	-10	-01	00	-07	24	32	06	13	-07	05	-16	20	-06	07	04	15	-03	00
Accountability	-07	-15	-01	-04	02	03	-00	02	00	04	05	14	-05	-15	-18	-02	02	13	03	10	-01	-05
Teaching	25	17	22	25	19	10	01	01	-28	-20	-33	-15	-19	-13	01	-01	36	16	41	11	04	20
Social Service	14	06	13	14	09	11	-07	05	-13	-13	-08	-00	01	-20	06	17	53	30	33	16	15	14
Elementary Education	00	-06	03	-02	03	20	-11	-05	-10	-17	-11	-00	-06	-28	05	-05	29	21	36	11	09	07
Finance	28	45	38	35	39	27	-01	19	-06	-11	-09	-30	-15	12	26	-04	-03	-11	01	-18	-30	01
Business	24	17	43	43	43	35	04	27	-25	-28	-18	-25	-11	-00	18	-10	07	-05	08	-09	-12	08
Office Work	-06	-20	10	10	09	31	-19	09	-09	-23	-12	-22	-12	-28	-03	-30	02	07	03	-00	-10	-12
Sales	21	12	42	52	44	33	-02	29	-19	-28	-15	-23	-05	01	18	-11	18	06	03	-08	-18	-02
Supervision	20	29	53	43	47	39	01	42	-09	-14	02	-26	-14	-07	13	-05	28	04	18	-19	-23	-04
Human Relations Mgmt.	52	55	49	48	44	25	08	25	-11	-10	-15	-09	-05	01	20	14	41	09	31	04	-04	24
Law	28	48	27	25	25	14	06	09	-15	-22	-22	-22	-04	14	25	02	02	-07	00	-14	-18	11
Professional Advising	41	37	45	29	38	22	-05	20	-14	-16	-16	-21	-19	-01	09	-02	17	-00	11	01	-01	23
Author/Journalism	28	05	-06	-01	-03	-16	-05	-20	-32	-26	-31	-15	-23	03	-09	-13	02	-01	00	23	36	62
Academic Achievement	27	19	09	-05	05	08	-00	-01	00	23	-08	-02	-23	-03	-13	09	15	21	27	16	04	33
Technical Writing	36	22	14	12	14	13	-00	-04	-16	-11	-31	-11	-21	-02	01	05	14	11	10	19	13	43
Independence	23	23	15	16	17	08	-04	14	-07	-05	05	-00	-02	09	03	-14	14	-12	08	06	07	21
Planfulness	00	01	13	04	15	19	03	18	-16	-07	-00	07	-02	-14	-01	-08	05	08	12	-09	-24	-12
Interpersonal Confidence	22	22	23	22	22	06	00	09	-20	-23	-15	-17	-14	-03	15	-09	23	-00	09	-07	-08	13

Note. Decimals have been omitted. JVIS scales are listed on the left and SVIB scale along the top of the table.

An Experimental Approach to Vocational Interest Scale Validation

The main purpose of this unpublished study, undertaken in collaboration with Shirley Parkin, and with the assistance of Nadia de Luca, was an examination of the construct validation of JVIS scales. To date, most research in vocational interest measurement has focused upon specific empirical predictions, with relatively little emphasis on investigations of basic theory. Most concepts in this area have evolved

Table 5-5: Correlations between the JVIS and the Strong Vocational Interest Blank (SVIB) (N - 123 females)

	Public Speaking	Law/Politics	Merchandising	Office Practices	Numbers	Physical Science	Mechanical	Outdoors	Biological Science	Medical Service	Teaching	Social Service	Sports	Homemaking	Religious Activities	Music	Arts	Performing Arts	Writing
Creative Arts	-33	-43	00	-19	-27	-02	15	32	-03	02	-04	03	16	18	-08	-01	45	18	01
Performing Arts	-00	-24	-12	-18	-20	01	02	10	-07	-04	-05	-01	01	-14	-04	31	24	50	20
Mathematics	-16	02	-25	-04	58	61	32	06	24	17	-24	-26	11	-10	-15	04	-14	-01	-03
Physical Science	-12	02	-12	-15	24	74	35	12	47	36	-22	-21	-03	-17	-21	04	03	02	01
Engineering	-08	02	-03	-04	21	46	45	11	23	18	-19	-15	-00	-02	-10	06	-00	02	00
Life Science	-07	-06	-16	-33	-08	54	23	27	50	43	-15	-02	05	-08	-10	01	14	16	12
Social Science	07	10	-16	-33	-13	-00	-16	08	07	-09	-12	02	-23	-10	08	04	-03	-00	07
Adventure	02	-00	02	-35	-14	27	33	30	26	15	-21	03	18	-10	-19	05	22	23	26
Nature/Agriculture	-18	-24	-19	-25	-15	12	20	58	11	14	-17	-02	05	11	02	-09	07	03	-01
Skilled Trades	-39	-31	-06	07	01	-16	03	03	-28	-12	-20	-08	00	13	-05	-13	00	-09	-22
Personal Service	-25	-44	16	11	-12	-15	00	07	02	13	-03	02	20	26	04	-01	17	05	-13
Family Activity	-52	-55	-07	07	-07	-25	-09	23	-23	-06	-02	-04	08	41	02	-15	02	-13	-28
Medical Service	-06	00	-12	-03	-02	29	03	-07	65	75	-08	18	06	-01	-02	-04	-08	-02	00
Dominant Leadership	10	03	02	-09	-05	03	-07	-15	16	10	-06	-03	00	-07	08	05	-10	-06	-09
Job Security	-48	-43	-26	09	-00	-26	-35	-24	-21	-07	-23	-23	-08	-02	-02	-20	-30	-31	-52
Stamina	-11	-04	-28	-20	02	09	06	12	02	02	-15	-10	-03	-06	03	01	-16	-15	-20
Accountability	-36	-31	-14	07	19	01	-07	-00	-06	-00	-26	-20	-01	-05	03	-15	-30	-26	-34
Teaching	31	30	11	15	03	-26	-16	01	-21	-23	48	16	-04	13	24	03	-05	-03	08
Social Service	10	-02	-07	-06	-33	-37	-32	-07	-02	10	34	53	01	19	35	14	-01	05	05
Elementary Education	-08	-16	01	31	-02	-36	-24	02	-26	-06	55	26	10	38	26	00	-03	-05	-11
Finance	22	35	20	20	33	05	06	-17	-13	-21	-00	-23	-07	-08	-24	-03	-06	-12	-04
Business	21	13	45	30	03	-20	-09	-18	-15	-16	12	-02	-07	02	-02	-11	-04	-16	-04
Office Work	-19	-17	16	55	16	-39	-18	-24	-45	-29	02	-15	-05	08	-08	-21	-16	-22	-30
Sales	04	-04	34	20	-14	-41	-13	-18	-25	-17	15	17	-02	13	-03	-13	15	-04	00
Supervision	11	15	29	35	13	-26	-05	-24	-25	-23	18	-01	-08	02	-01	-15	-15	-30	-22
Human Relations Mgmt.	62	54	16	-05	-07	-10	-05	-00	-01	-12	34	25	08	-08	19	26	-02	12	27
Law	34	59	17	13	-03	-14	-05	-24	-05	-17	11	17	-06	-24	06	09	02	05	22
Professional Advising	33	33	32	13	03	-19	-10	-25	-26	-36	15	-01	-15	-06	00	01	-11	-05	08
Author/Journalism	46	26	15	-11	-20	-02	00	-15	-05	-14	21	20	-01	-19	-04	26	33	48	69
Academic Achievement	21	31	-05	-00	06	02	-11	-20	-10	-21	03	-07	-24	-07	14	-08	-05	-12	05
Technical Writing	33	39	13	09	07	-07	-01	-09	-11	-25	07	-04	-19	-07	04	06	00	07	28
Independence	12	14	-07	-22	-06	-02	01	-07	-10	-22	-06	-11	-01	-25	-09	00	07	07	08
Planfulness	-12	-04	-03	26	28	-19	-24	-18	-23	-19	-07	-16	03	03	10	-22	-35	-31	-31
Interpersonal Confidence	12	02	-02	05	-10	-23	-19	-16	-14	-16	-00	-12	00	-04	04	-00	-10	-07	-00

Note. Decimals have been omitted. JVIS scales are listed on the left and SVIB scale along the top of the table.

inductively. That is, from a data base, summary statements of empirical relationships are constructed without the logical deductions of theorems (or testable hypotheses from axioms or postulates).

This study treats JVIS scales as dimensions representing constructs of vocational interests. In a manner analogous to procedures which have evolved in the investigation of validity of personality constructs, JVIS basic scales were subjected to an appraisal of their convergent and discriminant validity by the multitrait-multimethod matrix (Campbell & Fiske, 1959). These data were then subjected to a multiple-set factor

analysis. It has long been recognized that choices made regarding participating in one activity vs. another reflect personality traits and interests. There is a research literature indicating that the decision to participate in a particular psychological experience is a reflection of something about the person. It was thus hypothesized that a person's volunteering preferences for psychological experiments would be associated with JVIS scale scores bearing a substantive relationship to a particular experiment. This study can thus be viewed as a construct validation of the JVIS since experimental descriptions are used as the basis for identifying volunteering preferences were each prepared so as to be consistent with specific JVIS scale definitions.

Development of the Experimental Preference Questionnaire

A questionnaire entitled "Student Participation in Psychological Research" was designed for use in the study. For each JVIS scale one or more hypothetical experiments were written to represent the scale description and typical occupations representing that scale. The experiments were evaluated according to the following criteria: (a) the experiment was judged to reflect the scale description of *only* the interest for which it was written; (b) the degree to which the experiment involved student participants; and (c) the feasibility or possibility of running such an experiment. Consequently, a number of experimental descriptions, some of which were taken from the literature, were either rejected or reworded to satisfy the above criteria.

For each experiment, a title was written stating the main focus of the experiment. Two examples of final experiments are given below:

Teaching Spelling

> Volunteers are required to act as substitute teachers in grade classes. This study is aimed at discovering more effective methods of increasing academic success in children by evaluating different methods of teaching spelling. (JVIS Scale: Elementary Education)

Chemical Treatment of Experimental Materials

> Students are required to assist in the preparation of chemically-treated paper for the fingerprint stain test of palmer sweating. Preparation involves impregnating Dietzgen 198 M drafting paper with a five per cent solution of tannic acid and also preparing an anhydrous solution (in acetone) of ferrous chloride. (JVIS Scale: Physical Science)

The final questionnaire contained 51 hypothetical experiments representing 29 of the 34 JVIS scales. The five not included were non-occupational scales describing work styles (Job Security, Accountability, Independence, Planfulness, Interpersonal Confidence), as opposed to work roles or occupational areas. Experiments reflecting work styles were difficult to create as the scales reflected elements of several occupations and interest areas. However, two work style scales (Dominant Leadership and Stamina) were included.

Experiments were randomly ordered in the final questionnaire. A seven-point rating scale was attached to each experiment. The ratings ranged from "Strongly Uninterested," to "Strongly Interested." The "Student Participation in Psychological Research" preference questionnaire was administered with the following instructions:

> The following is a list of some research projects in psychology for which volunteer participants are needed. In order to allow student volunteers to take part in areas of research in which they are particularly interested, we would like some indication of your preferences. Please read carefully the following descriptions of experiments. After reading all of the descriptions we would like you to indicate your preferences.

Responses were recorded on a 7-point rating scale ranging from "Strongly Uninterested" to "Strongly Interested."

Evaluation of Relationships Between Experimental Preferences and JVIS Scales

Intercorrelations of the 80 variables (29 JVIS scales, 51 hypothetical experiments) over all subjects were calculated and a factor analysis performed. The principal axes factor loadings were rotated to an orthogonal procrustes criterion, with the experiments hypothesized to be associated to particular JVIS scales serving as targets.

Results indicated that most experimental preferences do reflect the interest expressed by the JVIS scale. The rotated factor matrix closely paralleled expectations based on hypotheses. Generally, experiments reflected the interest scale on which they were based. Salient factor loadings, as well as the highest irrelevant loadings (shown in italics) for the 29 factors, are shown below with decimals omitted. Twenty-five factors of the 29 showed the highest factor loadings for the experiment and scale representing a given interest. With but three exceptions the highest irrelevant loading was less than the loading expected for a given scale's experimental preferences.

Factor I

Artistic Drawings	74
Illinois Art Expression Index	72
Creative Arts (JVIS)	59
Writing About People	*44*

Factor II

Script Presentation	62
Role Playing	59
Performing Arts (JVIS)	58
Author-Journalism	*44*

Factor III

Mental Arithmetic	72
Coaching Effects in Mathematics	80
Mathematics (JVIS)	56
Stamina	*29*

Factor IV

Chemical Treatment of Experimental Materials	76
Physical Properties of Light Sources	64
Physical Science (JVIS)	34
Visual Tracking	*43*

Factor V

Factory Planning	48
Acoustic Measurement	47
Engineering (JVIS)	61
Physical Science	*39*

Factor VI

Spontaneous Skin Responses in Rats	68
Neuroanatomy of the Nervous System	75
Life Science (JVIS)	42
Acoustic Measurement	*39*

Factor VII

Questionnaire Design	67
Social Science (JVIS)	69
Smoking Control Consultant	*28*

Factor VIII

Aeronautics Simulation	61
Drug Study	57
Adventure (JVIS)	60
Personal Service to Experimental Participants	*34*

Factor IX

Turkey Breeding	79
Nature-Agriculture (JVIS)	64
Adventure	*29*

Factor X

Manual Dexterity	61
Skilled Trades (JVIS)	57
Perceptual-Motor Efficiency	*21*

Factor XI

Personal Service to Experiment Participants	57
Host or Hostess	62
Personal Service (JVIS)	41
Performing Arts	*30*

Factor XII

Family Activities	73
Parental Role Playing	66
Family Activity (JVIS)	45
Personal Service	*31*

Factor XIII

Medical Assistant	73
Participant Observers in Patient Care	
Medical Service (JVIS)	59
Long Term Hospitalization	*42*

Human Relations Management (JVIS)	40
Professional Advising	*33*

Factor XXV

Courtroom Behavior Patterns	65
Legal Contracts	66
Law (JVIS)	54
Sales	*31*

Factor XXVI

Smoking Control Consultant	44
Vocational Test Advisor	61
Professional Advising (JVIS)	08
Questionnaire Design	*31*
Divorce-Conflict Mediator	*31*

Factor XXVII

Script Writing	65
Propaganda in News	57
Writing About People	43
Author-Journalism (JVIS)	63
Writing Abstracts	*40*

Factor XXVIII

Scholastic Achievement	46
Academic Achievement (JVIS)	69
Stamina	*30*

Factor XXIX

Writing a Training Manual	43
Writing Abstracts	58
Technical Writing (JVIS)	66
Script Writing	*31*

Implications

There are a number of implications of the study of experimental choices that bear on the construct validity of the JVIS Basic Interest scales.

1. Experimental preferences are positively related to JVIS interest scores when the experiments bear an appropriate conceptual link to the interest scale.
2. As many as 29 fairly distinct interest dimensions can be identified in the domain spanned by experimental preferences and vocational interests.
3. This type of experimental approach to vocational interest and choice behavior adds to the empirical foundations from which a theory of vocational interest and vocational choice can be developed. The study also has implications for the design of experimental studies that might contribute to an understanding of career and educational decision making.

Some Research Recommendations

The JVIS lends itself readily to research. There are several areas of contemporary interest. In this section several of these areas of potential research activity are out-

lined with illustrative citations to the literature, including studies using the JVIS and other instruments.

Studies of the structure of interests. Dimensional and other spatial models are of continuing significnce in representing the organization of interests. For example, we have demonstrated that it is possible to represent the 34 JVIS basic interest scales into a dimensional space of 12 components. It would be of interest to project into this space, using multivariate analysis, other information, such as the interests of clusters of university students or occupational clusters. Alternatively, one could relate the space defined by JVIS basic interest scales with external information, such as personality scale scores, preferences for avocations, or reports on satisfaction with different facets of work.

Another area of importance is the structure of intellectual abilities in relation to interest structuring (Oswald & Ferstl, 1999; Prediger, 1999). Of course, studies of structure must first come to grips with the proper structural model for vocational interests, a topic that remains controversial. The literature contains some thoughtful contributions that address unresolved issues (Rounds, 1995; Rounds, Tracey, & Hubert, 1992). Structural analyses lend themselves to the development of new measures. For example, one might examine a measure of interest differentiation by developing quantitative measures of the number of extremely high or extremely low scores vs. scores near the midpoints and evaluate the implications of such high differentiation for educational and career decision making. Other approaches to differentiation and interest diversity may be found in the works of Gaeddert and Hansen (1997) and of Leung, Conoley, Scheel, & Sonnenberg (1992). We have already demonstrated in the previous section how it is possible to use structural analyses to identify academic major groups into reliable clusters based on JVIS results obtained at an earlier stage. It would be useful to identify the interests even earlier in the high school years to examine longer-term predictive patterns (cf. Care, 1996).

Studies of the longer-term implications of interests on vocational choice and satisfaction. L. Jackson (1983) investigated the JVIS career interests of engineers who were tested while in high school and followed up after university graduation more than six years later. Using structural equation modeling, Jackson found that stronger engineering interests as reflected both in a higher Engineering basic interest scale score and a higher similarity to the engineer occupational cluster was predictive of the choice of a more technical career choice (some engineering graduates selected occupations in sales or administration, while others chose more traditionally technical engineering careers). The opportunities for other similar studies are limitless, with the main constraints the costs and the time required.

Studies of the interests of persons with disabilities. Persons with disabilities and those receiving rehabilitation counseling pose a particular counseling challenge. Career placement and satisfaction is important for these groups. A review of studies in this area can be found in Klein, Wheaton and Wilson (1997). Illustrative studies are those by Porch and Schullen (1998) on psychosis-prone individuals, and by Rohe

and Krause (1999) on persons suffering the effects of traumatic spinal cord injury. A theoretical perspective is provided by Lowman (1997).

Studies in the career interests of women. This is an active area of contemporary research and theorizing. Betz (1993) addresses counseling issues in the use of interest measures for females and discusses possible sources of bias. Hatcher (1991) has studied female executives, while Matzeder and Krieshok (1995) have investigated career self-efficacy in the context of competing work and home role demands. Others have gone beyond the issue of main effects in sex differences in interests, examining interactions (Schulenberg, Goldstein, & Vondracek 1992) and differences in structure (Hansen, Collins, Swanson, & Fouad, 1993).

Studies of interests and career development over the life span. The bulk of research is conducted on younger individuals, but careers normally span a lifetime. Oleski and Subich (1996) have examined the issue of interest and career in a sample of adults, while Swanson (1999) offers a thoughtful perspective and review of the issue of interest stability and change over the course of adulthood.

Studies of cross-cultural and ethnic diversity of career interests. The use of measures developed in one country with national and ethnic groups that differ importantly from the original standardization sample remains a matter of concern. A few investigators have looked at national differences. For example, Fouad and Dancer (1992) compared samples from Mexico and the United States, and Tracey, Watanabe, and Schneider (1997) compared American and Japanese college students interest patterns.

Others have studied the interests of racially and ethnically diverse populations in the United States, including Park and Harrison (1995) who studied Asian-Americans, as did Tang and Smith (1999). In a comprehensive study, Day and Rounds (1998) found a remarkably similar structure for large samples of major U.S. ethnic subgroups.

Studies of the gifted or unusually creative. This has been an area of particular research activity. Lubinski, Benbow, and Ryan (1995) undertook a 15-year longitudinal study of interests with a highly intellectually gifted population, finding considerable stability for major themes. Helson (1997) considered the long-standing hypothesis that gifted individuals were multipotential in their career interests and abilities, implying that the gifted individual could undertake a wide variety of career paths. Her findings challenged this traditional view by showing that most gifted individuals exhibited differentiated interests and abilities. Helson (1997) showed that highly creative individuals differed in important ways in personality and interests from their peers.

Studies of rated vs. measured interests. This remains a controversial area, with some authorities arguing that expressed and measured interests are about equal in their predictive power. The weight of the evidence suggests that these are different domains, with one adding incrementally to the other in predictive power. Athanasou and Cooksey (1993) provide a worthwhile review of studies examining the degree of overlap and also refer to studies evaluating the variation in ability of individuals to estimate their own interests.

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JVIS Items by Scale

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Creative Arts

p(m)	p(f)	r(orig)	r	#	Item
60	67	69	56	1A	Making unusual glass vases.
68	51	73	36	4A	Designing furniture.
53	48	70	45	7A	Artistically painting sets for a play.
22	60	68	54	10A	Weaving rugs with unusual designs.
39	50	73	59	13A	Crafting unusual picture frames.
59	71	75	52	16A	Making decorative tiles.
69	65	68	51	19A	Carving animals out of wood.
35	54	70	65	22A	Creating unusual dishware on a pottery wheel.
27	50	74	50	25A	Fashioning interesting jewelry.
33	35	68	59	28A	Making decorative wrought iron.
49	32	71	54	31A	Making sculptured designs from plastic.
44	56	68	33	34A	Creating artistic greeting cards.
46	59	73	51	37A	Making artistic candles.
61	65	71	57	40A	Making prints with a silk-screen technique.
36	42	65	51	43A	Modeling with clay.
43	39	70	46	46A	Sketching.
32	30	69	43	49A	Designing a stained glass window.

Performing Arts

p(m)	p(f)	r(orig)	r	#	Item
66	57	66	57	2A	Becoming a recording star.
70	49	69	47	5A	Playing the romantic lead in a Hollywood film.
67	44	66	53	8A	Acting in a television comedy.
32	60	62	41	11A	Memorizing lines for a play.
33	28	65	47	14A	Starring in a low-budget movie.
38	45	71	48	17A	Starring in an opera.

1. Abbreviations of headings are as follows:

p(m) and p(f)—proportion of males (m) (N=1250) and females (f) (N=1250) endorsing the designated item pair member. Note that an item's endorsement values are in inverse proportional relation to the other item in the pair.

r(orig)—correlation of the item with the factor from the scale derivation sample before item pairing (single stimuli) (decimals omitted).

r—item-total point biserial correlations from a sample of 2500 respondents, 1250 males and 1250 females (decimals omitted). Note that the correlation for an item is affected by the other item in the pair. In general, if two items in a pair come from highly related constructs, the item-total correlations for the two items will be lower than if items were presented as single stimuli.

refers to the item number in the JVIS booklet.

58	68	72	45	20A	Appearing on a talent show.
33	40	87	59	23A	Trying out for a role in a stage production.
41	43	79	54	26A	Learning theatrical gestures for a play.
26	36	73	41	29A	Performing in one of Shakespeare's plays.
61	56	71	56	32A	Taking a screen test for the movies.
63	56	65	16	35A	Playing an instrument in a concert band.
46	40	63	47	38A	Rehearsing with a band.
77	71	64	40	41A	Perfecting a nightclub act.
51	38	65	48	44A	Playing the electric guitar in a popular band.
56	49	70	58	47A	Acting in a movie.
14	24	68	39	50A	Singing in a musical.

Mathematics

p(m)	p(f)	r(orig)	r	#	Item
48	29	99	61	3A	Expressing the mathematical relationship between two objects.
37	14	99	61	6A	Forming one system of equations from isolated discoveries in calculus.
40	20	99	64	9A	Spending spare time 'playing' with difficult algebra problems.
29	33	99	48	12A	Developing unusual mathematical problems for use in a textbook.
41	26	99	69	15A	Studying the proof of a complex mathematics problem.
58	41	99	55	18A	Explaining the applications of trigonometry to navigation.
64	52	99	57	21A	Describing the flight of an airplane in terms of a mathematical formula.
38	26	99	61	24A	Reasoning with numbers on an abstract level.
39	37	99	48	27A	Reading a book on mathematical theory.
41	27	99	66	30A	Expressing the theory of motion using a mathematical formula.
24	20	99	52	33A	Presenting a new derivation at a meeting of mathematicians.
43	20	99	64	36A	Using geometry to determine the volume of a pyramid.
40	26	99	58	39A	Learning a new branch of mathematics.
40	28	99	65	42A	Exploring new aspects of mathematical theory.
51	47	99	41	45A	Thinking of new ways to use numbers to solve practical problems.
27	17	99	55	48A	Developing a mathematical equation to represent a line on a graph.
26	16	99	54	51A	Describing the nature of mathematical reasoning.

Physical Science

p(m)	p(f)	r(orig)	r	#	Item
43	23	74	62	52A	Investigating the characteristics of electrons in the upper atmosphere.
54	17	73	58	56A	Doing research on the energy levels of various elements.
43	20	80	64	60A	Conducting laboratory experiments on sub-atomic particles.
38	43	60	50	64A	Explaining how atoms are joined to make molecules.
52	44	47	46	68A	Explaining long-term changes in a country's climate.
48	35	74	58	72A	Planning a study of high frequency sound waves.
60	52	64	51	76A	Discussing the discoveries of famous chemists.
41	24	72	66	80A	Using an atom smasher to study small particles.
49	23	68	66	84A	Studying the effects of electricity upon chemical reactions.
52	38	67	56	88A	Predicting the movement of a comet.
40	31	58	46	92A	Analyzing information on the behavior of ocean currents.
48	25	53	52	96A	Investigating the movements of arctic ice packs.
38	20	70	56	100A	Studying the properties of a new chemical element.
66	56	76	40	104A	Observing the behavior of metals at low temperatures.
24	22	67	48	108A	Analyzing the chemical composition of unusual rocks.

42	29	59	54	112A	Using special instruments to identify gases present on other planets.
29	18	73	60	116A	Joining a staff of scientists engaged in atomic research.

Engineering

p(m)	p(f)	r(orig)	r	#	Item
44	15	64	57	53A	Devising procedures for evaluating electronic equipment.
57	17	58	52	57A	Planning railway tracks so that all trains will clear each other.
61	27	62	53	61A	Making tests to be sure the ground is solid enough to support a large building.
47	35	67	51	65A	Designing chemical plant equipment.
55	35	74	57	69A	Coordinating facilities for transmitting electric power to consumers.
77	37	58	58	73A	Soundproofing the offices in a medical building.
63	41	75	63	77A	Designing a cooling system for a petroleum plant.
48	33	63	54	81A	Developing methods for eliminating background noise in communication systems.
51	24	78	64	85A	Selecting the proper materials for constructing a chemical plant.
54	37	63	44	89A	Developing more efficient telephone equipment systems.
47	16	63	61	93A	Preparing exact plans for the construction of major highways.
54	21	69	49	97A	Planning the location and construction of mine shafts and tunnels.
34	15	62	44	101A	Designing a sewage system.
54	33	77	49	105A	Calculating the amount of electric wiring needed in an office building.
32	24	62	40	109A	Devising an instrument panel for an airplane.
51	55	50	20	113A	Designing a large lecture room to make efficient use of space.
53	27	60	59	117A	Designing an expansion bridge.

Life Science

p(m)	p(f)	r(orig)	r	#	Item
49	47	86	55	54A	Investigating cell division in microscopic organisms.
38	21	74	49	58A	Analyzing the role of salt concentration on seaweed growth.
41	25	82	48	62A	Explaining how bacteria maintain shellfish populations.
47	59	73	60	66A	Studying the life cycle of certain species of tropical insects.
45	77	88	37	70A	Studying the structure of the eyes of frogs.
65	59	79	54	74A	Comparing the development of teeth among different animals.
56	49	87	60	78A	Doing research on the natural enemies of certain snails.
39	42	74	54	82A	Identifying migratory habits of insects.
39	37	84	63	86A	Comparing the body heat conservation of raccoons and otters.
50	43	85	60	90A	Studying the hearing system of bats.
26	26	76	60	94A	Observing the effects of limiting water intake on rats.
51	40	83	49	98A	Examining the bone structure of seals.
57	52	75	54	102A	Cross-breeding plants in a laboratory experiment.
53	47	85	62	106A	Classifying a newly discovered plant fossil.
35	39	71	47	110A	Seeking to develop a living virus from non-living matter.
29	34	70	45	114A	Observing the effects of a special diet on research animals.
22	18	78	49	118A	Comparing radiation damage in different types of animals cells.

Social Science

p(m)	p(f)	r(orig)	r	#	Item
48	31	58	41	55A	Studying the effects of modern industry upon primitive peoples.
57	51	75	35	59A	Investigating the causes of social unrest in cities.
58	68	68	42	63A	Exploring the ways family members influence one another.

50	65	55	42	67A	Gathering information on why cities attract rural people.
51	30	60	40	71A	Investigating the effect of propaganda on enemy soldiers.
64	78	68	45	75A	Analyzing the relationships between personality and language.
55	58	61	55	79A	Investigating the effects of geographic isolation upon language.
39	44	71	54	83A	Surveying the cultural differences between two nations.
54	70	65	37	87A	Investigating the causes of juvenile delinquency.
40	50	77	52	91A	Analyzing the class structure of a society.
54	51	58	38	95A	Compiling data on urban slum conditions.
46	50	57	45	99A	Studying the religious attitudes of the world's peoples.
43	62	58	42	103A	Discussing the ways culture affects personality.
71	55	55	11	107A	Investigating employee attitudes toward work.
51	56	76	34	111A	Studying the influence of income on personality.
25	35	61	43	115A	Studying family structures in rural areas.
21	32	65	41	119A	Analyzing the effects of group pressures on a person's actions.

Adventure

p(m)	p(f)	r(orig)	r	#	Item
68	33	75	57	120A	Test-flying new airplanes.
76	46	73	46	123A	Driving speed boats.
74	47	65	58	126A	Joining a snow rescue team.
66	64	71	50	129A	Leading an expedition to a remote part of the world.
68	55	70	64	132A	Testing canoes by taking them through swift rapids.
77	66	60	56	135A	Teaching people how to mountain climb.
69	59	59	57	138A	Flying a small plane in an air circus.
69	41	63	64	141A	Piloting a jet airliner.
69	35	63	52	144A	Driving in a stock car race.
61	52	60	54	147A	Guiding a medical team up the Amazon river.
76	68	65	62	150A	Sky diving.
66	40	66	46	153A	Testing a surfboard in rough water.
51	63	62	36	156A	Working with a television crew in Africa.
70	66	64	52	159A	Diving for pearls.
73	65	70	51	162A	Exploring remote parts of the world.
63	48	65	61	165A	Exploring an unmapped cave.
42	38	70	48	168A	Sailing a small boat around the world.

Nature-Agriculture

p(m)	p(f)	r(orig)	r	#	Item
42	39	66	52	121A	Caring for a cherry orchard.
61	37	62	41	124A	Running a vegetable farm.
35	21	66	45	127A	Bird watching.
51	48	78	61	130A	Raising fish at a hatchery.
44	33	64	37	133A	Protecting crops from insects and disease.
26	30	64	50	136A	Inspecting and grading eggs.
26	21	78	51	139A	Raising berries for commercial use.
43	54	71	60	142A	Working in a greenhouse.
46	44	75	56	145A	Lighting smudge pots to keep frost off fruit trees.
34	44	68	57	148A	Raising flowers for plant shows and exhibitions.
31	35	84	59	151A	Raising dairy cows to produce milk and milk products.
30	26	82	43	154A	Feeding and caring for beef cattle.

56	58	78	50	157A	Planting trees in a reforestation project.
45	38	91	59	160A	Raising turkeys.
23	21	71	40	163A	Helping to harvest a wheat crop.
51	38	69	49	166A	Restocking lakes and ponds with fish.
27	15	62	41	169A	Checking campsites for smoldering fires.

Skilled Trades

p(m)	p(f)	r(orig)	r	#	Item
22	18	70	50	122A	Painting furniture pieces in a factory.
51	15	70	51	125A	Assembling small tools at a factory.
47	12	79	49	128A	Servicing television sets.
33	42	77	50	131A	Laying the tiles in an apartment building.
33	16	93	55	134A	Installing the upholstery in cars in an assembly plant.
37	19	68	46	137A	Buffing the floors of an office building.
36	32	62	37	140A	Running a machine that makes lace trim.
34	24	56	49	143A	Making the strings for musical instruments.
23	35	56	48	146A	Making draperies for restaurants.
21	14	72	47	149A	Operating power looms in a textile factory.
24	37	64	31	152A	Making plastic false teeth from molds.
46	48	84	41	155A	Polishing prescription contact lenses.
40	28	78	51	158A	Operating equipment for manufacturing toys.
23	33	79	51	161A	Operating a stitching machine to make purses and gloves.
26	15	77	44	164A	Reading electric meters for a power company.
34	38	68	39	167A	Printing business cards for customers.
25	10	79	49	170A	Servicing customers' appliances.

Personal Service

p(m)	p(f)	r(orig)	r	#	Item
53	42	52	38	171A	Mixing drinks in a neighborhood restaurant.
55	38	69	18	175A	Arranging transportation and accommodation for groups of tourists.
67	44	66	18	179A	Planning recreational activities for passengers on a cruise ship.
24	56	61	51	183A	Fitting and altering garments in a clothing store.
26	69	61	55	187A	Helping a client plan a beauty treatment.
59	63	78	32	191A	Giving haircuts to customers.
14	61	59	43	195A	Working in a beauty shop.
60	79	81	52	199A	Arranging parties and other services for guests at a resort hotel.
41	70	62	54	203A	Helping to select accessories to match a customer's clothing.
21	36	54	29	207A	Fitting special shoes for disabled children.
59	72	51	48	211A	Assisting customers with body conditioning exercises in an athletic club.
46	51	55	42	215A	Photographing people for passports.
39	44	63	49	219A	Seeing that airline passengers are safe and comfortable during a flight.
71	73	54	45	223A	Giving body massages to clients in a health studio.
35	42	57	30	227A	Receiving and directing clients coming into a large office building.
46	50	62	33	231A	Describing points of interest to a tour group.
28	33	60	28	235A	Planning a welcome party for foreign visitors at a trade show.

Family Activity

p(m)	p(f)	r(orig)	r	#	Item
50	63	64	41	172A	Reading a bedtime story to a child.
64	30	51	25	176A	Working outdoors with the family to keep the yard clean.
62	46	59	28	180A	Accompanying the family on a drive in the country.
47	72	55	51	184A	Refinishing an old piece of furniture as a family project.
47	58	61	39	188A	Organizing a kitchen efficiently.
71	72	68	19	192A	Planning the menu for a late dinner party.
44	66	57	46	196A	Attractively arranging a group of family pictures.
51	77	51	54	200A	Redecorating a summer cottage.
51	62	64	56	204A	Rearranging living room furniture.
33	49	51	53	208A	Creating an attractive backyard flower garden.
48	69	57	58	212A	Painting a room in bright colors for a child.
57	60	51	43	216A	Experimenting with unusual food recipes.
50	55	59	53	220A	Remodeling the basement into a family room.
70	74	53	42	224A	Doing the weekly shopping.
40	58	58	46	228A	Preparing an unusual meal.
44	54	74	42	232A	Keeping a home looking attractive.
37	49	54	41	236A	Taking the family to a nearby lake.

Medical Service

p(m)	p(f)	r(orig)	r	#	Item
44	40	86	45	173A	Taking someone's pulse.
56	35	98	57	177A	Sewing up a skin wound with surgical stitches.
48	41	83	63	181A	Cleaning wounds.
41	56	99	60	185A	Changing surgical dressings.
36	42	89	45	189A	Studying a medical journal.
46	41	85	63	193A	Giving drugs with a hypodermic needle.
42	47	93	69	197A	Drawing blood from patients.
35	48	87	63	201A	Listening for a heart condition.
30	39	99	70	205A	'Hooking up' a patient to an artificial kidney machine.
46	44	88	60	209A	Performing a skin graft operation.
31	32	97	70	213A	Removing a patient's appendix.
33	34	99	60	217A	Removing surgical stitches.
45	45	88	65	221A	Examining a patient.
54	40	86	43	225A	Freezing a patient's mouth before a tooth is extracted.
39	52	80	56	229A	Administering medicine.
42	41	84	64	233A	Setting a broken leg.
26	26	83	64	237A	Performing surgery.

Dominant Leadership

p(m)	p(f)	r(orig)	r	#	Item
52	34	54	46	174A	Making strong demands for performance from workers.
67	36	62	51	178A	Giving orders and expecting them to be obeyed.
51	35	62	49	182A	Asserting authority.
47	46	64	41	186A	Discharging someone from a position for not doing a good job.
45	29	50	47	190A	Criticizing the work of others.
50	42	56	46	194A	Drawing attention to someone who has disobeyed orders.

49	36	64	50	198A	Reprimanding an employee for lateness.
37	26	72	51	202A	Giving orders to employees.
25	24	55	34	206A	Enforcing work regulations.
50	47	71	31	210A	Questioning an employee about misconduct.
53	50	53	30	214A	Being responsible for enforcing the law.
42	39	68	43	218A	Disciplining a group of uncooperative workers.
40	36	54	31	222A	Maintaining discipline within a group.
74	68	71	40	226A	Cross examining an employee who has made excuses for poor work.
42	38	65	36	230A	Having the power to decide about the work of other people.
39	27	57	49	234A	Giving commands and expecting them to be obeyed.
41	24	59	48	238A	Telling others what to do.

Job Security

p(m)	p(f)	r(orig)	r	#	Item
52	41	48	40	239A	Being very cautious in thought and action at work.
75	49	63	34	242A	Working for a large, stable organization rather than one with an uncertain future.
65	38	51	42	245A	Using only well established techniques at work.
48	65	52	38	248A	Participating only in business undertakings that are quite certain.
51	49	52	46	251A	Avoiding challenges that could mean the loss of a job.
59	62	38	31	254A	Preferring a job with established procedures to one requiring decisions on uncertain matters.
49	52	35	46	257A	Taking a job involving very little risk.
50	53	64	56	260A	Playing it safe in any job situation.
54	56	36	51	263A	Preferring a job I know I could handle to an unfamiliar one.
47	48	58	43	266A	Being very careful about topics of conversation in the presence of the boss.
33	47	49	36	269A	Hesitating to accept a dangerous job.
40	35	53	50	272A	Not taking chances when working.
39	36	58	41	275A	Carefully considering what I say on the job so as to avoid embarrassment.
59	60	36	49	278A	Undertaking tasks in which there is no possibility of failure.
40	46	63	27	281A	Considering security an important element in a job.
66	64	51	18	284A	Enjoying a position involving a definite future.
27	19	55	25	287A	Exercising caution and conservatism in the choice of a position.

Stamina

p(m)	p(f)	r(orig)	r	#	Item
61	47	64	36	240A	Discussing subjects which require concentrated thought.
67	54	59	37	243A	Working at tasks where stamina is needed.
66	47	73	46	246A	Working overtime to complete a project.
61	71	46	34	249A	Spending a great deal of time solving problems in my work.
46	41	62	52	252A	Doing more work than is necessary.
64	50	42	46	255A	Working for hours without stopping.
61	55	44	41	258A	Working under pressure.
57	60	66	42	261A	Pushing myself to work harder.
48	44	67	46	264A	Doing jobs requiring perseverance.
47	34	67	45	267A	Undertaking involved tasks where long effort is required.
55	72	69	40	270A	Putting forth more effort than is necessary.
72	61	61	36	273A	Exercising the mind with problems requiring concentration.
51	47	71	24	276A	Working hard at a job.
66	60	49	40	279A	Working longer hours than required.

47	53	70	30	282A	Getting very involved in my work.
42	38	50	24	285A	Working on several jobs without becoming tired.
43	35	70	30	288A	Working at a task until it is finished.

Accountability

p(m)	p(f)	r(orig)	r	#	Item
61	58	82	40	241A	Being polite to those with whom I have contact.
60	30	88	44	244A	Respecting coworkers' possessions.
71	46	82	31	247A	Respecting verbal as well as written agreements.
81	92	75	26	250A	Being considered a worker of high integrity.
59	62	72	45	253A	Missing work only when it is absolutely necessary.
84	79	72	27	256A	Earning the high regard of coworkers.
71	75	67	44	259A	Doing everything possible to avoid making an error in my work.
53	53	84	38	262A	Fulfilling obligations made to others.
62	62	69	44	265A	Always being on time for work.
49	48	81	40	268A	Repairing any damage I have done to someone else's property.
70	60	73	33	271A	Being held in high esteem by those with whom I work.
53	59	68	35	274A	Working only for companies that deal fairly with the public.
53	50	77	36	277A	Gaining a reputation for honesty in my work.
81	81	79	39	280A	Promptly repaying all loans of even a few cents.
35	40	85	34	283A	Remembering to return things borrowed from coworkers.
88	92	84	17	286A	Being considered trustworthy and responsible.
30	38	82	29	289A	Returning borrowed items on time.

Teaching

p(m)	p(f)	r(orig)	r	#	Item
40	33	59	34	1B	Attending a faculty meeting to decide on textbooks for the coming year.
34	43	61	33	2B	Discussing better teaching methods at a professional teachers' meeting.
52	71	56	44	3B	Planning lectures for high school courses.
57	77	58	52	52B	Teaching at a night school.
56	85	55	48	53B	Teaching students how to make creative use of their leisure time.
51	53	54	44	54B	Selecting new textbooks for a history class.
52	69	59	46	55B	Assisting students in selecting appropriate courses of study.
32	67	61	50	120B	Adapting teaching material to make it interesting.
58	61	68	43	121B	Assigning homework to students.
77	82	51	41	122B	Organizing field trips for students.
47	58	52	41	171B	Directing and supervising student research projects.
50	37	52	26	172B	Writing helpful comments on a student's test paper.
56	60	68	50	173B	Assisting student teachers who are practice teaching.
48	66	52	39	174B	Serving as faculty advisor to a student club.
48	59	62	44	239B	Answering students' questions on a particular subject.
39	53	49	36	240B	Suggesting a reference book to a student writing a report.
39	42	57	40	241B	Conducting informal discussions with interested students outside of class.

Social Service

p(m)	p(f)	r(orig)	r	#	Item
32	49	71	51	4B	Helping ex-patients of a mental hospital gain employment.
30	51	69	44	5B	Working in a treatment relationship with emotionally disturbed people.

63	86	66	44	6B	Collecting used clothing and articles for needy families.
46	83	80	61	56B	Organizing nursery school classes for needy children.
43	83	62	59	57B	Taking a child from a home where the parents are unable to care for it.
62	79	67	51	58B	Finding low-rent housing for families of the unemployed.
43	49	64	28	59B	Setting up training programs for prisoners.
24	54	66	59	123B	Helping handicapped people become interested in preparing for a career.
39	63	75	61	124B	Conducting workshops for disabled children.
49	85	67	61	125B	Placing physically handicapped children in proper schools.
45	62	64	51	175B	Helping alcoholics with their problem.
36	70	76	60	176B	Arranging for suitable foster homes for orphaned children.
44	65	68	44	177B	Arranging recreational activities at a mental hospital.
33	64	72	58	178B	Counseling families requiring the assistance of a social service agency.
25	51	64	58	242B	Counseling the family of a hospitalized patient.
33	46	67	49	243B	Helping ex-prisoners to secure necessary education or employment.
40	70	68	54	244B	Making the arrangements for a childless couple to adopt a baby.

Elementary Education

p(m)	p(f)	r(orig)	r	#	Item
47	52	61	33	7B	Playing records and having young students sing along.
33	56	72	37	8B	Teaching children how to write.
60	80	55	39	9B	Correcting spelling errors on a pupil's lesson.
57	80	64	58	60B	Instructing school-age children.
39	73	58	60	61B	Helping young people draw pictures of farm animals.
59	75	54	52	62B	Using children's blocks to demonstrate simple arithmetic.
42	32	59	26	63B	Having students play educational classroom games.
26	53	67	57	126B	Explaining to young students how to tell time.
65	79	68	46	127B	Teaching young people how to add and subtract.
53	88	64	54	128B	Teaching students to read.
33	56	61	50	179B	Having young children act out a fairy tale in a class.
38	54	64	48	180B	Teaching a variety of simple subjects to young children.
52	59	66	44	181B	Holding a spelling bee for school children.
49	65	62	53	182B	Teaching children how to count money.
35	62	55	51	245B	Teaching children to read and write a second language.
34	53	63	59	246B	Having children take part in a class project.
29	54	60	56	247B	Showing children how to paste pictures in a scrapbook.

Finance

p(m)	p(f)	r(orig)	r	#	Item
78	40	80	62	10B	Buying and selling stocks for a client.
68	40	80	52	11B	Investigating the possibility of buying foreign bonds.
71	67	76	38	12B	Studying a company's history of financial growth.
62	57	80	47	64B	Deciding whether or not to invest in municipal bonds.
53	65	84	49	65B	Arranging for the refinancing of a corporation loan.
53	41	74	61	66B	Setting the interest rate on bank deposits.
50	35	81	56	67B	Managing the funds of an international exchange bank.
34	36	78	46	129B	Providing the clients with information on investment opportunities.
49	52	77	59	130B	Making detailed financial studies for stock brokers.
67	58	80	57	131B	Buying business securities for a large bank.
76	44	75	51	183B	Deciding on proper investments for an employee's pension fund.

53	28	77	63	184B	Bidding for shares of stock on a stock exchange.
59	44	81	53	185B	Arranging to finance a new mutual fund.
53	54	80	32	186B	Judging whether or not a business stock is priced too high.
52	65	80	43	248B	Predicting future price changes in a business stock.
39	29	80	49	249B	Deciding the investment policies of a city bank.
19	08	73	39	250B	Trading in financial securities.

Business

p(m)	p(f)	r(orig)	r	#	Item
61	50	66	40	13B	Ordering new supplies for a store.
67	72	44	31	14B	Serving as assistant to the head of a large firm.
59	74	52	35	15B	Corresponding with customers by mail.
48	56	69	47	68B	Holding a sales contest to boost a newspaper's circulation.
45	65	63	43	69B	Assigning insurance salesmen to certain areas.
55	23	56	37	70B	Applying for a city building permit.
49	70	53	40	71B	Managing the food services of a large resort hotel.
32	45	66	42	132B	Planning the work flow chart for various departments of an industrial firm.
56	67	53	47	133B	Managing a municipal fruit and vegetable market.
67	84	57	35	134B	Arranging for competitive bids on refurnishing an office.
74	31	63	23	187B	Establishing departmental operating budgets.
53	42	52	38	188B	Taking charge of the shoe department in a large store.
64	58	53	35	189B	Developing and promoting a new breakfast cereal.
55	71	51	25	190B	Directing a municipal low-rent housing program.
49	51	65	37	251B	Arranging the timetable for a business conference.
54	59	60	41	252B	Being business manager of a magazine.
41	38	53	40	253B	Reviewing transfers and promotions of employees.

Office Work

p(m)	p(f)	r(orig)	r	#	Item
41	29	99	45	16B	Running a photocopier in an office.
62	55	89	44	17B	Typing reports from employees' work records.
42	59	99	49	18B	Stapling pages of a business circular.
52	65	91	47	72B	Billing clients for service.
23	63	95	47	73B	Taking telephone messages.
35	41	99	61	74B	Sorting mail.
36	22	86	48	75B	Entering numbers into a computer terminal.
23	34	94	56	135B	Filing accounts in numerical order.
74	70	92	31	136B	Bringing customer accounts up to date.
63	81	74	23	137B	Composing and typing routine business letters.
41	37	99	46	191B	Addressing envelopes.
29	28	89	45	192B	Arranging names in alphabetical order.
54	59	92	45	193B	Putting price tags on merchandise.
50	58	85	26	194B	Tabulating the charges for a rented car.
41	38	76	30	254B	Taking stock count of all office supplies on hand.
36	50	77	36	255B	Opening office mail.
16	21	82	38	256B	Locating information in a filing cabinet.

Sales

p(m)	p(f)	r(orig)	r	#	Item
31	35	56	50	19B	Selling merchandise to customers by telephone.
42	32	58	32	20B	Receiving sales commissions rather than salaried income.
36	48	70	45	21B	Demonstrating a vacuum cleaner to prospective buyers.
40	48	70	54	76B	Selling magazine subscriptions in different cities.
37	59	86	55	77B	Selling group insurance to a company.
44	51	85	54	78B	Calling on a couple interested in buying dinnerware.
45	42	59	51	79B	Explaining the advantages of fire insurance to merchants.
31	41	61	43	138B	Convincing a homeowner to buy aluminum siding.
74	79	52	40	139B	Showing a house to interested buyers.
64	68	61	37	140B	Selling shoes in a large department store.
86	39	55	08	195B	Demonstrating camera equipment for a department store.
56	34	59	32	196B	Working in the sales department of a publishing company.
58	53	75	48	197B	Working as a sales representative for a telephone company.
51	64	59	27	198B	Introducing people to new home products.
51	48	72	36	257B	Becoming sales representative for a retail business.
39	45	54	25	258B	Selling drug supplies to a drug store.
29	25	69	37	259B	Selling real estate.

Supervision

p(m)	p(f)	r(orig)	r	#	Item
65	46	58	52	22B	Interpreting company policy to new workers.
67	60	52	45	23B	Being responsible for employee promotions and transfers.
62	74	42	39	24B	Reviewing purchase orders prepared by staff members.
59	76	49	44	80B	Discussing vacation schedules with workers.
52	67	61	48	81B	Deciding about salary increases for employees.
61	58	42	48	82B	Coordinating the activities of workers who process chemicals.
61	56	64	46	83B	Interviewing applicants for an important position.
31	59	54	43	141B	Explaining a job order to an employee.
57	46	47	54	142B	Establishing work standards according to typical workers' performance.
66	76	66	53	143B	Reviewing the work records of a number of employees.
40	21	64	24	199B	Coordinating activities of all departments in an industrial organization.
49	23	60	40	200B	Finding new ways to get workers to be more efficient.
65	52	57	49	201B	Checking an employee's work to see if it meets certain standards.
63	74	44	09	202B	Supervising a new employee learning to use office equipment.
50	47	60	23	260B	Describing job duties to a temporary worker.
43	40	64	32	261B	Explaining to an employee how performance can be improved.
47	47	50	35	262B	Coordinating the work of several people to complete a job on time.

Human Relations Management

p(m)	p(f)	r(orig)	r	#	Item
73	50	57	40	25B	Convincing a company board of directors not to dismiss an executive.
59	57	50	41	26B	Addressing community groups to promote a city's counseling services.
61	63	52	46	27B	Speaking at a political convention to promote votes for a candidate.
51	77	53	46	84B	Greeting and introducing guests at a political meeting.
49	76	52	42	85B	Convincing students to cooperate with university council decisions.
61	63	56	50	86B	Acting as representative for groups of consumers seeking lower food costs.

46	30	57	33	87B	Meeting with workers to resolve their complaints.
31	65	46	33	144B	Convincing city planners of the need for more public parks.
54	56	50	54	145B	Seeking the cooperation of the community to accept a new school tax.
77	65	45	48	146B	Participating in public discussions of consumers' rights.
59	30	51	42	203B	Serving as campaign manager in a political campaign.
49	38	53	49	204B	Representing a school board in discussions with dissatisfied parents.
70	61	62	38	205B	Attending meetings to discuss wage raises for employees.
75	76	56	29	206B	Talking to employees to encourage higher productivity.
46	44	46	37	263B	Organizing activities to raise the morale of the employees.
52	56	51	33	264B	Convincing an employer that a job applicant is reliable and honest.
38	38	60	34	265B	Encouraging dissatisfied employees to present their views to the manager.

Law

p(m)	p(f)	r(orig)	r	#	Item
67	65	76	57	28B	Representing a client against an insurance company seeking a settlement.
74	64	72	47	29B	Prosecuting in court a man accused of fraud.
59	73	82	41	30B	Writing a legal description of property for a deed.
48	62	68	44	88B	Preparing a last will and testament for a client.
46	63	76	34	89B	Examining official records to determine ownership of land.
50	57	67	56	90B	Preparing the required legal documents for a transfer of property.
60	50	75	52	91B	Advising officers of a corporation as to whether they can win a law suit.
39	48	65	50	147B	Ruling on the admissibility of evidence in court cases.
66	56	78	57	148B	Preparing the legal aspects of an application for a patent.
79	86	68	43	149B	Maintaining order in the courtroom during a highly emotional trial.
79	64	71	48	207B	Defending a client against a criminal charge.
67	51	71	57	208B	Arranging to have experts testify in court on behalf of a client.
54	56	68	35	209B	Building up a collection of law books.
50	53	67	38	210B	Protecting a newspaper against lawsuit.
53	52	64	43	266B	Advising a client as to whether to sue another person.
53	66	70	51	267B	Preparing the witnesses and gathering the evidence to be presented in a court trial.
51	52	66	55	268B	Cross-examining court witnesses in an accident case.

Professional Advising

p(m)	p(f)	r(orig)	r	#	Item
51	68	50	48	31B	Managing the sales campaign of a cosmetics company.
39	44	54	33	32B	Serving on a citizens' advisory committee.
76	80	52	32	33B	Providing a firm with a budget analysis.
60	69	31	23	92B	Coaching a professional swimming team.
53	84	42	35	93B	Counseling an editor on where to advertise.
74	74	49	53	94B	Providing a company with advice on better business methods.
46	49	41	37	95B	Representing a private citizens' group.
24	32	48	38	150B	Providing manufacturers with surveys of public buying habits.
69	65	67	45	151B	Suggesting ways to raise a corporation's sales volume.
76	63	48	29	152B	Giving golf instructions at a country club.
41	28	38	39	211B	Offering national leaders advice on the public's political mood.
52	31	45	40	212B	Recommending to national leaders improvements in the welfare system.
69	68	46	40	213B	Aiding toy manufacturers with information of buying trends.
47	50	44	39	214B	Showing a large firm how to cut production costs.

67	53	47	31	269B	Suggesting more efficient production methods to plant managers.
45	28	45	25	270B	Heading an independent panel of automobile safety experts.
30	40	29	14	271B	Advising the public of the health dangers of polluted water.

Author-Journalism

p(m)	p(f)	r(orig)	r	#	Item
56	44	85	44	34B	Writing scripts for television dramas.
37	44	76	40	35B	Writing plays for amateur theater.
57	80	67	46	36B	Editing the biography of a famous writer.
52	75	61	51	96B	Publishing stories about famous people.
46	79	67	55	97B	Working to bring characters to life in a novel.
49	60	73	59	98B	Re-writing a short story for publication.
54	50	67	28	99B	Editing news stories for radio.
34	60	68	50	153B	Writing mystery novels.
70	74	71	49	154B	Writing comedy sketches for a children's television show.
54	52	69	51	155B	Preparing a book on historical fiction.
54	49	74	49	215B	Writing newspaper editorials.
43	40	61	31	216B	Jotting descriptive notes to accompany news photographs.
67	66	62	49	217B	Writing the script for a motion picture cartoon.
58	61	82	52	218B	Writing movie screen plays.
60	65	73	50	272B	Writing adventure stories for young people.
28	39	69	59	273B	Writing major novels.
47	41	62	42	274B	Developing plots for television comedies.

Academic Achievement

p(m)	p(f)	r(orig)	r	#	Item
54	41	59	47	37B	Attending lectures on academic subjects.
54	60	68	44	38B	Putting forth the best effort possible in studies.
60	74	64	17	39B	Doing extra reading for a project.
62	80	60	30	100B	Having read all necessary material for a course or project.
66	85	56	43	101B	Using spare time for learning new facts.
43	48	60	43	102B	Coordinating facts from different reference books.
57	38	62	24	103B	Working at a challenging assignment.
49	37	71	42	156B	Learning as much information as possible.
44	42	61	50	157B	Studying an academic subject.
60	72	64	49	158B	Thoroughly learning material before going on to a new topic.
61	56	54	50	219B	Studying in order to reach a long-term goal.
50	45	59	43	220B	Participating in thoughtful discussions with experts.
55	55	52	38	221B	Organizing study time so that it is spent efficiently.
60	64	64	34	222B	Being especially accurate in completing an assigned task.
61	64	65	32	275B	Discussing intellectual topics with others.
49	53	61	32	276B	Working on an assignment until it is completed.
47	50	67	24	277B	Learning new things.

Technical Writing

p(m)	p(f)	r(orig)	r	#	Item
39	35	56	36	40B	Writing a summary of the minutes of a business meeting.
23	29	62	39	41B	Compiling a dictionary of current English usage.

60	72	64	18	42B	Writing a magazine article on how to make leather goods for personal use.
34	44	85	48	104B	Writing a scholarly history of a merchant navy.
46	67	63	43	105B	Writing an account of the economic policies of a large company.
47	53	59	31	106B	Compiling a list of business terms and their meanings.
29	45	61	26	107B	Defining words for a dictionary.
30	34	58	51	159B	Writing a research paper to be read at a professional convention.
55	62	66	39	160B	Compiling a list of definitions for an accounting textbook.
77	67	60	39	161B	Authoring an article on the financial situation of a particular country.
29	27	60	38	223B	Writing a medical textbook.
30	26	62	51	224B	Writing historical introductions for books by famous authors.
46	60	73	46	225B	Translating the works of an ancient poet into English.
26	32	71	41	226B	Writing entries for an encyclopedia.
41	40	53	38	278B	Writing an official pamphlet outlining driving laws.
34	40	58	37	279B	Recording the history of the Indian tribes in North America.
19	19	59	42	280B	Writing the biography of a 19th century statesman.

Independence

p(m)	p(f)	r(orig)	r	#	Item
64	58	70	34	43B	Being independent of others at work.
49	62	73	22	44B	Organizing my work projects on my own.
49	53	42	35	45B	Being called unconventional by those at work.
76	78	67	44	108B	Having to rely on my own judgment, rather than the advice of others.
68	76	60	47	109B	Having a job where I don't have to answer to anyone.
65	61	46	47	110B	Working without specific directions.
49	44	70	26	111B	Protesting unfair work policy.
27	35	73	32	162B	Being on my own to complete an assignment.
77	79	55	44	163B	Following my own set of rules.
74	85	52	27	164B	Expressing what might be called extreme ideas.
65	58	58	34	227B	Working alone on an important project.
60	42	72	34	228B	Independently solving problems at work.
61	48	60	42	229B	Stating sincere disagreement with a supervisor's policy.
58	62	62	26	230B	Working where there are no strict rules.
60	54	73	43	281B	Strongly preferring to work in my own way.
53	47	78	33	282B	Defending my own ideas on how a job should be done.
65	60	72	36	283B	Working without close supervision.

Planfulness

p(m)	p(f)	r(orig)	r	#	Item
57	61	65	43	46B	Rarely being late.
44	51	65	45	47B	Strongly preferring an uncluttered work room.
73	83	53	24	48B	Planning the amount of time spent on each work activity.
58	71	64	48	112B	Having a systematic method for doing work.
49	45	67	45	113B	Always putting tools back in place after use.
71	66	47	47	114B	Often completing a task ahead of time.
75	65	74	44	115B	Keeping all important things in place.
37	52	69	54	165B	Remembering to complete all on-the-job assignments.
49	62	71	57	166B	Keeping a neat work area.
66	62	46	32	167B	Keeping an accurate record of expenses.
54	50	53	48	231B	Keeping important papers in a safe place.

56	46	71	32	232B	Organizing my work before I start it.
58	59	46	42	233B	Making each minute of work time count.
61	73	53	25	234B	Easily finding things when needed.
34	36	68	30	284B	Completing work on time.
58	62	62	36	285B	Always remembering appointments or meetings.
12	08	44	14	286B	Neatly arranging work tools.

Interpersonal Confidence

p(m)	p(f)	r(orig)	r	#	Item
68	70	61	41	49B	Considering myself an interesting person.
86	76	66	30	50B	Feeling confident in unfamiliar surroundings.
74	84	57	36	51B	Acting as ‘official host’ for a large organization.
71	82	64	45	116B	Making a good leader of coworkers.
47	73	62	48	117B	Striking up conversations with supervisors.
78	82	63	51	118B	Feeling at ease during job interviews.
79	68	64	29	119B	Feeling confident when learning a new task.
58	62	66	36	168B	Remaining calm in awkward situations.
73	85	53	45	169B	Talking easily with others.
75	90	54	44	170B	Directing coworkers without feeling self-conscious.
72	67	68	37	235B	Feeling comfortable about meeting new workers.
63	51	62	37	236B	Making a better leader than a follower.
74	74	65	39	237B	Feeling confident in strange work situations.
59	76	65	26	238B	Preferring jobs involving meeting others.
73	81	70	37	287B	Feeling socially at ease.
57	65	62	36	288B	Believing that I possess valuable personal qualities for work.
70	62	70	36	289B	Being a leader at work.

SIGMA Assessment Systems, Inc.
P.O. Box 610757, Port Huron, MI 48061-0757

Research Psychologists Press, Inc.
P.O. Box 3292, Station B, London, ON N6A 4K3