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Investigating the Feasibility of Using Vocational Interests in the Classification of Canadian Military Personnel

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A Thesis Submitted In Partial Fulfilment of the

Requirements for the Degree of Master of Science in

Applied Psychology

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No step in life, unless it may be the choice of a husband or wife, is more important than the choice of a vocation. The wise selection of the business, profession, trade, or occupation to which one's life is to be devoted and the development of full efficiency in the chosen field are matters of the deepest moment....These vital problems should be solved in a careful, scientific way, with due regard to each person's aptitudes, abilities, ambitions, resources, and limitations, and the relations of these elements to the conditions of success in different industries. (Frank Parsons, *Choosing a vocation*, 1909/1967, p. 3)

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Abstract

This study investigated the feasibility of using Holland's typology of vocational interests to classify military personnel. Data were obtained from Canadian Forces personnel (n = 1992) and from university students (n = 627). The Canadian Work Preference Inventory (CWPI) was used to measure vocational interests. This measure met psychometric criteria for use. There were no differences in the measure that could be related to Anglophone and Francophone cultural background, subjects form other cultural backgrounds, and male and female subjects.

Tests of a priori predictions about the differences of interests in military occupations and in academic faculties supported the validity of Holland's typology. As well, there was a relationship between a student's CWPI factor type and ratings of different Canadian Forces occupations. Typically, the CWPI factor which was significant in the rating was the CWPI factor that was predominant in the rated occupation. Discriminant analysis of the distribution of CWPI interest factors in military occupations essentially classified occupations into two types: those with a high Objective component, i.e. those of a "hands on" nature, and those with a low Objective component. Discriminant analysis of the five occupational families derived from ability based tests (Catano & Ibel, 1995) found that only the Objective factor discriminated among the occupational families.

Tests of Holland's theory of congruence, i.e. the degree of relatedness between individual and occupation vocational type, and its relationship to performance by using a number of congruence indices derived for the CWPI provided only modest support for this

aspect of the theory. The results indicated that there might be some usefulness in incorporating vocational interests in the classification of military personnel. Recommendations were made for future research.

The purpose of this study is to investigate the feasibility of incorporating vocational interests into the selection and classification systems used by the Canadian Forces (CF) personnel. In the 1996-1997 fiscal year, there were 2648 Regular Force officer applicants, 7175 Regular Force Non-Commissioned Member (NCM) applicants, 658 Reserve Force officer applicants, and 11674 Reserve Force NCM applicants. Current selection practices for all applicants include a test of learning ability and a semi-structured interview. In addition, NCM applicants undergo aptitude testing. While applicants may express a desire for a specific occupation or for service in a particular branch of the military, there is no systematic or standardized method for exploring their vocational interests.

The "Future directions for Non-Commissioned Member (NCM) Selection and Classification" project (Halliwell & Spinner, 1991) is an on-going review of military applicant assessment procedures. Vocational interest testing is related to two aspects of this project. The first reviewed current testing procedures performed in NCM applicant assessment. The goal of this phase was to reduce testing time to allow other potential predictors of performance, such as vocational interest measures, to be introduced into the assessment process. The second aspect involved the clustering of entry level NCM occupations into job families for validity generalization research (Catano, 1990, 1992). Five occupational families were derived from an analysis of occupational abilities (Catano & Ibel, 1995). These families were recommended for further research in the "Future Directions" project.

Vocational interests may be a potential predictor of military performance, and may have a role to play in the selection and classification of military personnel. Vocational

interests show promise for this application because they exhibit a consistent, albeit moderate, relationship with job satisfaction, job persistence, and job performance (Assouline & Meir, 1987; Spokane, 1985; Tranberg, Slane & Ekeberg, 1993). The relationship of vocational interest information to the ability based occupation families has practical applications for personnel selection. If future aptitude testing indicates suitability for one of the five occupational families, interest testing may narrow the choice of specific occupation within that family.

Theoretical Approaches to Vocational Psychology

Vocational psychology, also known as career psychology or career development psychology, has had a long history, starting with the work of Frank Parsons in 1908 (Brown & Brooks, 1990). It has generated a vast theoretical literature which is continually being revised and updated, with new theories added to the literature. This literature has been the subject of a number of recent comprehensive reviews. These include *Theories of career development* (Osipow, 1983; Osipow & Fitzgerald, 1996); *Career choice and development* (Brown & Brooks, 1984; 1990; 1996); and *The handbook of vocational psychology* (Walsh & Osipow, 1983; 1995). In fact, some suggest that the field of vocational psychology has matured to the point that the various theories are starting to overlap and to resemble each other, prompting calls for a more unified theory of vocational psychology (Savickas, 1995; Savickas & Lent, 1994).

Osipow (1990) narrowed the broad theoretical base of vocational psychology. He categorized the main theoretical approaches as developmental, trait oriented, reinforcement based, and personality focused. He concluded that four major theoretical approaches now dominate the field through either "their empirical base and operational

utility or because their ideas have widespread appeal" (p. 123). These theories are the social learning approach (Mitchell, Jones, & Krumboltz, 1979), developmental theories, (Super, 1980), the Theory of Work Adjustment (Dawis & Lofquist, 1984) and Holland's theory of vocational personalities and work environments (Holland, 1985).

Holland's theory provides the best theoretical rationale for the present study. It is well-established and has been subject to more than 450 studies into its theoretical constructs (Weinrach and Srebalus, 1990, p. 48) Research on this theory is ongoing (for a recent review see Spokane, 1996).

Holland's (1985) theory is based upon four central assumptions: (1) that most people can be classified according to six personality types: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional (RIASEC); (2) that environments where people live and work can also be classified according to these types on the basis of the personality type that is dominant, or most prevalent, in that environment; (3) that people tend to search for an environment that is the same as their personality type; and (4) that behaviours such as choice of vocation and vocational achievement are determined by the interaction between personality and environment type. In addition, Holland proposes the concept of congruence, that people perform best in environments which match their types. According to Holland, "different types require different environments" (p. 5). Vocational type, work environment, and congruence all may have applications in personnel selection.

Vocational Type

Holland (1985) established the reliable classification of individuals into distinctive vocational types. Following the introduction of the theory in 1959, it was tested in a series of studies using student populations. Results from a variety of measures of

personality traits, activities and hobbies, and choice of college major and career supported the predictions made from the theory (Holland, 1962; Holland, 1963a; Holland, 1963b; Holland, 1963c; Holland, 1968). Predictions based upon the typology have also been supported in a series of studies that investigated the concurrent validity of Holland's typology in a variety of employed adult samples. The samples included male professionals (Lacey, 1971), employed men (Gaffey & Walsh, 1974), non-college-degreed employed men (Fishburne & Walsh, 1976), college-degreed employed women (Horton & Walsh, 1976), non-college degreed black working men (O'Brien & Walsh, 1976), non-college-degreed employed women (Matthews & Walsh, 1978), and non-college degreed employed black women (Ward & Walsh, 1981).

Not all research of the theory has been supportive. In an early study, Hughes (1972) classified a group of 400 employed men according to the Holland type of the actual occupations held. He then tested the agreement between the occupational Holland type and the individual's tested Holland personality type determined from the SVIB and VPI. The overall results found a low level of support for the theory, with the various SVIB typings correctly predicting occupational type in the range of 14 to 35 percent, and the VPI giving 42 percent correct predictions.

Holland's theory asserts that "vocational interests are an expression of personality" (Holland, 1985, p. 8). Early research into the relationship between the vocational types and a wide variety of personality measures reviewed by Holland (1985) and more recent research reviewed by Spokane (1996; see also Weinrach and Srebalus, 1990, for a list of studies involving specific personality measures) support predictions based upon the theory. Recently, Gottfredson, Jones, & Holland (1993) examined the relationships between the

vocation types and the "big five" personality factors. For a sample of U.S. Navy personnel, artistic and investigative types correlated with the big five factor of "openness". The second part of this study reviewed data from other studies which represented Holland types and personality scores which could be converted to the five factors. Although the size of the correlations were small, personality types were related to the Big Five factors. Specifically, Extraversion was related to social and enterprising interests; Intellectance, to investigative and artistic interests; and Control to conventional interests; Neuroticism had small negative correlations with all six Holland interest dimensions.

The predictive validity of the theory was investigated in two longitudinal studies. The prediction of major field of study from high point codes of high school seniors (Holland, 1962) were correct in about a third of the cases over a one and two year period. Similar results were obtained over a four year longitudinal study (Holland, 1963a). Vocational choice was correctly predicted from Holland type in just under 30% of cases, and major field at graduation in 34.0% of the male and 39.3% of the female cases. Other studies found the Holland type of expressed vocational choice was a good predictor of final vocational choice (Gottfredson and Holland, 1975; Holland, 1968; Touchton and Magoon, 1977; Wiggins and Weslander, 1977).

Defining the Work Environment

The environmental part of Holland's theory has not been defined as thoroughly as his typology. In Holland's theory, the environment is defined by the personality type that is dominant or most prevalent, thus making the environment an extension of the personality typology (cf Schneider, 1987: "the people make the place"). For example, the

Realistic type is defined as having "a preference for activities that entail the explicit, ordered, or systematic manipulation of objects tools, machines, and animals" (Holland, 1985, p. 19); the Realistic environment is characterized by "environmental demands and opportunities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines and animals" (Holland, 1985, p. 36).

Early work in defining the environment dealt exclusively with academic environments and student populations (Holland, 1985; Spokane, 1985). The Environmental Assessment Technique (EAT; Astin & Holland, 1961) involved assigning a college major a Holland type by judging what it should be according to the theory. Having typed the college majors, an academic environment was defined on the basis of the percentage of students in each major.

The EAT approach has been expanded to define a wider variety of environments. Holland (1985, p. 40) states that the technique "can be used to assess the population of a college, a hospital, a business, a community, or of any other institution or group". The technique is still basically a census of "occupations, training preferences, or vocational preferences of a population" (Holland, 1985, pp. 40-41). Having determined the Holland type of individuals in a given population, the environment is then defined in terms of the distribution of the Holland types within the population.

Congruence Research

One of the "background principles" of Holland's theory is that "vocational satisfaction, stability, and achievement depend on the congruence between one's personality and the environment in which one works" (Holland, 1985, p. 10). A literature review by Spokane (1985) and meta-analyses by Assouline and Meir (1987) and by

Tranberg, Slane and Ekeberg (1993) provide a good introduction to congruence research.

In the studies reviewed by Spokane (1985), a wide variety of criterion measures have been studied, including personal adjustment, achievement, stability, and satisfaction. Many of the studies used students in academic environments; in work environments, job satisfaction was the usual criterion measure. Although the results of the studies reviewed were mixed, with correlations between congruence and outcome measures rarely exceeding 0.25 to 0.35, positive relationships were found between congruence and "(a) academic performance and persistence, (b) job satisfaction, (c) stability of choice, (d) perceived congruency, and (e) personality (ego strength)" (Spokane, 1985, p. 328).

The inconsistency of the results reviewed in Spokane's review was the stated impetus for Assouline and Meir's (1987) meta-analysis. They analysed 41 studies set in both academic and work environments. They found a correlations of 0.06 between congruence and academic achievement, 0.15 between congruence and stability, and 0.21 between satisfaction and congruence. They further analysed the latter result by method for determining the environment: the correlations were 0.21 by occupation, 0.29 by others in the environment, and 0.42 by specialty in the occupation.

Tranberg et al (1993) conducted a meta-analysis on measures of congruence and occupational and academic satisfaction. The overall mean correlation was 0.17 between satisfaction and congruence, 0.20 between congruence and occupational satisfaction, and 0.10 between congruence and academic satisfaction; the confidence intervals indicated that none of these correlations were significantly different from zero. The results of this study can be interpreted as rejecting the congruence hypothesis or as an indication of inadequacies in the operationalization of congruence measures (Brown & Gore, 1994).

Indeed, Tranberg et al's concluded that the results of their study reflect "the overly simple view of congruence, satisfaction, and the relation between the two" (p.261).

Results of other recent studies investigating congruence and other correlates have produced mixed results. In a longitudinal study with 345 newly hired bank tellers, Gottfredson and Holland (1990) found a significant, but weak, correlation of 0.13 between congruence and persistence measured four months after hiring. They also found significant correlation of 0.36 between congruence and overall satisfaction for those still employed. Meir and Navon (1992) performed a similar longitudinal study of congruence, also using bank tellers as subjects. In a sample of 95 subjects tested four to six months after hiring, they found significant correlations ranging from 0.40 to 0.54 between satisfaction and congruence. There was a significant correlation of 0.37 between congruence and supervisor mean evaluations of performance.

Meir, Esformes, and Friedland (1994) studied the relationship between congruence and job stability, defined as hired and persisted versus hired and did not persist, measured about one year after the initial hiring. Overall, they found a significant biserial correlation of 0.21 between congruence and job stability. In the different occupational fields in which there were enough subjects for separate analyses, they found significant biserial correlations of 0.31 and 0.26 for males in Business and Technology fields, but nonsignificant biserial correlations of 0.06 and 0.09 were found for males and females in Organization fields. They also examined the relationship between congruence and job performance as measured by supervisor ratings. Correlations between congruence and performance measures ranged from 0.22 to 0.27 for males subjects in the combined Business and Technology fields, but the results for the combined male and female subjects

in the Organization field were not significant.

Application of Holland's Theory to CF Selection

Operationalizing Holland's Theory

There are several well-established measures for determining vocational type (see Chartrand, Strong, & Weitzman, 1995 and Spokane, 1996 for American measures, and Rounds & Tracey, 1996 for measures developed in other countries). Practicality is an issue that must be addressed in choosing one of these measures. Assessment made during recruiting by the CF is essentially a one-time "snapshot" of the skills, abilities, health status, and other characteristics of the applicants. Any instrument that is used must be capable of being administered and evaluated quickly, inexpensively, and in a standardized manner. This has lead the CF to focus on the Canadian Work Preferences Inventory (CWPI) as a possible measure of vocational interest for use in selection (Bradley, 1996). The CWPI was developed by Employment and Immigration Canada and was available for adaptation by the CF at minimal cost.

The CWPI was based upon Holland's theory of vocational personality type (Bognar, 1985). The CWPI consists of 50 Likert-type items which constitute five different interest scales: (1) Methodical items describe a preference for work that is clearly defined and under the direction and supervision of others; (2) Objective items describe a preference for working with tools, equipment, and machinery on repair and "hands-on" type of work; (3) Innovative items reflect a scientific or academic orientation with a focus on problem solving; (4) Directive items describe a preference for taking charge, organizing and directing the work of others; (5) Social items represent a preference for working with and helping people.

Applicability of the CWPI to Different Population Samples

Any selection instrument by the CF must be applicable to both English and French speaking populations. The CF is sensitive to this issue, and the current instruments used in selection, the General Classification test (GC) and Canadian Forces Classification Battery (CFCB), have separate English and French language norms. Any vocational interest instrument should also be available in both languages. The CWPI Technical Manual (1992) indicates that the CWPI norms were derived from a combined sample of subjects who completed the English or French language versions of the test. However, no data is provided which indicates that there is any differences in responding between the two versions of the test.

Similarly, the CWPI should be appropriate for use with people of different cultural backgrounds. Reviews of the applicability of Holland's theory to African Americans (Brown, 1995) and Hispanic Americans (Arbona, 1995) suggest that the theory is generalizable to ethnic populations. In the Canadian context, the CWPI must be applicable to the larger English and French speaking populations and to ethnic groups within those populations. The requirement of Canadian citizenship for eligibility for Regular Force military service (in some limited cases landed immigrants may serve with the Reserve force) may have an effect on limiting the "ethnicity" of military applicants. Applicants must have enough competence in French or English to complete selection processing.

As ethnic group members become second and third generation Canadians, they become more similar to the "mainstream" culture, and theoretical models derived from that mainstream become more applicable (Arbona, 1995, derives this perspective from the

Hispanic American experience). Similarly, the more that aboriginal peoples become assimilated into the mainstream culture, the more applicable theories derived from the mainstream become (Johnson, Swartz, and Martin, 1995). Therefore, in the present study, no differences in responding are expected among participants from either different cultural backgrounds or from the predominate Anglophone and Francophone cultures.

Differences in the applicability of the CWPI to both males and females is another area that must be investigated if the CWPI is to be used in personnel selection. Gender differences in Holland typing is well established. In an interesting study by Hansen (1988), the comparison of Holland types of different female samples from the 1930's, 1960's, 1970's and 1980's showed remarkably little change. In comparison to male samples over the same periods, women consistently scored lower than men on the Realistic scale, and higher than men on the Artistic scale. The CWPI Technical Manual (1992) also reports consistent gender differences in the Objective factor, with males scoring higher than females, and the Social factor, with females scoring higher than males. This same pattern of responding is expected in the samples used in the present study.

Testing Vocational Type Hypotheses Using the CWPI

The CWPI does not produce a RIASEC typology, however, it is similar enough to Holland's typology to be used to test hypotheses based upon the theory. Holland's theory proposes that people search for an environment that is the same as their personality type. Therefore, environments which are related to a given CWPI factor should attract more individuals with an elevated score on that given factor. Based upon the CWPI factor descriptions, the following a prior predictions can be made for each of the five CWPI factors:

Methodical. The style of work represented by this factor is typical of that performed by Junior NCMs at the entry level of employment, therefore Junior NCMs should have elevated scores in this CWPI dimension.

Objective. Many technical, construction engineering and Combat Arms occupations have a "hands on" orientation that is characteristic of this factor. CF personnel in these occupations should have elevated scores on this factor; conversely, CF personnel in occupations which are not "hands on", for example administrative support occupations, should score relatively low on this factor.

In military occupations, as rank increases, the job changes to include more supervisory and managerial duties. This results in a decrease in the amount of time spent performing the "hands on" aspect of the job. Therefore, scores on the Objective dimension should decrease as rank increases.

Innovative. This factor reflects a scientific or academic orientation with a focus on problem solving. While problem solving is an aspect of any military occupation, problem solving coupled with an academic background is more descriptive of the training and duties of officers rather than of NCMs; therefore, officers should score higher on this factor than NCMs. In addition, a scientific orientation characterizes the training of military technicians; therefore CF personnel in technical occupations should have elevated scores on this dimension.

Directive. Directive activities comprise a large component of the work performed by officers; therefore officers should score higher on this interest factor than NCMs. Also, increasing rank involves increasing Directive oriented activities. Therefore, scores on this factor should increase with rank.

Social. In addition to items about dealing with people generally, items which contribute to the Social factor score specifically relate to dealing with the sick and looking after people. Therefore, scores on this factor should be elevated in health related military occupations.

Just as occupations of a given CWPI type should attract more individuals with an elevated score on that CWPI factors, the same rationale can be applied to university faculties and students. In the present study, the following predictions can be made about students in the faculties of Arts, Commerce, and Science.

Methodical. There are no reasons to expect differences in this factor in the different academic disciplines. Therefore, no a priori predictions are made on the basis of this factor.

Objective. The hands-on nature of this factor make it more likely to be relatively higher in science students through their greater involvement with "hands on" type of laboratory work.

Innovative. All university students should be academically oriented as described by this factor. The difference expected between students is a higher scientific orientation among Science students and therefore higher Innovative factor scores.

Directive. The managerial aspect of this factor make it more likely to be elevated in Commerce students.

Social. Students interested in the helping professions could start their academic career in the social sciences, which are typically Arts programs; therefore, this factor should be relatively higher in Arts students.

Another method of testing the prediction that people of a certain CWPI type are

attracted to occupations of the same type is to have subjects of a known CWPI type rate the attractiveness of occupations of a known CWPI type. According to Holland's theory, subjects of a given type should find occupations of a similar type more attractive than occupations of a dissimilar type. For example, an "Objective" individual should find a hands-on oriented "Objective" occupation more attractive than a people oriented "Social" occupation.

In the present study, the foregoing will be tested using a university student sample to rate military occupations. This aspect of the study is analogous to the situation in CF recruiting: if more than one occupation is available for the applicant to choose from, the applicant may be assigned the occupation that they find the most attractive. The university student sample is not meant to be representative of the NCM applicant population, but are a convenient sample to test the attractiveness hypothesis of Holland's theory.

Relating CWPI Types to Ability Based Occupation Families

Subsequent to clustering entry level NCM occupations into five families based upon ability (Catano & Ibel, 1995), Catano (1995) used discriminant analysis to identify predictors which successfully differentiated the five families (Table 1). Most of the predictors are related to physical abilities which cannot be tied to CWPI interest factors in any direct way. However, "Analytic Ability", which was based upon Mathematical Reasoning, Number Facility, Originality, Category Flexibility, Deductive Reasoning, and Visualization and "Cognition", which was based upon Problem Sensitivity, Inductive Reasoning, Deductive Reasoning, Memorization, Fluency of Ideas, and Information Ordering (Catano, 1995) may be related to the CWPI Innovative factor. These predictors differentiate the Technical A and Technical B families from the remaining families.

Table 1

Predictor Variables for Ability Based Occupation Families from Catano (1995).

Military	Operator	Admin	Tech A	Tech B
Strength/ Movement	Audition	[a]	Fine Motor Control	Strength/ Movement
Controlled Reaction	Information Processing		Analytical Ability	Controlled Reaction
Vision	Vision		Cognition	Fine Motor Control
			Vision	Analytical Ability
				Cognition

[a]There are no predictors for the Administrative family.

Therefore, CF personnel in these families may have elevated Innovative scores.

The occupational families based upon ability offer a convenient way of categorizing the many entry level NCM occupations. The nature of the work performed by CF personnel in these different families can be used to predict the predominant CWPI types that should be found in each family.

Military. These occupations are "hands on"; CF personnel in this family should have elevated Objective scores.

Operator and Administrative. These occupations are not "hands on"; CF personnel in these families should have relatively low Objective scores.

Technical A and Technical B. Because of the "hands on" nature of these occupations, CF personnel in these families should have elevated Objective scores. Also,

because of the Information Processing and Cognition aspects of these occupations, CF personnel in these families should have elevated Innovative scores.

Determining the CF Work Environment

Using the EAT is relatively straightforward; determining which environment to assess is not. In the case of selection of personnel for the CF, classifying individual occupations based upon the predominant type of the occupation's members is a viable alternative. This slight variation in technique reflects the recruiting practice of hiring the majority of personnel directly into individual entry-level occupations. Much of the initial training takes place with other members from the same occupation. In many occupations an individual continues to work mostly with other members from the same occupation.

Congruence Measurement

Following similar methods as in previous studies, the present study will test congruence hypotheses in a sample of miliary personnel. Congruence indices based upon the five factors of the CWPI will be developed for the study. Holland's theory predicts that the higher the degree of similarity between an individual's CWPI type and the CWPI type of the individual's occupation, the higher the self-reported level of performance. Similarly, the theory predicts that there will be an increase in congruence with increasing tenure. With this increase in congruence, there should be less variability in the CWPI types of senior personnel in an occupation will show less variability than in the CWPI types of the junior personnel.

Summary

The present study seeks to:

1. Evaluate the psychometric adequacy of the CWPI.

This includes evaluation of the five factor structure of the CWPI and its applicability to subjects with Anglophone and Francophone cultural backgrounds, subjects with other than Anglophone and Francophone cultural backgrounds, and male and female subjects.

2. Investigate the validity of Holland's typology.

CWPI typing will be used to distinguish between different occupations in a sample of military personnel. Similarly, CWPI typing will be used to distinguish areas of study in a student sample. In another test of the theory, subjects with a known CWPI type will rate the attractiveness of occupations of a known CWPI type.

3. Examine the relationships between vocational interests and occupational families derived from ability measures.

Occupational families will be derived from interest typing for comparison with the ability based occupational families. Interest data will be investigated for its efficiency in predicting membership in the ability based occupational families.

4. Investigate the relationship between congruence and performance.

The relationship between congruence and performance will be tested using military personnel data. There should be a directional relationship, i.e. the higher the level of congruence, the higher the level of performance. The relationship between congruence and persistence will be tested by examining the relationship between congruence and tenure, and by comparing the variability of vocational types of junior and senior personnel.

5. Recommendations

The final part of the study is to evaluate the use of the CWPI for the selection of CF personnel. Recommendations will be made for incorporating the instrument into current and future selection processes.

Method

Participants

Military Sample

Archival data from a random sample of CF military personnel who were selected to complete the Canadian Forces Personnel Applied Research Unit (CFPARU) 1996 Personnel Survey were made available for use in the present study. The survey was conducted in April to May of 1996. Surveys, names of selected participants, and administration instructions were sent from CFPARU to Base/Wing Personnel Selection Officers. The method of administering the surveys was left to the discretion of the Personnel Selection Officers, with the direction that because of the protected nature of one of the measures in Version C, administration of this version had to be supervised and all copies, completed or otherwise, had to be returned to CFPARU. Participation in the survey was voluntary and anonymous.

The mean age of the sample was 33.9 years (SD = 7.0), and ranged from 17 to 57 years. The survey reported both NCM and Officer occupations. For the 81 NCM occupations, 1350 indicated occupational membership; the number of members per occupation ranging from 1 to 132 (mean = 16.7, SD = 26.5). Because of changes in the CF military occupation structure since the survey data were collected, occupations were recoded according to their codes in the current system. Former Military Occupation Codes (MOCs) 511 Aero Engine Technician, 512 Airframe Technician, 513 Aviation Technician, 531 Safety Systems Technician, 551 Instrument electrical Technician, and 572 Air Weapons Systems Technician were reclassified as MOC 514 Aviation Systems Technician; former MOCs 521 Integral Systems Technician, 524 Communication and

Radar Systems Technician, and 525 Avionics Technician were reclassified as MOC 526 Avionics systems Technician; former MOCs 561 Metals Technician, 562 Machinist, and 563 Refinisher Technician were reclassified as MOC 565 Aircraft Structure Technician. The survey data represented responses for 947 Junior NCMs, which are the ranks of Private/Ordinary Seaman and Able Seaman, Corporal/Leading Seaman, and Master Corporal/Master Seaman, and 477 Senior NCMs, which are the ranks of Sergeant/Petty Officer 2nd Class, Warrant Officer/Petty Officer 1st Class, Master Warrant Officer/Chief Petty Officer 2nd Class, and Chief Warrant Officer/Chief Petty Officer 1st Class.

Entry level occupations were defined as occupations into which an applicant could enter into directly from recruiting (non-entry level occupations can only be entered by transferring after serving in the CF or are entered after specialized training and/or promotion. For the cluster analysis of entry level occupations, the junior NCM members of entry level occupations with more than five members in the data set were used. There were a total of 770 entry level Junior NCM subjects from 34 entry level occupations. The mean number of subjects per occupation is 22.65, SD = 24.20.

The survey contained responses for 505 officers, representing 31 occupations, with the number of members per occupation ranging from 1 to 66 (mean = 16.3, SD = 17.1). Because of changes in the CF military occupation structure, the former MOC 63 Air Traffic Control and 64 Air Weapons Control were reclassified as MOC 39 Aerospace Control. The survey represented responses for 376 junior officers, which are the ranks of Lieutenant/Sub-Lieutenant and Captain/Lieutenant(N), and 147 senior officers, which are the ranks of Major/Lieutenant-Commander, Lieutenant Colonel/Commander, and Colonel/Captain (N).

The distribution of officers and NCMs in the survey is comparable to figures reported in the Military Personnel Information System (MPIS) database on 9 June, 1995 (Ewins, 1996). On that date the total number of Regular Force personnel was 69,269; 22.5% (n = 15,582) were officers and 77.5% (n = 53,687) were NCMs. In the present sample, of the 1855 subjects indicating occupational membership, 72.8% (n = 1350) are NCMs and 27.2% (n = 505) are officers. Of the 1424 subjects indicating rank, 73.1% (n = 1424) are NCMs and 26.9% (n = 523) are officers. For NCMs in the MPIS database, 29.8% (n = 15,981) were Senior NCMs and 70.2% (n = 37,706) were Junior NCMs; in the present sample, 33.5% (n = 477) are Senior NCMs and 66.5% (n = 947) are Junior NCMs. For officers in the MPIS database, 30.8% (n = 4806) were senior officers and 69.2% (n = 10776) were junior officers; in the present sample 28.1 % (n = 147) are senior officers and 71.9% (n = 376) are junior officers.

The sample contained 79.1% (n = 1532) males and 20.9% (n = 405) females. The MPIS database figures for gender were 10.7% (n = 7452) female and 89.2% (n = 61,817) male Regular Force members (Ewins, 1996).

A subject was designated as an Anglophone or Francophone on the basis of their response to the question "What is your First Official Language". Anglophones comprised 65.8% (n = 1292) and Francophones 34.2% (n = 671). A total of 1397 English language questionnaires (70.1%) and 595 French language questionnaires (29.9%) were included in the database. The greater majority of subjects completed the survey in the same language as their First Official Language: 98 Francophone subjects completed an English language survey (7.1% of the English language surveys), and 11 Anglophone subjects completed a French language survey (1.9% of the French language surveys).

The sample contained 38 subjects who indicated that they were of aboriginal status: this represents 1.9% of respondents to this question. The sample contained 92 subjects who indicated that they were members of a visible minority: this represents 4.7% of respondents to this question. The sample contained 52 cases who indicated that their first language was other than French or English: this represents 2.7% of respondents to this question. The CF Diversity Survey, distributed to all CF personnel on effective strength on 22 March, 1995 reported 1.6% Aboriginal Peoples and 1.8% visible minorities in the Regular Force (Ewins, 1996); no data were reported for first language.

Student Sample

Saint Mary's University students (n = 627) from Introductory Psychology courses participated in this part of the study.

The students were administered questionnaires during class time except for three classes where time constraints required the materials to be issued in one class and returned in a subsequent one. Every class was briefed on the nature of the study. Prior to disseminating the material, classes were informed that participation was voluntary and anonymous. With the exception of one introductory class, subjects received extra credit for participation, as determined by their professor.

The mean age of the student sample was 20.93 years (SD = 4.61). The sample consisted of 56.1% female and 43.1% students (92.2%). Table 2 reports the breakdown of students by year of study; the majority of students (69.5%) were in their first year of studies. Table 3 reports the breakdown of subjects by faculty; approximately half the students were in Arts, 30% in Commerce and the remainder in Science. The sample contained 50 subjects whose first language learned was other than English (8.0% of

Table 2

Year of Studies

Year	Freq.	%	Valid %
First	436	69.5	70.1
Second	85	13.6	13.7
Third	63	10.0	10.1
Fourth+	38	6.1	6.1
Missing	9	0.8	-
Total	627	100.0	100.0

Table 3

Faculty

Faculty	Freq.	%	Valid %
Arts	310	49.4	50.2
Commerce	187	29.8	30.3
Science	108	17.2	17.5
N/A	13	2.1	2.1
Missing	9	1.4	-
Total	627	100.0	100.0

respondents to this question); 10 subjects who were of aboriginal status (1.6% of respondents); and 57 subjects who indicated that they were of a visible minority (9.2% of respondents).

Personnel Surveys

The data for the military sample were gathered from the administration of three versions of the Personnel Survey, in both English and French. The CWPI was included in Versions B and C of the survey. Other information pertinent to the present study included

questions relating to military course performance, Performance Evaluation Report (PER) results, ratings of current day-to-day performance, and rank, occupation, and demographic information. The performance information and personal information sections of the surveys, as they appeared in Version C, are reproduced in Appendix A. The data set consists of 1239 (62.1%) Survey B and 756 (37.9%) Survey C results.

Questionnaires

In addition to the CWPI, student subjects were given a booklet which contained 10 occupations to be rated (see Appendix B). The occupations in each booklet were a random selection of 30 entry level CF occupations. These 30 occupations consisted of six occupations from each of the five occupational families derived by Catano and Ibel (1995: see Table 4). The occupations were chosen to be representative of the types of occupation in each occupation family and to represent a sample of Naval, Combat Arms, Air Force, and support occupations. Subjects were also to respond to background and demographic questions (see Appendix C).

The rating scale was an adaptation of the Bullock (1952) job satisfaction scale, as it appeared in Cook, Hepworth, Wall and Warr (1981). Five of the original ten questions were used in the present study. The original questions were changed to the conditional tense, e.g. the original question "Place a check mark in front of the statement which best tells how good a job you have" was changed to "Place a check mark in front of the statement which best tells how good a job this would be". Cook et al report a Spearman-Brown reliability coefficient of 0.90 and a test-retest correlation of 0.94 for the original instrument.

Table 4

Occupations from Catano and Ibel (1995) Occupational Families Used in Student Study

Family	Occupation
Military	Crewman
	Artilleryman (Field)
	Infantryman
	Field Engineer
	Lineman
	Boatswain
Operator	Meteorological Technician
	Air Defence Technician
	Oceanographic Operator
	Radio Operator
	Naval Combat Information Operator
	Communicator Research
Administrative	Teletype Operator
	Administrative Clerk
	Steward
	Postal Clerk
	Supply Technician
	Traffic Technician
Technical A	Aerospace Telecommunications and Information Systems Technician
	Naval Electronics Technician (Acoustic)
	Avionics Systems Technician
	Photographic Technician
	Construction Engineering Technician
	Dental Clinical Assistant
Technical B	Hull Technician
	Weapons Technician (Land)
	Aviation Systems Technician
	Water, Sanitation and POL Technician
	Medical Assistant
	Ammunition Technician

For the present adaptation, the alpha reliability coefficient for the entire occupation rating scale was 0.89. Question 4, which asks about recommending the occupation to a friend, is of a different type than the remaining four, which ask for the raters own responses to the occupation. Removing Question 4 raised the alpha reliability coefficient to 0.92; this question was omitted in subsequent analyses. The ratings can range from 4 for extreme dislike to 20 for full endorsement; a rating of 12 is neutral.

Scoring the CWPI

The numerical ratings for each of the 10 Likert-like responses that make up each of the five CWPI factors are totalled to give the CWPI factor raw score. Raw scores are converted to T-scores with a mean of 50 and a SD of 10. The scoring protocol for the CWPI converts the T-scores of the three highest factors into a three letter CWPI profile.

Single Interest Codes

If the T-score difference between the highest and second highest factor scores is four or greater, this is designated a "single interest code" (CWPI Technical Manual, 1992, p. 12). This is represented by the first letter of the highest factor score capitalized followed by the first letter of the second and third highest factor score in lower case letters. For example, the profile Mid represents a relatively high Methodical score followed by lower Innovative and Directive scores.

Double Interest Codes

If the difference between the highest and second highest CWPI factor T-scores is three or less and the difference between the second and third highest score is four or greater, this is designated a "double interest code" (CWPI Technical Manual, 1992, p. 12). This is represented by the first letter of the highest and second highest factors in capital

letters followed by the third highest factor in lower case. For example, the profile SDo represents relatively high Social and Directive scores followed by a lowered Objective score.

Triple Interest Codes

If the difference between the highest and second highest CWPI factor T-scores is three or less and the difference between the second and third highest score is also three or less, this is designated a "triple interest code" (CWPI Technical Manual, 1992, p. 12). This is represented by the first letter of the highest, second highest and third highest CWPI factors all in capital letters. For example, the profile MSO represents relatively high Methodical, Social and Objective scores.

Individual and Occupational CWPI Profiles

In order to produce a CWPI profile, subjects had to have responded to every CWPI question. Individual CWPI profiles were produced for every subject. For an occupational CWPI profile, the mean raw score of every subject in that occupation was scored according to the CWPI protocol.

Scoring Modifications Used in the Present Study

Although not explicitly stated in the Technical Manual, the single, double and triple codes appear to incorporate a standard error of measurement (SEM) in producing CWPI profiles. For the purposes of profile matching between individual and occupational CWPI profiles, which is the basis of the congruence indices to be discussed below, it was found necessary to extend the SEM concept somewhat. Also, exact numerical ties in CWPI factor T-scores sometimes lead to more than three letter profiles, e.g. MOds.

Single Interest Codes. If the difference between the second and third highest

CWPI factor T-score was three or less, the second and third letter codes were interchangeable. For example, using the letters A, B, and C to represent the factor codes generically, the profile Abc is equivalent to Acb. If the difference between the second and third highest scores was four or greater, the second and third codes could not used interchangeably. Designated as Ab(c), the only order possible was A followed by b followed by c.

Double Interest Codes. The first two codes could be used interchangeably, followed by the third letter. For example, the profile ABc is equivalent to BAc.

Triple Interest Codes. If the difference between the highest CWPI factor T-score and the third highest score was three or less, all three codes could be used interchangeably. If the difference between the highest and third highest scores was four or greater, the highest and second highest were interchangeable, followed by the third highest code, or following the first highest code, the second and third were interchangeable. Designated as AB/C, this is equivalent to BAC or to ACB.

Congruence Indices

Dichotomous One Letter Match

The guidelines for single letter matches are given in Table 5. Given the equivalencies in double and triple interest codes, a second or third letter code could be a match for an occupational single interest code. For example, an individual code of ABC would be a match with an occupation code of Cxx; however an individual code of AB/C would not be a match.

Differentially Adjusted Vocational Equating (DAVE) Index

The Differentially Adjusted Vocational Equating (DAVE) index is a method of

Table 5

Dichotomous One Letter Matching Guidelines

Occupation Code	Match
Axx	Axx
	AXx
	AX/X
	AXX
ABx or AB/X	Axx or Bxx
	AXx or BXx
	AX/X or BX/X
	AXX or BXX
ABC	Axx or Bxx or Cxx
	AXx or BXx or CXx
	AX/X or BX/X or CX/X
	AXX or BXX or CXX

matching two letter CWPI profiles. It is a method of weighting the degree of match between a perfect match and a clear miss. The weighting scheme is given in Table 6. The index was derived rationally; some of the weightings may be arbitrary and until tested may have no psychological meaning.

Primary Interests Congruence Scale (PICS)

The Primary Interests Congruence Scale (PICS) was adapted from Grotevant, Cooper and Kramer (1986). Three versions of PICS were tested in the present study.

PICS1. PICS1 is the T-score of the one letter match which results in the highest T-score using the rules of interchangeability given above. For an occupation with a single interest code, this would be the individual's T-score for that single letter code (there is no interchangeability in this case). For a double interest occupation code, PICS1 would be

Table 6

The Differentially Adjusted Vocational Equating (DAVE) Index

Weight	To Match Ab Profile	To Match AB Profile
10	Ab	AB
9	AB	
8	Ba	Ab or Ba
7	AXb	
6	BXa	AXb or BXa
5	Xab	Xab
4	Ax	
3	AX	
2		Ax or Bx
1		AX or BX
0	X	X

the higher of the individual's T-score of the first or second letter of occupation code. For a triple interest occupation code, PICS1 would be the individual's highest T-score out of the three occupation code letters.

PICS2. After determining PICS1, PICS2 is calculated by summing the T-score for PICS1 and the next highest T-score possible for a two letter match with the occupation CWPI profile.

PICS3. After determining PICS2, PICS3 is calculated by summing the T-score for PICS2 and the next highest T-score possible for a three letter match with the occupation CWPI profile.

Data Analysis

The psychometric properties of the CWPI were analysed through a number of methods. The alpha reliability coefficients for each of the five CWPI factors were

determined. The mean CWPI factor scores for the samples were compared to the CWPI normative data, the CWPI factor scores were intercorrelated, and Principal Components Analysis (PCA) was performed using CWPI responses to investigate the adequacy of the five factor structure. The applicability of the CWPI to subjects with Anglophone and Francophone cultural backgrounds, subjects with other cultural backgrounds, and male and female subjects was evaluated using Multivariate Analysis of Variance (MANOVA). A priori predictions about CWPI differences between military occupations and academic faculties were tested using one-way ANOVA for the raw scores of the CWPI factors of interest, followed by post hoc testing.

Analyses of entry level occupations, the main population of interest, were performed on occupations with five or more junior members represented in the data set. The relationship between the CWPI data to entry level military occupations was investigated by simply inspecting the standardized mean raw scores of the CWPI factors. In addition, the a prior predictions based on the ability based job families were tested by one-way ANOVAs followed by post hoc testing.

Entry level occupations were clustered on the basis of CWPI profiles following the method used in Catano and Ibel (1995). Raw CWPI factor scores were transformed to standard scores and the mean standardized score was determined for each of the 34 entry level occupations. The resulting standardized CWPI profiles were submitted to Hierarchical Cluster Analysis using Ward's method through the SPSS Release 6.1 procedure CLUSTER, with squared Euclidian distances as the distance measure. The accepted practice of determining the number of clusters heuristically was followed. The derived clusters were validated using the SPSS discriminant analysis procedure

DISCRIMINANT. The discriminant analysis, with the cluster solution as the grouping variable, was performed on a random sample of approximately 73% of the entry level junior NCM cases and cross-validated on the remaining 27% of the cases.

The relationship between the ability based job families and CWPI factors was also investigated using discriminant analysis. Using occupation family membership as the grouping variable, the discriminant analysis was performed on a random sample of 72% of the entry level junior NCM cases and cross-validated on the remaining 28% of the cases.

For the student occupation ratings, gender differences between ratings were investigated by separate t-tests for each occupation, with p set at ≤ 0.001 to avoid Type I error. Because each subject received a random sample of 10 of the 30 occupations, it was not possible to directly compute the overall relationship between CWPI factor scores and occupation ratings. In order to investigate this relationship, the mean for each occupation rating and the mean of the CWPI T-score for every subject who rated the occupation was calculated, and these two variables were correlated. To investigate the effect of CWPI factors for each individual occupation rated, hierarchical regression analyses were performed with gender entered at the first step, and the CWPI factors entered at the second step.

For the military sample, the direct relationship between CWPI information and performance variables were examined by hierarchical regression analyses, entering occupation, rank, and gender at the first step to clarify the main effects of the CWPI factor T-scores. T-scores were used to be consistent with subsequent analyses of the relationships between performance variables and congruence indices, which require the use of the CWPI T-scores. The a priori prediction that senior ranking occupation

members would have less variability in CWPI type than junior members was tested using Levene's test of unequal variance.

The relationship between congruence indices and performance variables was investigated by correlational analyses for the entire sample and for officers and NCMs separately. These relationships were also investigated separately for entry level Junior NCMs.

Results

Psychometric Analyses of the CWPI

Table 7 presents the alpha reliability coefficients for each of the five CWPI factors as reported in the CWPI Technical Manual (1992), those calculated from CWPI raw scores for the present military sample, and those for the student sample. The alpha

Table 7

Alpha Reliability Coefficients as Reported in the CWPI Technical Manual and as Calculated from the Military Sample (n = 1847) and Student Sample (n = 586)

CWPI Factor	Technical Manual	Military Sample	Student Sample
Methodical	0.82	0.69	0.73
Objective	0.90	0.90	0.91
Innovative	0.77	0.73	0.76
Directive	0.88	0.88	0.87
Social	0.86	0.83	0.83

coefficients across the three samples are similar for each factor, with the exception of "Methodical". On this factor both the military and student samples report lower alphas than those reported in the Manual. With respect to the CWPI factor raw score means,

Table 8

CWPI Factor Norms for Raw Scores and T-scores for 50th Percentile and Military and Student Sample Mean CWPI Factor Raw Scores and Conversion to T-scores

CWPI	Manual		Military[a]		Student[b]	
Factor	M	T	M	T	M	T
Methodical	35	50	35.18	50	35.54	52
Objective	28	50	32.86	55	25.41	47
Innovative	35	50	37.06	53	34.00	49
Directive	35	50	37.90	53	36.65	52
Social	36	50	35.62	50	38.18	52

[a] $n \leq 1924$
[b] $n \leq 604$

reported in Table 8, the military sample, in comparison to the normative data, had similar means for the Methodical and Social factors, but higher means for the remaining factors, especially Objective. The student sample had somewhat higher means for all factors except for Objective, which was lower than the normative mean value, and very much lower than the mean for the military sample.

Table 9 presents the intercorrelations of the CWPI raw scores for the military

Table 9

Intercorrelations of CWPI Factor Raw Scores for the Military Sample

Factor	Method.	Object.	Innov.	Direct.
Object.	0.30**			
Innov.	0.22**	0.26**		
Direct.	0.06*	-0.08**	0.47**	
Social	0.18**	-0.12**	0.33**	0.46**

Note. $n \leq 1894$
*$p < 0.05$. **$p < 0.01$.

Table 10

Intercorrelations of CWPI Factor Raw Scores for the Student Sample

Factor	Method.	Object.	Innov.	Direct.
Object.	0.19**			
Innov.	0.19**	0.36**		
Direct.	0.01	-0.04	0.31**	
Social	0.18**	-0.23**	0.12*	0.34**

Note. $n \leq 597$
*$p < 0.001$. **$p < 0.01$.

sample. Relatively large correlations occur between the Directive and the Innovative ($r = 0.47$) and Social ($r = 0.46$) factors. The intercorrelations of the CWPI raw scores for the student sample, reported in Table 10, show a pattern that is similar to the military sample. Relatively large correlations appear between the Objective and Innovative factors (0.36) and between Directive and Social (0.34) and Directive and Innovative (0.31).

For the military sample Principal Components Analysis with Varimax rotation of the CWPI items produced nine factors which accounted for 54.1% of the variance. Factor 1 consisted of 9 of the ten Directive items; Factor 2 consisted of the ten Objective items; Factor 3 consisted of six of the Social items, with the remainder in Factor 5; and Factor 4 consisted of eight of the Innovative items. Factors 6, 7, and 8 contained nine of the Methodical items. Forcing a five factor solution resulted in 48 of the 50 items grouped into the correct factor (these results are reported in Appendix D).

For the student sample, Principal Components Analysis with Varimax rotation of the CWPI items produced 11 factors which accounted for 58.9% of the variance. Factor 1 consisted of 9 of the ten Objective items; Factor 2 consisted of 9 of the ten Directive

items; Factor 3 consisted of eight of the Social items; and Factor 4 consisted of eight of the Innovative items. Factors 5 and 6 consisted of seven of the Methodical items. Forcing a five factor solution resulted in all of the items grouped into the correct factor (these results are reported in Appendix E).

Application of the CWPI to Different Sub-populations

Gender

Gender differences for overall CWPI raw score responses were explored using MANOVA. For the military sample, the a priori predictions that females would have lower raw scores on the Objective factor and higher scores on the Social factor were supported; however, significant gender differences were found for all CWPI factors (Wilks' lambda = 0.83, F = 73.01, df = 5, 1799, $p < 0.001$). The univariate F-tests for the CWPI factors are presented in Table 11. For the student sample, the a priori predictions that females would have lower raw scores on the Objective factor and higher scores on the Social factor were also supported; however, significant gender differences were found for

Table 11

Univariate F-tests of CWPI Factor Raw Scores by Gender for the Military Sample

Factor	Male		Female		F
	Mean	SD	Mean	SD	
Method.	35.40	5.06	34.33	5.02	14.05
Object.	34.47	8.46	26.58	9.14	247.64
Innov.	37.40	5.32	35.74	5.36	28.58
Direct.	38.29	6.72	36.75	7.44	14.82
Social	35.18	6.40	37.54	6.00	40.88

Note. Df = 1, 1803. $p < 0.001$ for all factors.

all CWPI factors, (Wilks' lambda = 0.75, F = 38.19, df = 5, 579, $p < 0.001$) with the exception of the Methodical factor. The univariate F-tests for the CWPI factors are presented in Table 12.

Table 12

Univariate F-tests of CWPI Factor Raw Scores by Gender for the Student Sample

Factor	Male		Female		F
	Mean	SD	Mean	SD	
Method.	35.73	5.39	35.31	5.37	0.85
Object.	29.20	9.01	22.33	8.25	91.73**
Innov.	35.18	6.03	33.18	6.24	15.11**
Direct.	37.60	6.89	36.10	7.58	6.06*
Social	35.83	6.18	40.02	5.78	70.73**

Note. Df = 1, 583.
*$p < 0.05$. **$p < 0.001$.

Language

No a priori predictions were made about differences in CWPI responding between Anglophone and Francophone subjects. To investigate differences in responding to the two questionnaire languages in the military sample, subjects were classified into those who indicated their First Official Language as English and who completed an English language CWPI, and those who indicated their First Official Language as French and who completed a French language CWPI. MANOVA of the CWPI factor scores by these two language groups showed a significant difference overall between the responses to the different versions of the CWPI (Wilks's lambda = 0.98, F = 8.75, df = 5, 1720, $p < 0.001$), with univariate F-tests showing significant differences between the Methodical, Innovative

Table 13

Univariate F-tests of CWPI Factor Raw Scores by Language

Factor	Anglophone		Francophone		F
	Mean	SD	Mean	SD	
Method.	34.89	4.87	35.92	5.32	15.58**
Object.	32.72	9.39	33.11	8.50	0.67
Innov.	36.76	5.28	37.55	5.60	8.04**
Direct.	38.20	6.44	37.33	7.75	5.88*
Social	35.40	6.31	36.01	6.39	3.39

Note. Df = 1, 1724.
*p < 0.05. **p < 0.01.

and Directive factors (see Table 13).

Ethnicity

To investigate differences in responses by subjects in the military sample who could be considered as different from the predominant Anglophone or Francophone cultures, subjects of aboriginal status, members of a visible minority, or who indicated that their first language was other than French or English were designated as a "non-Anglo/Franco" sample. This resulted in 154 cases (7.9%) being classified as "non-Anglo/Franco". MANOVA of the five CWPI factors with this variable showed no significant differences between the responses of "non-Anglo/Franco" and "Anglo/Franco" subjects (Wilks' lambda = 1.00, F = 0.92, df = 5, 1806, p = 0.469).

In the student sample, to investigate differences in responding between the predominate English speaking culture and students those who may be considered to have a different cultural background, subjects whose first language learned was other than English, who indicated that they were of aboriginal status, or who indicated that they were

of a visible minority were reclassified as "non-Anglo". This resulted in 104 "non-Anglo" subjects (17.1%) and 505 "Anglo" subjects (82.9%). MANOVA of the CWPI factors indicated significant differences (Wilks' lambda = 0.97, F = 3.81, df = 5, 563, p = 0.002) between the "non-Anglo" and "Anglo" groups. Univariate F-tests (reported in Table 14)

Table 14

Univariate F-tests of CWPI Factor Raw Scores by Cultural Background for the Student Sample

Factor	"Non-Anglo"		"Anglo"		F
	Mean	SD	Mean	SD	
Method.	36.44	4.94	35.34	5.36	3.50
Object.	27.62	9.00	24.88	9.22	7.14*
Innov.	35.99	6.56	33.67	6.04	11.51*
Direct.	37.09	6.94	36.72	7.38	0.21
Social	39.27	5.75	37.99	6.43	3.27

Note. Df = 1, 567.
* $p < 0.01$

revealed significant differences between the Objective and Innovative factors. For all CWPI factors, the mean of the responses of the "non-Anglo" group was higher than the responses of the "Anglo" group.

Tests of A Priori Predictions of CWPI Differences

CWPI Differences Between Rank Level and Officer Status

One-way ANOVA results testing the a priori predictions about differences between rank level and officer status are reported in Table 15. Post hoc tests of the Methodical factor indicate that the responses of senior officers are significantly lower than those of junior officers and of all NCMs, and that the responses of all NCMs are also

Table 15

Oneway ANOVA of CWPI Factor Raw Scores by Rank

Factor	Source	df	SS	MS	F
Method.	Between	3	3644.28	1214.76	51.55†
	Within	1888	44487.81	23.56	
	Total	1891	48132.09		

Post Hoc Tests

Rank	Mean	1	2	3	4
1. Senior Officer	31.47				
2. Junior Officer	33.70	*			
3. Senior NCM	35.67	*	*		
4. Junior NCM	36.10	*	*		

Factor	Source	df	SS	MS	F
Object.	Between	3	12368.44	4122.81	52.99†
	Within	1906	148305.20	77.81	
	Total	1909	160673.64		

Post Hoc Tests

Rank	Mean	1	2	3	4
1. Senior Officer	27.39				
2. Junior Officer	29.50				
3. Senior NCM	33.01	*	*		
4. Junior NCM	34.90	*	*	*	

Factor	Source	df	SS	MS	F
Innov.	Between	3	83.63	27.88	0.98
	Within	1890	53878.61	28.51	
	Total	1893	53962.23		

Factor	Source	df	SS	MS	F
Direct.	Between	3	4996.66	1665.55	37.08†
	Within	1897	85220.29	44.92	
	Total	1900	90216.95		

Post Hoc Tests

Rank	Mean	1	2	3	4
1. Jr NCM	36.35				
2. Sr NCM	39.08	*			
3. Jr Off	39.28	*			
4. Sr Off	41.06	*	*	**	

*Significant at p = 0.05 by Scheffe and Tukey HSD methods
**Significant at p = 0.05 by Tukey HSD method only
†Significant at p < 0.0001

significantly higher than those of junior officers. Post hoc tests of the Objective factor show that the responses of all NCMs are significantly higher than those of all officers, and that those of junior NCMs are also higher than those of senior NCMs. ANOVA of the Innovative factor show no significant differences between the responses. Post hoc tests of the Directive factor revealed significant differences between junior NCMs and all others, and showed senior officers to have significantly higher Directive scores than all others. For the CWPI Social factor, for which no a priori predictions were made, the univariate f-test for this factor from a MANOVA of all CWPI factors showed no significant differences by rank ($F = 1.65$, $df = 3, 1812$, $p = 0.176$).

CWPI Differences Among Entry Level Occupations

The standardized mean raw scores of the CWPI factor for junior rank members of entry level occupations are reported in Table 16. The a priori prediction relating to the

Table 16

Entry Level NCM Occupations Clustered by CWPI Profile

n	Method.	Object.	Innov.	Direct.	Social
Family 1: Low Innovative					
Crewman					
23	-0.24	-0.14	-0.27	-0.08	-0.20
Boatswain					
10	0.02	0.51	-0.74	-0.05	-0.50
Naval Electronic Sensor Operator					
7	-0.36	-0.09	-0.36	0.04	-0.52
Photographic Technician					
8	-0.38	0.07	-0.20	-0.45	-0.22
Cook					
15	-0.01	0.06	-0.58	-0.24	-0.11
Mobile Support Equipment Operator					
40	0.12	0.22	-0.27	-0.26	0.03
Mean	-0.06	0.11	-0.35	-0.19	-0.14
Family 2: Moderate Objective					
Artilleryman (Field)					
31	-0.16	0.28	-0.10	0.16	-0.23
Infantryman					
77	0.08	0.21	-0.03	0.05	-0.14
Aerospace Telecommunications and Information Systems Technician					
9	-0.24	0.30	0.32	-0.39	-0.16
Aviation Systems Technician					
101	0.22	0.40	0.19	0.00	-0.13
Avionics Systems Technician					
29	-0.16	0.22	0.43	0.05	-0.23
Traffic Technician					
13	0.25	0.25	-0.10	0.11	-0.08
Mean	0.07	0.30	0.11	0.03	-0.15

n	Method.	Object.	Innov.	Direct.	Social
Family 3: Methodical					
Field Engineer					
9	0.76	0.19	0.22	0.27	0.41
Land Communications and Information Systems Technician					
7	0.68	0.29	0.71	0.08	0.13
Naval Radio Operator					
6	0.62	0.03	0.30	0.17	0.23
Fire Fighter					
7	0.77	0.40	0.07	0.37	0.18
Mean	0.72	0.23	0.32	0.22	0.25
Family 4: High Objective					
Naval Weapons Technician					
12	0.17	0.71	0.52	0.10	0.20
Marine Engineering Mechanic					
5	-0.03	1.00	0.11	0.00	-0.52
Hull Technician					
9	0.38	0.72	0.32	-0.21	-0.17
Vehicle Technician					
44	0.17	0.85	0.19	0.00	-0.36
Aircraft Structures Technician					
11	0.10	0.78	0.10	-0.20	-0.02
Mean	0.17	0.81	0.24	-0.06	-0.22
Family 5: Low Objective/Methodical					
Radio Operator					
14	-0.21	-0.49	0.00	0.17	-0.08
Teletype Operator					
24	-0.12	-0.77	-0.19	-0.12	0.03
Communicator Research					
13	-0.26	-0.04	0.03	-0.10	0.32
Administrative Clerk					
71	-0.28	-0.87	-0.33	-0.05	0.25
Finance Clerk					
26	-0.31	-0.84	0.02	-0.38	0.25

n	Method.	Object.	Innov.	Direct.	Social
Supply Technician					
74	-0.13	-0.34	-0.08	-0.10	-0.01
Mean	-0.21	-0.61	-0.15	-0.10	0.12
Family 6: Social/Directive					
Naval Signalman					
6	0.12	-0.42	-0.09	0.31	0.49
Medical Assistant					
32	0.04	-0.49	0.12	0.48	0.93
Military Police					
11	0.01	-0.90	0.19	0.40	0.72
Steward					
8	0.59	-0.28	-0.14	0.33	0.20
Mean	0.12	-0.54	0.07	0.43	0.73
Family 7: Innovative/Directive					
Naval Acoustics Operator					
7	-0.70	0.00	0.39	0.29	-0.12
Naval Combat Information Systems Operator					
6	-0.50	-0.06	0.45	0.51	0.02
Naval Electronic Technician (Acoustics)					
5	-0.03	0.53	0.57	0.57	-0.23
Mean	-0.44	0.13	0.46	0.44	-0.10

Objective factor scores of technical and construction oriented occupations is borne out by the pattern of elevated z scores for this factor. Given that the mean Objective score for this sample is already one half a standard deviation higher than the CWPI norms, z scores which were greater than one standard deviation above the CWPI norms ($z \geq 0.40$) were considered to be more "extreme". These occupations were technical and "hands-on". The remaining technical occupations also had positive z scores. The Combat Arms

occupations of Artilleryman, Infantryman and Field Engineer had positive z scores; Crewman did not. Also in support of the definition of the Objective factor was the relatively low z scores of occupations not considered "hands-on": the z scores for administrative support occupations were predominantly negative.

Elevated z scores for the Innovative factor occur in technical occupations, notably Land Communications and Information Systems Technician (z =0.71), Naval Electronics Technician (Acoustic; z = 0.57), and Naval Weapons Technician (z = 0.52). The z scores for other technical occupations are positive, as are the z scores for Naval Acoustics Operator, Naval Radio Operator and Naval Combat Information Operator (but not Naval Electronic Sensor Operator).

The other a priori prediction that can be investigated by inspecting z scores is that an elevated CWPI Social factor score is expected in health related occupations. This is supported by a z score of 0.92 for Medical Assistants. Military Police also has an elevated z score of 0.72.

CWPI Differences Among Ability Based Job Families

The results of one-way ANOVAs to test the a priori hypotheses about the responses of members of the job families based upon ability testing (Catano & Ibel, 1995) are reported in Table 17. For the Objective factor, the Administrative family responded significantly lower than all other families, and the Technical B family is also significantly higher than the Operator and Military families. For the Innovative factor, the Technical B family responded significantly higher than the Administrative family. A MANOVA of the CWPI factor raw scores by job family reveals a significant univariate F test for the Methodical factor ($F = 2.69$, $df = 4, 734$, $p = 0.030$), and nonsignificant results for the

Table 17

Oneway ANOVA of CWPI Factor Raw Scores by Ability Family Membership

Factor	Source	df	SS	MS	F
Object.	Between	4	10294.83	2573.71	37.70††
	Within	787	53723.15	68.26	
	Total	791	64017.98		

Post Hoc Tests

Family	Mean	1	2	3	4	5
1. Admin	29.24					
2. Operator	32.76	*				
3. Tech A	35.46	*				
4. Military	35.76	*				
5. Tech B	38.23	*	*		*	

Factor	Source	df	SS	MS	F
Innov.	Between	4	412.02	103.00	3.32†
	Within	773	23949.48	30.98	
	Total	777	24361.49		

Post Hoc Tests

Family	Mean	1	2	3	4	5
1. Admin	36.06					
2. Military	36.34					
3. Operator	37.14					
4. Tech B	37.68	*				
5. Tech A	37.95					

*Significant at p = 0.05 by Scheffe and Tukey HSD methods
†Significant at p < 0.05
††Significant at p < 0.0001

Directive and Social factors.

CWPI Differences Among Academic Faculties

The a priori hypotheses about differences in CWPI responding in the different academic faculties were tested by individual one-way ANOVAs for each of the CWPI factor raw scores, and are presented in Table 18. No significant differences were found between the faculties for the Methodical or Directive factors. The responses of Science students were significantly higher than Arts and commerce students for the Objective and Innovative factors, and the responses of Arts students were significantly higher than Commerce and Science students for the Social factor. To test for the interaction of faculty and gender a MANOVA of the CWPI factor raw scores by both gender and faculty was performed. There was no significant gender by faculty interaction (approx. $F = 1.32$, $df = 10, 1112$, $p = 0.215$).

CWPI Occupation Cluster Analysis

The results of clustering entry level NCM occupations on the basis of CWPI profiles are presented in Table 16. The seven cluster solution was chosen as having the right balance between detail and parsimony. Using six clusters combined Family 2 and Family 4, while using seven clusters resulted in Family 6 being split into two clusters.

The clusters can be described in terms of their most distinctive CWPI factors. For the most part, there are no readily apparent similarities in the type of work performed in each interest family. Family 1 is most noteworthy for consistently low Innovative scores; Crewman, Boatswain and Mobile Support Equipment Operator all involve operating machinery, Naval Electronic sensor Operator and Photographic Technician involve operating more delicate equipment, and Cook can also be considered to involve operating

Table 18

Oneway ANOVA of CWPI Factors Raw Scores by Faculty

Factor	Source	df	SS	MS	F
Method.	Between	2	38.69	19.35	0.68
	Within	579	16488.37	28.48	
	Total	581	16527.06		
Object.	Between	2	2749.02	1374.51	16.79†
	Within	589	48232.37	81.89	
	Total	591	50981.39		

Post Hoc Tests

	Faculty	Mean	1	2	3
1.	Arts	23.90			
2.	Commerce	25.16			
3.	Science	29.83	*	*	

Innov.	Between	2	1948.35	974.18	28.42†
	Within	584	20020.04	34.28	
	Total	586	21968.40		

Post Hoc Tests

	Faculty	Mean	1	2	3
1.	Arts	32.81			
2.	Commerce	33.51			
3.	Science	37.70	*	*	

Direct.	Between	2	128.33	64.17	1.22
	Within	586	30778.27	52.52	
	Total	588	30906.60		

Factor	Source	df	SS	MS	F
Social	Between	2	2088.92	1044.46	28.64†
	Within	588	21447.24	36.47	
	Total	590	23536.16		

Post Hoc Tests

Faculty	Mean	1	2	3
1. Commerce	36.30			
2. Science	36.35			
3. Arts	40.08	*	*	

*Significant at p = 0.05 by Scheffe and Tukey Methods
†p < 0.0001

machinery and equipment. Family 2 has moderately elevated Objective scores; Artilleryman, Infantryman and Traffic Technician all have a hands-on aspect, while Aerospace Telecommunications and Information Systems Technician, Aviation Systems Technician and Avionics Systems Technician are all of a more obvious technical nature. Family 4, in comparison, has the most highly elevated Objective scores and all deal with the repair and maintenance of large equipment; Hull Technician, Vehicle Technican, and Aircraft Structures Technician all involve work with the structural aspects of ships, automotive vehicles, and aircraft. Family 3 has elevated Methodical scores; occupations in this family are all quite different from each other. Family 5 has low Objective scores, and the occupations all involve equipment operation and administrative duties. Family 6 also has low Objective scores, but also has elevated Social and Directive scores; with the exception of Naval Signalman, three of the four occupations in this family involve dealing with people. Family 7 has both highly elevated Innovative and Directive scores and

include two naval sensing equipment operator occupations and a naval technician occupation.

Discriminant Analysis of Cluster Analysis Results

A stepwise discriminant analysis was performed using the five CWPI factors to predict membership in the seven CWPI families. Mean scores for all the CWPI factors differed significantly across the seven families (see Table 19). As indicated by Wilks'

Table 19

Wilks' Lambda (U-statistic) and Univariate F-ratio with 6 and 509 Degrees of Freedom

Factor	Wilks' Lambda	F	Sig
Method.	0.97	2.45	0.0239
Object.	0.77	24.78	<0.0001
Innov.	0.95	4.13	0.0005
Direct.	0.96	3.32	0.0033
Social	0.93	5.94	<0.0001

lambda, the Objective factor produced the largest effect, which was substantially greater than the effects of the rest of the factors. In stepwise entry, only the Objective and Social factors entered the two discriminant functions; these functions accounted for 91.2% and 8.8% of the total variance accounted for by the discriminant functions. Function 1 is primarily associated with the Objective factor, and Function 2 is primarily associated with the Social factor. Rotating the structure matrix results in two new discriminant functions which account for 76.5% and 23.5% of the variance; the rotated structure matrix is given in Table 20.

Table 20

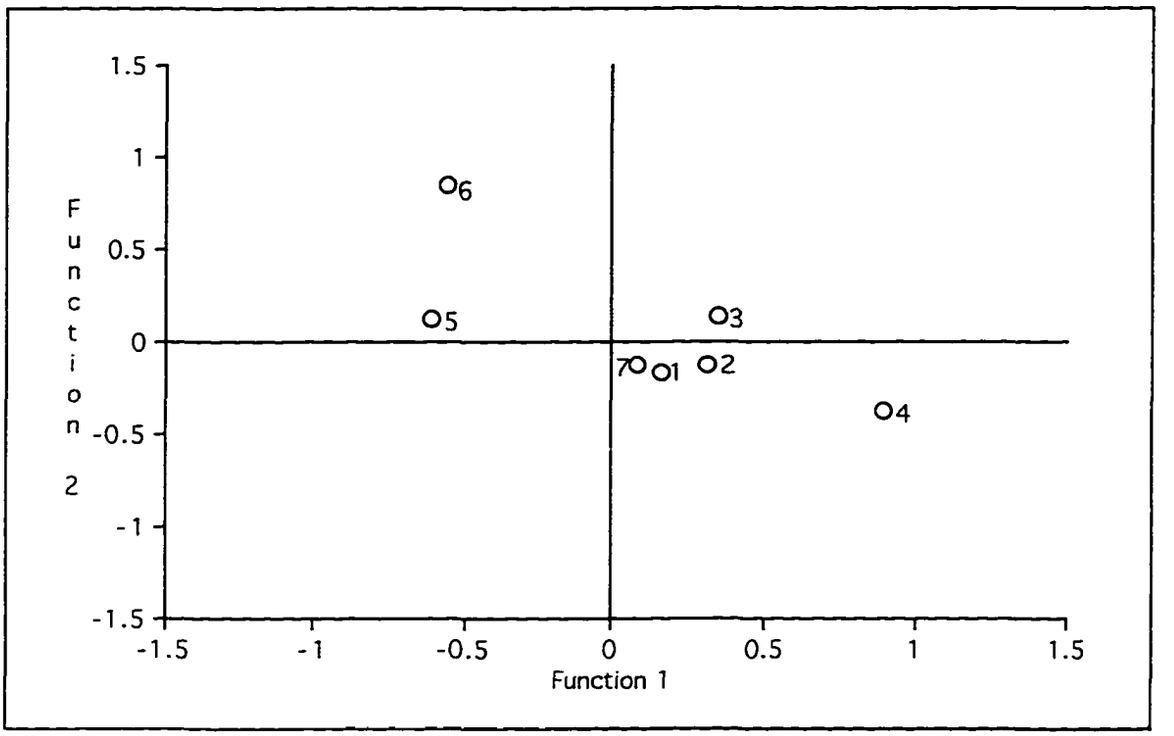
Rotated Correlations Between Discriminant Variables and Canonical Discriminant Functions

Factor	Function 1	Function 2
Object.	0.99	-0.12
Method.	0.30	0.23
Social	0.06	1.00
Direct.	0.02	0.51
Innov.	0.31	0.38

The group centroids, plotted in Figure 1, show that the first function, the Objective function, clearly separates Family 4; Family 4 is the cluster with the most extreme Objective factor scores. The Objective function also clearly separates Families 5 and 6 in a negative direction; these Families both have the lowest Objective factor scores. Function 2, the Social function, separates the families less well, with only Family 6 clearly distinguished; Family 6 has the highest overall Social factor scores.

Classification results for the discriminant functions are reported in Appendix F. The two discriminant functions correctly classified 42.1% of individual occupations (229 out of 544 cases) compared to 23.5% expected by chance based on family group sizes. Only the two largest families, Family 2 (n = 175) and Family 5 (n = 166) had correct classifications (75.4% vs. 32.2% by chance and 58.4% vs. 31.0% by chance, respectively); members from the other families were either classified as Family 2 or Family 5. Similar classification results were obtained when the two discriminant functions were used to classify the hold-out sample. Overall the discriminant functions correctly classified 47.3% of individual occupations (97 of 205 cases) compared to 23.3% expected by chance.

Figure 1: Plot of Group Centroids for Discriminant Functions



Again correct classifications were only obtained in Family 2 and Family 5 (83.8% vs. 32.2% by chance and 62.5% vs. 31.0% by chance).

Discriminant Analysis of Ability Based Occupation Families

A stepwise discriminant analysis was performed using the five CWPI factors to predict membership in the five ability based job families. Mean scores for the Objective and Innovative factors were significant across the five families, with the Methodical factor approaching significance (see Table 21). As indicated by Wilks' lambda, the Objective

Table 21

Wilks' Lambda (U-statistic) and Univariate F-ratio with 6 and 509 Degrees of Freedom

Variable	Wilks' Lambda	F	Sig
Method.	0.98	2.23	0.0647
Object.	0.82	27.58	<0.0001
Innov.	0.97	3.25	0.0120
Direct.	0.99	1.32	0.2598
Social	0.99	1.40	0.2341

factor produced the largest effect, which was substantially greater than the effects of the rest of the factors. In stepwise entry, only the Objective factor entered the discriminant function. Technical B, Technical A and the Military Families are positively associated with the function, and the Operator and Administrative families are negatively associated.

Classification results for the discriminant function are reported in Appendix G. The discriminant function correctly classified 42.4% of individual occupations (225 of 531 cases) compared to 26.2% expected by chance. Only two families, Military and

Administrative had correct classifications (62.1% vs. 29.5% by chance, and 65.8% vs 29.1% respectively); no cases were classified into the Operator or Technical A families, and classifications into the Technical B family was lower than expected by chance (18.1% vs. 28.5%). The Military, Administrative, and Technical B Families each had cases misclassified into the other two families, despite the fact that the Administrative family is the least associated with the Objective factor, and the Technical B Family is the most associated with the Objective factor.

Student Occupation Ratings and CWPI Results

Gender Differences in Occupation Ratings

The mean rating for each occupation by gender is given in Table 22, with t-tests significant at $p \leq 0.001$ indicated (the results of the t-tests for each occupation are reported in Appendix H). Noteworthy gender differences occur in the Military family, with males rating all occupations except Boatswain higher than females, and in the Administrative family, with females rating Administrative Clerk, Steward, and Postal Clerk higher than males. Females also rated the health care occupations, Dental Clinical Assistant and Medical Assistant, higher than males.

Relationships Between Occupational Ratings and CWPI

The correlations between mean occupation rating and mean CWPI factor scores of the raters were Methodical: -0.09, $p = 0.649$; Objective: -0.05, $p = 0.801$; Innovative: -0.01, $p = 0.949$; Directive: 0.08, $p = 0.664$, and Social: 0.05, $p = 0.776$.

To investigate the effect of CWPI factors for each individual occupation rated, hierarchical regression analyses were performed with gender entered at the first step. The full results are reported in Appendix I and a summary of the main findings are reported in

Table 22

Male and Female Means of Occupation Rating Scale

Male Mean	SD	n	Female Mean	SD	n
Military					
Crewman*					
13.25	4.17	89	11.07	4.45	122
Artilleryman (Field)*					
14.07	4.19	97	10.13	4.26	103
Infantryman*					
13.77	4.80	97	10.48	5.00	116
Field Engineer*					
13.98	4.49	92	11.35	4.43	116
Lineman*					
11.91	3.79	90	10.04	3.36	122
Boatswain					
11.73	3.94	90	11.64	3.90	118
Operator					
Meteorological Technician					
13.01	3.59	80	13.71	3.75	129
Air Defence Technician*					
14.45	3.39	87	12.66	3.61	116
Oceanographic Operator					
12.69	3.85	83	13.15	3.77	122
Radio Operator					
13.45	3.35	88	11.88	3.72	121
Naval Combat Information Operator					
14.23	3.56	86	12.67	3.46	124
Communicator Research					
12.91	3.70	91	12.70	3.92	115
Administrative					
Teletype Operator					
11.64	3.56	89	11.52	3.40	115
Administrative Clerk*					
10.23	4.57	98	12.68	3.69	107
Steward*					
9.86	4.05	100	13.34	3.96	105

Male Mean	SD	n	Female Mean	SD	n
Postal Clerk*					
9.12	3.83	94	11.93	3.86	108
Supply Technician					
11.26	3.96	81	11.98	3.74	123
Traffic Technician					
11.42	3.20	88	11.26	3.53	121
Technical A					
Aerospace Telecommunications and Information Systems Technician					
13.04	3.65	96	11.92	4.01	118
Naval Electronics Technician (Acoustics)*					
12.87	3.56	84	10.74	3.73	127
Avionics Systems Technician					
14.06	3.65	103	12.58	3.46	105
Photographic Technician					
13.51	3.62	89	14.13	3.38	114
Construction Engineering Technician					
13.72	4.37	82	12.85	4.39	124
Dental Clinical Assistant*					
11.39	3.99	88	14.34	3.85	116
Technical B					
Hull Technician*					
11.64	4.20	80	9.82	3.30	131
Weapons Technician (Land)*					
13.26	3.52	90	10.86	3.61	117
Aviation Systems Technician					
13.88	3.45	89	12.67	3.66	120
Water, Sanitation and POL Technician					
9.51	4.09	95	9.08	3.60	112
Medical Assistant*					
13.49	3.68	83	15.38	3.81	131
Ammunition Technician					
12.67	4.11	91	11.09	4.05	111

*T-test significantly different at $p \leq 0.001$

Table 23. Significant gender differences in occupation ratings occurred in 11 of the 30 occupations, and the relationship between the subjects' CWPI factors and occupation ratings were significant for 24 of the 30 occupations. A comparison of the CWPI factors rated as significant in the hierarchical regression analyses with the actual CWPI occupation type at the entry level is also given in Table 23.

CWPI and Performance Variables

Direct Relationships Between CWPI and Performance

In order to perform the examination of the relationship between CWPI factors and performance variables, subjects had to have a complete CWPI profile. This requirement resulted in 1736 cases available for analysis. The frequency of responses to course performance questions on the Personnel Survey are given in Table 24 and the frequency of responses to annual Performance Evaluation Rating (PER) questions and day-to-day performance question are given in Table 25. The tendency to over-estimate performance on these questions is readily apparent, with the responses being skewed toward favourable performance. The other variable investigated is full-time service; there were 1692 valid responses, with a mean of 13.63 years, SD = 7.09, ranging from zero to 37 years.

The dichotomous variables of course result (pass/fail) and number of course attempts (one or more than one) were too extremely skewed and the results of logistic regression (not reported) did not approach significance. The regression results for the remaining performance variables are reported in Tables 26 to 30.

For the course performance variables, course grade and course standing, differences in rank, occupation and gender had small but significant effects ($R^2 = 0.0097$ and 0.0082, respectively). Differences in CWPI factors accounted for a greater, but still

Table 23

Summary of Hierarchical Regression Analyses for Variables Predicting Occupation Rating, with Gender Entered at Step 1 and the CWPI Factors Entered at Step 2, and Actual CWPI Occupation Types of Entry-level CF Occupations Determined from the Military Sample

Step 1: Gender		Step 2: Sig. Variables			CWPI
R^2	β	ΔR^2	Var.	β	Type
Military					
Crewman					
0.05	-0.22**	0.04	Object	0.19*	OI/D
Artilleryman (Field)					
0.19	-0.44**	0.08**	Object	0.30**	Odi
			Gender	-0.34**	
Infantryman					
0.10	-0.32**	0.14**	Object	0.36**	Oimd
			Gender	-0.17*	
Field Engineer					
0.08	-0.28**	0.16**	Object	0.34**	OMID
Lineman[a]					
0.06	-0.25**	0.24**	Object	0.52**	MOS
			Direct	0.15*	
Boatswain					
0.00	-0.02	0.13**	Object	0.36**	Omd
			Social	0.17*	
Operator					
Meteorological Technician[a]					
0.01	0.08	0.06*	Innov	0.22**	Dio
Air Defence Technician[a]					
0.07	-0.27**	0.18**	Object	0.25**	ODS
			Innov	0.32**	
			Direct	-0.15*	
Oceanographic Operator[a]					
0.00	0.04	0.07*	Innov	0.17*	Oms
Radio Operator					
0.05	-0.23**	0.10**	Object	0.23**	IDO
			Social	0.19*	
			Gender	-0.19*	
Naval Combat Information Operator[a]					
0.05	-0.22*	0.03	Gender	-0.18*	IOD

Step 1: Gender		Step 2: Sig. Variables			CWPI
R^2	β	ΔR^2	Var.	β	Type
Communicator Research					
0.00	-0.05	0.06*	Innov	0.19*	OI/S
Administrative					
Teletype Operator					
0.00	0.00	0.04			MID
Administrative Clerk					
0.09	0.30**	0.08**	Method	0.27**	DSMI
			Gender	0.26**	
Steward					
0.17	0.41**	0.04	Innov	-0.19*	MDO
			Gender	0.38**	
Postal Clerk[a]					
0.12	0.35**	0.06*	Direct	-0.18*	MO/I
			Social	0.20*	
			Gender	0.28**	
Supply Technician					
0.01	0.11	0.05	Object	0.23**	OIM
Traffic Technician					
0.00	-0.01	0.09**	Method	0.16*	Omid
			Object	0.24**	
Technical A					
Aerospace Telecommunications and Information Systems Technician					
0.02	-0.15*	0.23**	Object	0.29**	OIm
			Innov	0.24**	
Naval Electronics Technician					
0.09	-0.31**	0.12**	Object	0.28**	Oid
			Innov	0.19**	
			Gender	-0.16*	
Avionics Systems Technician					
0.05	-0.22**	0.10**	Object	0.25**	OId
Photographic Technician					
0.01	0.08	0.07*	Method	-0.15*	OIm
			Object	0.24**	
Construction Engineering Technician[a]					
0.01	-0.08	0.21**	Object	0.23**	Omi
			Innov	0.34**	

Step 1: Gender		Step 2: Sig. Variables			CWPI
R^2	β	ΔR^2	Var.	β	Type
Dental Clinical Assistant[a]					
0.10	0.32**	0.02	Gender	0.32**	SMo
Technical B					
Hull Technician					
0.06	-0.24**	0.14**	Object	0.34**	Oim
Weapons Technician (Land)[a]					
0.10	-0.32**	0.12**	Object	0.33**	Odmis
			Gender	-0.20**	
Aviation Systems Technician					
0.03	-0.18*	0.13**	Object	0.34**	Oim
Water, Sanitation and POL Technician[a]					
0.01	-0.11	0.14**	Object	0.38**	Oi(d)
Medical Assistant					
0.04	0.21**	0.10**	Innov	0.23**	SDI
			Social	0.21**	
			Gender	0.16*	
Ammunition Technician[a]					
0.03	-0.18*	0.17**	Object	0.42**	OID

*p < 0.05. **p < 0.01
[a]Occupations with fewer than five members in the data set

small, portion of the variance (ΔR^2 = 0.033 and 0.037, respectively). For both course performance variables, higher grades and standing were associated with lower Methodical factor scores (beta = 0.1410 and 0.1418, respectively) and with higher Innovative factor scores (beta = -0.1206 and-0.0753, respectively). In addition, higher course standing was associated with higher Directive factor scores (beta = -0.1085).

For the work performance variables, PER rating and day-to-day performance, differences in rank, occupation and gender also had relatively small but significant effects (R^2 = 0.0147 and 0.0277, respectively). Differences in CWPI factors accounted for a

Table 24

Frequency of Responses to Course Performance Questions

Variable	Freq.	%	Valid %
Final Course Result			
Pass	1704	98.2	98.4
Fail	7	0.4	0.4
Don't recall	20	1.2	1.2
Missing	5	0.3	-
Total	1736	100.0	100.0
Attempts Required to Pass Course			
One	1683	96.9	97.3
More than one	29	1.7	1.7
Not yet passed	6	0.3	0.3
Don't recall	12	0.7	0.7
Missing	6	0.3	-
Total	1736	100.0	100.0
Grade on Course			
A	557	32.1	32.2
B	541	31.2	31.3
C	110	6.3	6.4
D	3	0.2	0.2
F	2	0.1	0.1
No grade	328	18.9	18.9
Don't recall	190	10.9	11.0
Missing	5	0.3	-
Total	1736	100.0	100.0
Course Standing			
Top third	922	53.1	53.4
Middle third	353	20.3	20.4
Bottom third	109	6.3	6.3
No standing	198	11.4	11.5
Don't recall	145	8.4	8.4
Missing	9	0.5	-
Total	1736	100.0	100.0

Table 25

Frequency of Responses to PER and Daily Performance Questions

Variable	Freq.	%	Valid %
Last PER Performance Rating			
Outstanding	337	19.7	19.7
Superior	707	40.7	41.3
Normal	601	34.6	35.1
Adverse	15	0.9	0.9
Don't recall	53	3.1	3.1
Missing	23	1.3	-
Total	1736	100.0	100.0
Overall Numerical Average on Last PER (applies to NCMs only)			
N/A (officer)	401	23.1	24.0
3.0 - 3.9[a]	4	0.2	0.2
4.0 - 4.9	3	0.2	0.2
5.0 - 5.9	6	0.3	0.4
6.0 - 6.9	34	2.0	2.0
7.0 - 7.9	489	28.2	29.2
8.0 - 8.9	389	22.4	23.3
9.0 - 9.9	82	4.7	4.9
Don't recall	265	15.3	15.8
Missing	63	3.6	-
Total	1736	100.0	100.0
Personal Rating of Day-to-day Performance			
Outstanding	257	14.8	14.9
Superior	668	38.5	38.7
Above average	572	32.9	33.1
Average	190	10.9	11.0
Below average	9	0.5	0.5
Can't estimate	30	1.7	1.7
Missing	10	0.6	-
Total	1736	100.0	100.0

[a]A rating of 3.0 indicates poor performance, and a rating of 9.9 indicates exemplary performance.

Table 26

Hierarchical Regression Analysis for Variables Predicting Course Grade, with Occupation, Rank, and Gender Entered at Step 1, and the CWPI Factors Entered at Step 2 (n = 1187)

Variable	B	SE B	β	p
Step 1				
Occupation	-0.00	0.00	-0.07	0.0028
Rank	0.02	0.02	0.02	0.4514
Gender	-0.05	0.05	-0.03	0.3714
Step 2				
Method.	0.01	0.00	0.14	<0.0001
Object.	0.00	0.00	0.06	0.0907
Innov.	-0.01	0.00	-0.12	0.0005
Direct.	-0.00	0.00	-0.04	0.2434
Social	0.00	0.00	0.04	0.2520
Occupation	-0.00	0.00	-0.09	0.0096
Rank	0.06	0.02	0.08	0.0245
Gender	-0.01	0.06	-0.01	0.8232

Note. $R^2 = 0.0097$ for Step 1 ($p = 0.0089$); $\Delta R^2 = 0.0332$ for Step 2 ($p < 0.0001$).

greater, but still small, portion of the variance for the PER rating ($\Delta R^2 = 0.0480$), and a more substantial effect for day-to-day performance ($R^2 = 0.1544$). For both work performance variables, better performance ratings were associated with lower Methodical factor scores (beta = 0.0848 and 0.0429, respectively), with lower Directive factor scores (beta = -0.1916 and -0.3713, respectively). In addition, higher Objective factor scores (beta = 0.0789 and 0.1015, respectively), and with higher day-to-day ratings were associated with higher Innovative factor scores (beta = -0.0655).

For the fulltime service variables, rank, occupation and gender accounted for the majority of the variance ($R^2 = 0.1998$). The CWPI factors accounted for a small but

Table 27

Hierarchical Regression Analysis for Variables Predicting Course Standing, with Occupation, Rank, and Gender Entered at Step 1, and the CWPI Factors Entered at Step 2 (n = 1359)

Variable	B	SE B	β	p
Step 1				
Occupation	-0.00	0.00	-0.10	0.0011
Rank	-0.04	0.02	-0.06	0.0511
Gender	0.06	0.05	0.04	0.1760
Step 2				
Method.	0.01	0.00	0.14	<0.0001
Object.	0.00	0.00	0.02	0.5559
Innov.	-0.01	0.00	-0.08	0.0201
Direct.	-0.01	0.00	-0.11	0.0013
Social	0.00	0.00	0.03	0.3412
Occupation	-0.00	0.00	-0.11	0.0009
Rank	0.00	0.02	0.00	0.9469
Gender	0.06	0.05	0.04	0.2357

Note. $R^2 = 0.0082$ for Step 1 ($p = 0.0107$); $\Delta R^2 = 0.0337$ for Step 2 ($p < 0.0001$).

significant difference ($\Delta R^2 = 0.0100$), with longer service associated with lower Innovative factor scores (beta = -0.0987) and higher Directive factor scores (beta = 0.0972).

Congruence Indices and Performance

The number of occupation members who matched the high letter code for their occupation was 1490, and those who did not match was 246. The distribution of results for the Differentially Adjusted Vocational Equating (DAVE) Index is given in Table 31. The mean of this index is 7.12, SD =3.44. The mean of the three CWPI factor scores which were used to calculate the three PICS variables were 59.10 (SD = 5.84),

Table 28

Hierarchical Regression Analysis for Variables Predicting PER Performance, with Occupation, Rank, and Gender Entered at Step 1, and the CWPI Factors Entered at Step 2 (n = 1629)

Variable	B	SE B	β	p
Step 1				
Occupation	-0.00	0.00	-0.12	0.0001
Rank	-0.10	0.02	-0.13	<0.0001
Gender	0.07	0.05	0.04	0.1645
Step 2				
Method.	0.01	0.00	0.08	0.0015
Object.	0.01	0.00	0.08	0.0075
Innov.	-0.00	0.00	-0.01	0.6789
Direct.	-0.02	0.00	-0.19	<0.0001
Social	0.00	0.00	0.01	0.8103
Occupation	-0.00	0.00	-0.12	0.0001
Rank	-0.04	0.02	-0.05	0.1316
Gender	0.11	0.05	0.06	0.0344

Note. $R^2 = 0.0147$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.0480$ for Step 2 ($p < 0.0001$).

54.56 (SD = 6.23), and 49.92 (SD = 7.05). The mean of PICS2 is 113.66 (SD = 10.49), and the mean of PICS3 is 163.58 (SD = 15.08). The correlation matrix of the congruence indices is given in Table 32; both the parametric and nonparametric correlation coefficients are reported, after the reporting procedure used in Esformes et al (1994).

The a priori prediction that senior ranking occupation members would have less variability in CWPI type than junior members was tested by Levene's test of unequal variance for the DAVE and PICS indices. The results for NCMs, reported Table 33, show no significant differences between Junior and senior NCMs. The results for officers,

Table 29

Hierarchical Regression Analysis for Variables Predicting Day-to-day Performance, with Occupation, Rank, and Gender Entered at Step 1, and the CWPI Factors Entered at Step 2 (n = 1665)

Variable	B	SE B	β	p
Step 1				
Occupation	-0.00	0.00	-0.14	<0.0001
Rank	-0.17	0.03	-0.18	<0.0001
Gender	0.15	0.06	0.07	0.0059
Step 2				
Method.	0.01	0.00	0.05	0.0429
Object.	0.01	0.00	0.10	0.0002
Innov.	-0.01	0.00	-0.07	0.0159
Direct.	-0.04	0.00	-0.37	<0.0001
Social	0.00	0.00	0.03	0.2634
Occupation	-0.00	0.00	-0.14	<0.0001
Rank	-0.05	0.03	-0.06	0.0366
Gender	0.16	0.06	0.07	0.0054

Note. $R^2 = 0.0277$ ($p < 0.0001$) for Step 1; $\Delta R^2 = 0.1544$ for Step 2 ($p < 0.0001$).

reported in Table 34, show a significant difference in the predicted direction between the variability of junior and senior officers for the DAVE index only. The correlations of the congruence indices with the performance variables are given in Tables 35 and 36. None of the congruence indices were significantly related to the course performance variables. While there is a significant correlation between course standing and the DAVE, PICS2 and PICS3 indices, the skewed distribution of this variable make the nonparametric correlation statistic more appropriate; the Spearman correlation coefficient for the PICS3 approaches significance but the PICS2 and DAVE indices do not.

Table 30

Hierarchical Regression Analysis for Variables Predicting Fulltime Service, with Occupation, Rank, and Gender Entered at Step 1, and the CWPI Factors Entered at Step 2 (n = 1667)

Variable	B	SE B	β	p
Step 1				
Occupation	0.01	0.00	0.38	<0.0001
Rank	3.48	0.19	0.48	<0.0001
Gender	-3.58	0.40	-0.20	<0.0001
Step 2				
Method.	0.04	0.03	0.04	0.1238
Object.	0.04	0.02	0.05	0.0899
Innov.	-0.10	0.03	-0.10	0.0002
Direct.	0.09	0.03	0.10	0.0005
Social	-0.02	0.02	-0.02	0.4067
Occupation	0.01	0.00	0.38	<0.0001
Rank	3.50	0.20	0.48	<0.0001
Gender	-3.24	0.44	-0.18	<0.0001

Note. $R^2 = 0.1998$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.0100$ for Step 2 ($p = 0.0008$).

For the work performance variables, a clear relationship emerges between reported day-to-day performance and PICS2 (with parametric and nonparametric correlation coefficients of -0.13), and PICS3 (with parametric and nonparametric correlation coefficients of -0.16 and -0.15). The nonparametric correlation between day-to-day performance and PICS1, -0.057, although small, is also significant.

The relationship between congruence indices and performance variables shows a different pattern when examined separately within the officer and NCM samples. An overall PER numerical rating is a feature of NCM PERs that is not used for officer PERs.

Table 31

Frequency of DAVE Index Weights

Weight	Freq.	%
10	642	37.0
9	164	9.4
8	366	21.1
7	21	1.2
6	121	7.0
5	52	3.0
4	24	1.4
3	8	0.5
2	96	5.5
1	95	5.5
0	147	8.5
Total	1736	100.0

Table 32

Parametric and Nonparametric Intercorrelations of Congruence Indices (n = 1736)

Index	Correlation	Match	DAVE	PICS1	PICS2
DAVE	P.[a]	-0.63			
	S.[b]	-0.54			
PICS1[c]	P.	-0.46	0.40		
	S.	-0.41	0.28		
PICS2	P.	-0.27	0.38	0.86	
	S.	-0.24	0.31		
PICS3	P.	-0.17	0.27	0.74	0.91
	S.	-0.15	0.25		

[a]P. = Pearson correlation coefficient
[b]S. = Spearman nonparametric correlation coefficient
[c]The PICS variables can be considered interval scale measures; parametric correlations are appropriate for these measures, making the nonparametric correlations unnecessary.

Table 33

Levene's test of Unequal Variance Between Junior and Senior NCMs For DAVE and PICS Indices

Index	Jr NCM		Sr NCM		F
	Mean	SD	Mean	SD	
DAVE	7.26	3.38	7.03	3.47	1.38
PICS1	59.70	6.03	58.94	5.98	0.45
PICS2	114.50	10.72	113.77	10.42	0.28
PICS3	164.13	15.80	164.77	14.65	2.65

Table 34

Levene's test of Unequal Variance Between Junior and Senior Officers For DAVE and PICS Indices

Index	Jr Officer		Sr Officer		F
	Mean	SD	Mean	SD	
DAVE	6.74	3.60	7.61	3.08	13.33**
PICS1	58.00	5.43	58.67	4.61	3.75*
PICS2	111.92	10.23	112.44	9.27	0.32
PICS3	161.54	14.26	161.09	13.48	0.42

*$p = 0.053$
**$p < 0.001$

Table 35

Correlations of Congruence Indices with Course Performance Variables

Index	Correlation	Course[a]	Attempt[b]	Grade[c]	Standing[d]
Match	P.[e]	-0.03	0.02	0.00	0.03
	S.[f]	-0.03	0.02	0.01	0.02
DAVE	P.	-0.01	-0.01	-0.03	-0.06*
	S.	-0.00	-0.00	-0.04	-0.04
PICS1	P.	0.02	0.03	-0.01	-0.03
	S.	0.02	0.03	-0.02	-0.02
PICS2	P.	0.03	0.01	-0.04	-0.06*
	S.	0.02	0.01	-0.04	-0.05
PICS3	P.	0.02	0.03	-0.03	-0.05*
	S.	0.01	0.02	-0.03	-0.05

*$p < 0.05$
[a]Course = course result (n = 1711): 1 = pass, 2 = fail.
[b]Attempt = attempts to pass course (n = 1712): 1 = one, 2 = more than one.
[c]Grade (n = 1213): 1 = A, 2 = B, 3 = C, 4 = D, 5 = F.
[d]Stand = course standing (n = 1384): 1 = top third, 2 = middle third, 3 = bottom third.
[e]P. = Pearson correlation coefficient.
[f]S. = Spearman nonparametric correlation coefficient.

The correlations between this numerical rating and congruence indices are presented in Table 37. There is a significant relationship between a CWPI profile match and the numerical rating, with a correlation coefficient of 0.10. The relationship between the numerical rating and PICS1 is small but significant parametrically, but not significant non-parametrically.

The course performance results for NCMs are similar to that of the entire sample. For performance variables, a significant correlation emerges between the CWPI profile

Table 36

Correlations of Congruence Indices with Work Performance Variables

Index	Correlation	PER[a]	Daily[b]	Fulltime[c]
Match	P.	-0.03	-0.03	-0.03
	S.	-0.02	-0.03	-0.03
DAVE	P.	0.02	-0.00	0.04
	S.	0.02	0.02	0.03
PICS1[d]	P.	0.02	-0.04	0.00
	S.	0.01	-0.06*	
PICS2	P.	-0.02	-0.13**	-0.01
	S.	-0.02	-0.13**	
PICS3	P.	-0.04	-0.16**	-0.01
	S.	-0.04	-0.15**	

*p < 0.05. **p < 0.001

[a]PER = PER performance rating (n = 1660): 1 = outstanding, 2 = superior, 3 = normal, 4 = adverse.

[b]Daily = rating of day-to-day performance (n = 1696): 1 = outstanding , 2 = superior, 3 = above average, 4 = average, 5 = below average.

[c]Fulltime (n = 1692) = years of fulltime service.

[d]The PICS variables and the fulltime variable can be considered interval scale measures; parametric correlations are appropriate for these measures, making the nonparametric correlations unnecessary.

matching index and PER performance rating: the parametric correlation is -0.066 (p = 0.023) and the nonparametric correlation of is -0.063 (p = 0.030), with n = 1197. The same relationship found between day-to-day performance rating and PICS2 and PICS3 in the entire sample is also evident in the NCM sample. For PICS2, the parametric and nonparametric correlation coefficient are -0.126 (p = 0.000) and -0.123 (p = 0.000), respectively; for PICS3 the coefficients are -0.180 (p = 0.000) and -0.173 (p = 0.000),

Table 37

Correlations of Congruence Indices with Overall NCM PER Numerical Rating (n=960)

Index	Correlation	PER
Match	P.	0.10
	S.	0.10
DAVE	P.	-0.05
	S.	-0.05
PICS1	P.	-0.08
	S.	-0.06
PICS2	P.	-0.01
	S.	-0.02
PICS3	P.	0.02
	S.	0.02

Note. The numerical values were coded: 2 = 3.0-3.9; 3 = 4.0- 4.9; 4 = 5.0-5.9; 5 = 6.0-6.9; 6 = 7.0-7.9; 7 = 8.0-8.9; 8 = 9.0-9.9. A rating of 3.0 indicates poor performance, and a rating of 9.9 indicates exemplary performance.

with n = 1222. In addition, a significant relationship emerges with the profile matching index: the parametric and nonparametric correlation coefficients are -0.079 (p = 0.006) and -0.078 (p = 0.007).

The correlations between congruence indices and performance variables for the officer sample are substantially different from those obtained for entire sample and for the NCM sample, and warrant separate presentation in Tables 38 and 39. Unlike the entire sample, many significant correlations appear between the course performance variables and the congruence indices. The correlations with the number of attempts required to pass and PICS1 (-0.1032 and -0.0939) and PICS2 (-0.1443 and -0.1259), both parametric

Table 38

Correlations of Congruence Indices with Course Performance Variables for Officers Sample

Index	Correlation	Course (n=467)	Attempt (n=470)	Grade (n=293)	Standing (n=349)
Match	P.	-0.02	0.07	0.13*	0.14**
	S.	-0.02	0.07	0.14*	0.13*
DAVE	P.	0.04	-0.08	-0.14*	-0.13*
	S.	0.05	-0.05	-0.16**	-0.13*
PICS1	P.	0.06	-0.10*	-0.14*	-0.12*
	S.	0.06	-0.09*	-0.14*	-0.11*
PICS2	P.	0.07	-0.14**	-0.13*	-0.13*
	S.	0.07	-0.13**	-0.12*	-0.11*
PICS3	P.	0.07	-0.09	-0.09	-0.09
	S.	0.07	-0.09*	-0.09	-0.09

*$p < 0.05$. **$p < 0.01$

and nonparametric are significant; the correlations with PICS3 is significant non-parametrically (-0.0921), but not significant parametrically (-0.0856). For the variables of course grade and course standing, all congruence indices are significant except for PICS3. For the day-to-day performance variable, all congruence indices are significant.

A separate analysis of the correlations between congruence indices and performance variables was carried out with entry level NCMs only. The means of the CWPI factors including both Junior and Senior NCMs and with the Junior NCMs only is presented in Table 40. There are slight differences in the Objective and Directive factors between the two groups. All congruence indices were recalculated using the results from

Table 39

Correlations of Congruence Indices with Work Performance Variables for Officers Sample

Index	Correlation	PER (n=454)	Daily (n=465)	Fulltime (n=464)
Match	P.	0.07	0.11*	-0.06
	S.	0.07	0.10*	-0.05
DAVE	P.	-0.03	-0.12**	0.06
	S.	-0.03	-0.10*	0.05
PICS1	P.	-0.06	-0.17***	0.02
	S.	-0.07	-0.20***	
PICS2	P.	-0.08	-0.18***	-0.03
	S.	-0.09	-0.18***	
PICS3	P.	-0.05	-0.12**	-0.06
	S.	-0.07	-0.14**	

*p < 0.05. **p < 0.01. ***p < 0.001

Table 40

Mean CWPI Raw Score and T-score for Entry Level Occupations with Senior NCMs Included (n = 1141) and with Junior NCMs Only (n = 763)

Factor	All NCMs		Junior NCMs	
	Raw	T-score	Raw	T-score
Method.	36.02	51.65	36.17	51.84
Object.	33.97	55.95	34.70	56.67
Innov.	36.97	53.14	36.92	53.06
Direct.	37.44	52.75	36.54	51.71
Social	35.92	49.59	35.82	49.47

the junior rank members of entry level NCM occupations. This sample contained 763 valid cases for subsequent analysis. The results obtained from the entry level Junior NCM were similar to those obtained for the entire NCM sample. For the course performance variables, unlike the entire NCM sample, the CWPI matching index was significantly correlated with course grade: -0.086 (p=0.050) and -0.090 (p=0.42), n = 516. Similar to the entire NCM sample, the CWPI matching index was significantly correlated with overall PER rating (parametric: -0.092, p = 0.014; nonparametric: -0.094, p = 0.012; n = 718) and with the numerical PER rating (parametric: 0.085, p = 0.050; nonparametric: 0.10, p = 0.022; n = 526). For day-to-day performance, there were similar correlations with PICS2 (parametric: -0.127, p = 0.001; nonparametric: -0.142, p < 0.001) and PICS3 (parametric: -0.159, p < 0.001; nonparametric: -0.1704, p < 0.001) with n = 745. Unlike the overall NCM sample, there was no significant correlation with the CWPI matching index, but there was with the DAVE index (parametric: 0.082, p = 0.025; nonparametric: 0.108, p = 0.003).

Discussion

Application of the CWPI to Different Sub-populations

The CWPI is a psychometrically adequate instrument for measuring vocational interests. The five factor structure is an acceptable description of the pattern of CWPI responding, and was supported in both the military and student samples. Each of the factors appears to measure distinct types of vocational interests. This is borne out by the support for a priori predictions about gender differences and different factor distributions in CF occupations and in different academic faculties.

The predicted gender difference that males would score more highly than females on the Objective scale was quite substantial in both the military and student samples. The gender difference for the Social scale was also as predicted, moreso in the student sample than in the military sample. Gender differences were found in the other scales; however, these differences, although significant, were quite small, with the mean raw score differences ranging between one and two.

Based on the main gender difference in Objective factor scores, using the CWPI in the classification of military personnel would result in females tending to be assigned more to the "non-hands on" administrative and operator occupations than the "hands-on" technical and combat occupations. In light of Holland's theory, a less Objectively oriented person in a less Objectively oriented occupations should be more congruent, and thus more productive and satisfied. While the mean female Objective scores are lower than the mean male scores, there is still a broad range of scores within both genders. Using CWPI scores in selection would allow females with high Objective interests to be assigned to occupations in line with their interests.

The foregoing notwithstanding, the gender differences noted could represent an "adverse impact" on the placement of females into Objectively oriented occupations. This could necessitate producing separate norms for males and females. In the absence of evidence of a clear relationship between CWPI responding and performance, at best the CWPI results could be used for guidance in the selection of an occupation. For example, applicants who score more highly relative to the norms established for their gender on the Objective factor could be counselled to consider Objectively oriented occupations over non-Objectively oriented occupations, provided that they also meet the aptitude requirements.

The results obtained for the French and English versions of the CWPI were similar. Although significant differences were noted between the versions, the actual raw score differences were less than one. In addition, the Francophone results were higher than the Anglophone on these scales; using the current CWPI norms which combine Anglophone and Francophone results would favour the Francophone examinees. This could also necessitate the establishment of separate Anglophone and Francophone norms, as is currently the case with CF aptitude tests. Further analysis would be required to determine if the two versions of the CWPI are actually equivalent. The CWPI Manual indicates that the CWPI factor structure also emerged in the Francophone sample tested. However, on the basis of the present results the differences found in Anglophone and Francophone responding can not be definitively attributed to differences in the test versions or to culturally based differences in how the CWPI factors apply to the different populations.

No significant differences were found for the designated "non-Anglo/Franco" subjects in the military sample, although this group represented a very small proportion of

that sample. Differences were found between the designated "non-Anglo" subjects and the remaining "Anglo" subjects in the student sample. The "non-Anglo" sample scored higher for all CWPI factors, with significant differences for the Objective and Innovative factors; the mean raw score differences for the latter factors was less than three. On the basis of this "non-Anglo" group, using the CWPI for selection and classification would tend to favour "non-Anglo" applicants. However, the present "non-Anglo" group can not be considered as representative of CF applicants because many university foreign students are not Canadian citizens, and would not be eligible for military service in Canada.

The designated "non-Anglo" and "non-Anglo/Franco" represent a very rough means of investigating potential cultural biases of the CWPI. The present concern with promoting cultural diversity within the CF is focused on visible minorities and persons of aboriginal status. A larger sample of these designated groups than that in the present military sample would be required to perform the item analysis required to properly investigate cultural bias in the CWPI.

CWPI Characteristics of Different Occupations

The a priori predictions about CWPI differences between occupations were supported in general, although not always in specifics. The results obtained both clarify the nature of the CWPI factors and of the work performed by officers and NCMs. The prediction that the Methodical factor describes the work performed at junior levels of employment was not quite correct. The results show that this factor is more descriptive of the interests of NCMs versus those of officers, with senior officers scoring the lowest on this scale. Similarly, for the Objective factor, it is NCMs more so than officers whose interests relate to hands on duties, with Junior NCMs showing more hands on interests

than senior NCMs. The case is somewhat different for the Directive factor, with Junior NCMs scoring the lowest on this scale and both Senior NCMs and junior officers scoring about the same. While the Methodical results indicate that the Junior officers and NCMs are more oriented toward receiving orders to be carried out, the Directive factor indicates that junior officers and Senior NCMs in turn are more oriented to direct the activities of others.

The prediction that officers would score higher on the Innovative factor was not supported. Because a university degree is the typical entry requirement for officers, officers have more formal academic training than NCMs. In addition, many officer occupations are related to engineering, which is more directly related to the scientific and problem solving orientation of the Innovative factor. However, many NCM occupations are technically oriented and would have also have a scientific orientation, which is descriptive of the Innovative factor. The problem solving aspect of the Innovative factor is common to all military occupations, and could account for the lack of differentiation between officers and NCMs.

The results of the Directive factor may point to a developmental aspect in vocational interests. This is most clearly seen in the differences between Junior and Senior NCMs. Given that all Senior NCMs were once Junior NCMs, a number of possible explanations could account for the increase in Directive scores. Junior NCMs who show an interest in leadership activities as reflected in an elevated score on the Directive factor could be the individuals more likely to be promoted to Senior NCM. Conversely, Junior NCMs who do not show an interest in leadership activities may select themselves out of promotions to Senior NCM by declining promotions to Senior NCM, by transferring to

other occupations where they would, in effect, start over as entry level Junior NCMs, or by leaving the Regular Force. Another explanation is that with increasing rank comes increasing supervisory responsibilities; NCMs may adapt to the change by developing a preference for these leadership aspects of their employment, which is reflected in higher Directive scores.

The CWPI differences in individual NCM occupations found in the military sample were generally as predicted. Occupations characterized as hands on typically had elevated Objective scores and occupations not considered hands on had lower scores. This result was most clearly seen in the differences between the ability based job families, with the Administrative family scoring lowest on the Objective factor, followed by the Operator Family, the Technical A and Military families, and the Technical B family scoring the highest.

Support for the prediction that the Innovative factor would be higher in technical occupations was mixed. While many of the technically oriented occupations did have elevated scores, the majority of the naval operator occupations also had relatively high scores. This could reflect the level interest in the scientific knowledge required to understand sophisticated naval equipment, or the problem solving aspect of the Innovative factor being prevalent in these occupations. However, the overall differences in the Innovative factor among the ability based occupation families, although significant, were not large.

CWPI Characteristics of Different Faculties

Most of the a priori predictions about the CWPI types of students in different faculties were supported. As predicted, there were no differences in the students on the

Methodical factor. Science students scored more highly than Arts and Commerce students on the Objective and Innovative factors, and Arts students scored more highly on the Social factor than Commerce and Science students. The a priori prediction that Commerce students would be score more highly on the Directive scale was not supported. An interest in directing the activities of others does not appear to be more of a business related activity as originally predicted; the present results indicate that leaders (and followers) can come from every academic discipline.

Discriminant Analysis

The CWPI can be used to meaningfully describe military occupations. However, the results of the discriminant analyses indicate that it did not fare as well in predicting military occupation family membership. The first discriminant analysis was the prediction of membership in occupation families based on CWPI results. The main discriminator between the families was the Objective factor. The discriminant function classified all the five families with predominantly positive Objective z scores as one family, and the remaining two families with negative Objective z scores into another. For practical application in the classification of military personnel, this result would equate to a dichotomous choice, with assignment to either the high or low Objective score occupations.

The second discriminant analysis examined the prediction of membership in the five ability based occupation families. Only the Objective factor discriminated among the families. While family membership prediction was better than chance, the results suggest that the CWPI would not be useful as a primary predictor of family membership.

A limitation to the CWPI cluster analysis and both discriminant analyses was the

relatively small number of members represented in some of the occupations. The Catano and Ibel (1995) cluster analysis was based on a solid representative sample of occupation members, and the results of that study can be interpreted with a good degree of confidence. In the present study, entry level occupations with five or more members were used in the analyses, resulting in only 34 occupations being represented. A problem with the analysis using the ability based families was the disproportionate distribution of family members. This limited the predictive ability of the discriminant function, as can be seen in the 0% correct predictions for the Operator and Technical A families, the two families with the fewest members.

Another difficulty with the "entry-level" sample is that it may not be representative of entry level personnel. In the Personnel Survey, NCM rank was either Junior or Senior NCM. Junior NCM includes the entry level rank of Private, but also includes the rank of Corporal, which is typically achieved after four years of service and the rank of Master Corporal. The latter rank includes supervisory duties and, as discussed previously, is the point at which more time is spent with Directive oriented tasks, thus making the job of a Master Corporal different from the job of other junior NCMs.

CWPI Factors and Occupation Ratings

The main difficulty with the occupation rating method used in this study was the use of a random sample of occupations for students to rate. While this method gives information on the relationship between CWPI factors and occupation ratings for each of the 30 individual occupations rated, it effectively limited the investigation of the overall relationship of the CWPI factors to occupation ratings. As determined in the present study, there is no relationship between occupation rating and CWPI factor data.

Looking at the results from the individual occupations indicate that there is a relationship between occupational ratings and CWPI data. These results are most clearly seen in the Military, Technical A, and Technical B families. In these families, the significant CWPI variables that predict the occupation rating match the CWPI occupation profile based on the CWPI profile of individual occupation members. For each occupation in the Military family, the Objective factor is predominant in the occupation profile; the Objective factor was also significantly related to the student rating for each occupation. A similar relationship holds for the Objective factor in the Technical A and Technical B families, and to a lesser extent for the Innovative factor in these families. Some of the military CWPI occupation profiles must be interpreted with caution because they are based on a very small sample of occupation members.

The foregoing result provides support for Holland's theory. Within the limitations of the design of the study, the best way to state the findings is that there is a relationship between student CWPI factors and their rating of different CF occupations, and for many of the occupations the CWPI factor which is significant in the rating is the CWPI factor that is predominant in the occupation. The foregoing mainly applies to the Objective factor. It appears that from reading the description of the sample of CF occupations used in the study that students can recognize the hands-on nature of many of these occupations, and the students' rating of these occupations is related to their own interest in Objective factor related activities.

There are clearly gender differences in the rating of the occupations. The implications of these differences for selection and classification are that despite a candidate having tested interest scores related to an occupation (or even the aptitude for an

occupation), they may not want to serve in that occupation because of gender based differences in the perception of the occupation. For example, despite having the aptitude to be an Artilleryman (Field), a female would be less likely to want to serve in that occupation than a male, and despite having the aptitude to be a Steward, a male would be less likely to want to serve in that occupation than a female. While the foregoing may seem fairly obvious, it does have implications for gender equity: it would be difficult to balance the gender ratio of occupations if females do not find those occupations attractive. The foregoing comments are based upon group statistics. Given a range of scores for the ratings, there would be, for example, some females who would rate Artilleryman (Field) as an acceptable occupation; thus, when viewed on an individual basis, a favourable combination of aptitude, interest, and occupational attractiveness rating could result in a better match between the individual and the occupation.

Relationships Between the CWPI and Performance Variables

A similar pattern of results occurred between the direct relationships between CWPI factors and course performance variables for the entire military sample. For both course grade and course standing, higher Methodical factor scores were associated with poorer performance and higher Innovative factor scores with better performance. This indicates that an interest in problem solving, rather than a preference for carrying out assigned tasks, may make the difference to successful performance on military courses. An additional feature for course standing is that higher standing is associated with higher Directive scores. This may reflect the emphasis on leadership which is common to all military training courses.

The pattern of results for the job performance variables are somewhat different

from those for course results. For the PER performance variable, higher scores on both the Methodical factor and the Objective factor are associated with poorer performance, and there is a stronger association between higher Directive factor scores and better PER performance evaluations. A similar pattern occurs for self ratings of day-to-day performance, except that the Innovative factor is associated with better performance and the association with the Directive factor is even stronger. These results together indicate that an interest in leadership, as measured by the Directive factor, is what is important in how a military member views their own performance, and how others evaluate performance on the PER.

There were small but significant relations between CWPI factors and length of full time service. The results indicate that with longer service there is a decrease in the Innovative factor and an increase in the Directive factor. The latter result is understandable in terms of increasing rank with increasing tenure, and the noted increase in Directive factor scores with higher rank; decreasing interests in problem solving with increasing rank is not a result that can be interpreted in any straightforward manner. However, even stronger associations with fulltime service occur among different occupations and with rank. There is also a gender difference, with females having less fulltime service than males.

Congruence

The different congruence indices used in the present study produced different patterns of results, and different results were obtained in the officer and NCM samples. Overall, the relationship between congruence indices and course performance are negligible. For work performance variables, there are significant relationships between the

PICS variables and self reported day-to-day performance, ranging up to 0.15 for PICS3 for the overall sample and 0.18 for the NCM sample. The situation for officers is quite different. Congruence indices are significantly correlated with course results and all congruence indices are significantly related to day-to-day performance.

Overall, the results provide only modest support for Holland's congruence theory. The only variable which produced positive results is with self reported day-to-day performance. This variable can be viewed as related to self reports of job satisfaction in that it is entirely the subject's opinion, rather than an external measure like course performance or performance evaluation. In this case, there is a relationship between having similar interests as the majority of others in an occupation and perceived performance.

The results obtained for the officer sample examined separately are more supportive of the congruence theory. Congruence indices showed more relationships with course performance and day-today performance, but not with PER performance. The difference in results can be explained by the role of officer corps being more directly focussed on leadership. Officers reported higher overall Directive scores than NCMs which in turn is reflected in the CWPI type of officer occupations having an elevated Directive component. Individual officers would more likely be congruent with their occupation if they had relatively elevated Directive factor scores. Officer training has a strong leadership component, and the more congruent individuals, i.e. more Directive, could be more likely to achieve better course results.

The prediction that there would less variability in congruence among senior occupation members also received some support for officers, but not for NCMs. There

are differences between the CWPI profiles of Senior NCMs and Junior NCMs which can be attributed to the differences in the type of work performed by these two groups. With occupation profiles calculated as the mean of the CWPI factor scores for the personnel in the occupation, Senior NCM profiles would be less like the occupation profiles, which would more closely resemble the profiles of Junior NCMs because of their greater numbers. As a result, Senior NCMs would be less congruent than Junior NCMs. In the case of officers, the Directive factor is a predominant factor in the CWPI occupation profile. As a group, senior officers scored more highly on the Directive factor, and would be more alike as this similarity is translated into congruence indices.

There is no relationship between congruence indices and full time service. Tenure in the CF can be fairly automatic with clearly defined lengths of contract. Serving under a contract may serve to retain incongruent members in an occupation, rather than to adapt or leave as predicted by the theory. In cases where tenure is linked to performance, insofar as the results obtained indicate that measured performance is unrelated to congruence, it would also not be linked to tenure.

A number of problems occurred with examining congruence in the present study. The first set of problems relates to the measurement of congruence. The first step in measurement was to determine the CWPI type of an occupation by averaging the CWPI profiles of an occupation's members. There are differences in the interests of junior and senior occupation members; in other words, the work performed by a senior member in an occupation is not the same as the work performed by a junior member. However, even calculating congruence using the entry level NCMs still produced similar results. At the Junior NCM level there are differences between the work performed at the different rank

levels. This is especially the case with the Junior NCM rank of Master Corporal, which is typically includes supervisory duties.

The next step in congruence measurement is the calculation of congruence indices. There is a certain amount of arbitrariness in the calculation of these indices. In previous research, for example, an individual's high point code was simply the interest factor with the highest numerical value. In the present study, an attempt was made to incorporate the standard error of measurement. While this is a simple psychometric concept, it introduces quite a bit of complexity in the calculation of indices. It appears that allowing CWPI scores which are close to each other to be considered as equivalent introduces quite a bit of leniency in determining individual-occupation matches: the greater majority of the single letter code congruence index used in the present study were matches. The complexity of allowing for the standard error of measurement also accounts for some of the arbitrariness in determining weights for the DAVE index.

The PICS indices are the most straightforward and least arbitrary. These indices produced the most consistent relationships with the performance variables. What these indices measure are an individual's level of a CWPI factor that is important in the occupation, independent of the individual's CWPI profile. With these measures, there were some differences in using the one, two, or three CWPI scores in the PICS index. Typically, the highest correlations occurred with PICS2, which is the combination of two CWPI scores. This indicates that congruence is related to more than just a single CWPI interest; the second CWPI interest does have a role to play in congruence, but the third code generally does not.

Another difficulty in examining congruence in the present study was the self

reported performance variables. The performance reported was so skewed to superior performance that the results appear to be "too good to be true". An alternate to using self reports would be to use actual performance results. The CF maintains course performance results and PER information on databases; however, in matching CWPI results with the database information would require subjects to identify themselves, thereby losing the protection of anonymity. An alternate procedure would be to introduce the CWPI as part of recruit testing and including the results as part of the database for future research. This would only be feasible if it can be shown that there is some merit in using the CWPI in recruit assessment.

An alternate explanation is that the congruence theory does not apply to NCM populations. Unlike officers occupations, which are clearly related to the Directive factor, there is no clear relationship between NCM occupations and CWPI types. This may result from the limited availability of CF occupations for recruits at any given time. A "perfect world" test of the attraction of people with a certain interest type to an occupation of the same type would require that all occupations be equally available for the applicant to make a choice. The actual case in recruiting practice is that only a very few choices may be available, which forces an applicant to pick an occupation which may not congruent with their interests if they want employment with the CF.

Using the CWPI in Classifying Personnel

The results of the discriminant analysis indicate that the Objective factor is the main discriminator among entry level NCM occupations. The main distinction that can be made is between Objective-oriented occupations and non-Objective oriented occupations, the latter being predominantly the Operator and Administrative occupations as determined

from ability based occupation families. The results of the congruence investigation suggest that the CWPI Directive factor could be of use in selecting officer candidates.

The magnitude of the relationship between CWPI factors and performance variables was quite small. While classification of personnel is related to the Objective factor, the Methodical and Objective factors were negatively associated with performance, and the Innovative and Directive factors with good performance. The single strongest relationship between CWPI factors and performance was between the Directive factor and the overall self reports of day-to-day performance. There was no relationship between CWPI factors and tenure.

Notwithstanding the problems noted in investigating the relationship between the CWPI and performance, the results of the present study indicate that the CWPI could be of some use in the classification of NCM applicants. The student study showed that in rating military occupations, there is some relationship between the rater's level of Objective factor and the actual Objective level of the occupation. The student rating of the attractiveness of the occupation should be analogous to the desirability of the occupation to potential recruits, and their likelihood of considering employment in that occupation. Thus, an applicant with a high Objective factor should find technical occupations relatively more appealing, and applicants with a low Objective factor should find administrative occupations relatively more appealing.

The foregoing results justify classifying recruits on the basis of their Objective factor scores. The discriminant analysis of the ability based families indicate that this would be a fairly rough method of classifying personnel (i.e. the dichotomous classification into high or low Objective groups). However, this method does provide a

potential predictor for selecting members of the Administrative family, which was not found in the original discriminant analysis of the ability based occupation families (Catano, 1995). A caveat to the foregoing is that in absence of validity data relating CWPI scores to actual performance, the classification would not be legally defensible. Thus, rather than using the CWPI to classify personnel, it may be more legitimate to use the CWPI counsel personnel.

The results of the present study indicate that the CWPI could be used in addition to present NCM recruit assessment procedures. As such, it would have to be evaluated in conjunction with the current procedures to determine if its use would add any predictive validity to the selection system. The present study gives a preliminary indication that the CWPI could be useful, but, in a sense, the study was conducted in isolation from the recruit assessment process, and can not give an indication that the addition of the CWPI to the process would result in an improved selection system.

Recommendations

The present study has found the CWPI to be a psychometrically adequate instrument for the measurement of vocational interests. Using this instrument has provided support for Holland's typology in that it was possible to predict the interest types of people in different military occupations and academic faculties, and also to predict some aspects of interest types in occupational families based on ability. However, the present study did not find clear relationships between vocational interest and work performance. This latter result probably stems from methodological weaknesses in the present study, most notably in the reporting of the performance criteria, and not necessarily because of problems with Holland's theory. Therefore, because the present results indicate that there may be some usefulness in incorporating vocational interests in the classification of military personnel, the following recommendations are made to address the problems encountered in the present study.

The main difficulty with the self reported performance measures used in the present study was that they appeared to be skewed in favour of positive performance. Therefore, the main recommendation would be to use actual performance data, rather than the self reports. Although this seems straightforward, in the military setting it does lead to practical difficulties. One method would be develop the criteria longitudinally. This could be done by introducing the CWPI into the current recruit selection process and entering the information onto existing data bases. From this information, the CWPI types of occupation members could be easily determined. Using existing performance data bases, the relationship between CWPI data and actual course performance and PER results can be calculated. In addition, any potential improvements over the current selection system

that result from using the CWPI can be calculated directly. While the longitudinal method would develop the appropriate criteria, it would require a period of years to develop useful data.

The other recommended method would be a concurrent study. The model for this study would be the Catano and Ibel (1995) study, which used a sample of personnel selected to ensure adequate representation in each occupation. To use the CWPI information for classification, a representative sample of junior personnel in entry level occupation can be selected. This would be the main use for a concurrent study because it would be difficult to tie the CWPI data with performance information. Participation in this type of study is typically voluntary, and asking personnel to identify themselves may result in an unacceptably low level of participation.

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Appendix A

Sections from the CFPARU Personnel Survey 1996 Used with the Military Sample Study (from Version C)

PERFORMANCE INFORMATION

Please circle the appropriate number. Write directly on the test, but please don't make any unnecesary marks.

Please consider your most recent MOC-qualifying course (QL3, QL5A or QL 6A for NCMs; Phase 2,3, or 4 or Basic or Advanced MOC course for officers). With respect to that course, please answer the following questions, honestly and to the best of your recollection.

1. What was the final course result that was recorded on your course report?

1 Pass

2 Fail

3 Don't recall

2. How many attempts did you require to pass this course?

1 One

2 More than one

3 Not yet passed

4 Do not recall

3. What grade did you receive on your course report?

1 A

2 B

3 C

4 D

5 F

6 No letter grade assigned

7 Don't recall

4. What standing did you achieve on the course?

1 Top third

2 Middle third

3 Bottom third

4 No course standing assigned

5 Don't recall

The remaining questions are about your recent job performance. Please answer honestly and to the best of your recollection.

5. On your last annual PER, what was your performance rating?

1 Outstanding

2 Superior

3 Normal

4 Adverse

5 Don't recall

6. What was your overall numerical average on your last PER?

1 N/A (Officer)

2 3.0-3.9

3 4.0-4.9

4 5.0-5.9

5 6.0-6.9

6 7.0-7.9

7 8.0-8.9

8 9.0-9.9

9 Don't recall

7. How would you personally rate your current, day-to-day performance?

1 Outstanding

2 Superior

3 Above Average

4 Average

5 Below Average

6 Unable to estimate

PERSONAL INFORMATION

Please fill in the blanks, or circle the appropriate number or word as indicated.

1. What is your MOC number?

NCM			

Officer		

2. What is your present rank?

1 Pte/OS/AB or Junior Non-Commissioned Officer (Cpl/LS, MCpl/MS)

2 Senior Non-Commissioned Officer (Sgt/PO2 to CWO/CPO1)

3 Junior Officer (OCdt/NCdt to Capt/ Lt(N))

4 Senior Officer (Maj/LCdr to General Officer)

3. What is your age (in years)?

4. What is your total length of military service? (in completed years)

Full-time		

Part-time		

5. What is your sex?

1 Male 2 Female

6. You are currently a member of:

1 The CF Regular Force

2 The CF Reserve Force

7. Which environmental uniform do you wear?

1 Land 2 Sea 3 Air

8. What type of unit do you serve in?

1 Operational 2 Static

9. Have you served in a mixed-gender operational unit?

Yes No

10. What is your First Official Language?

1 French 2 English

11. Are you functional in your second official language?

Yes No

12. What is the first language you learned as a child, and still understand today?

1 French 2 English

3 Other (please specify)_____

13. What language do you speak most often at home?

1 French 2 English

3 Other (please specify)_____

14. What is the highest level of education which you have completed?

1 Some high school

2 High school diploma or Sec V

3 Some college or CEGEP

4 College diploma

5 Some university or CEGEP II

6 University degree

7 Some graduate school

8 A graduate degree

15. **What is your family status? (NOTE: married includes common-law; single includes separated, divorced, widowed)**

1 Married, service spouse

2 Married, civilian spouse

3 Single

16. a. **Do you have dependent children living with you at your place of primary residence?**

Yes No

b. **Do you have dependent children who are <u>not</u> living with you, *due to the requirements of military service*?**

Yes No

17. **Do you have adult children or other relatives living with you who require home care (i.e. disabled, elderly)?**

Yes No

18. **Are you an Aboriginal person (First Nation/North American Indian, Inuit, or Métis)?**

Yes No

19. **Are you, because of your race or colour, in a visible minority in Canada?**

Yes No

INSTRUCTIONS

Thank you for completing the 1996 CFPARU Personnel Survey. Please return the completed booklet to the survey administrator.

Appendix B

Instructions, Rating Scales and Occupation Descriptions Used with the Student Sample

INSTRUCTIONS

On the following pages you will find job descriptions of various occupations in the Canadian Forces. Following each job description there are five sets of statements. Follow the instructions for each set of statements as they apply to each job description. Try to consider only the job as it is described. Try not to consider such things as your attitude toward military organizations or your actual interest in or qualifications for employment by the Canadian Forces. All of these jobs are open to both males and females.

1. Place a check mark in front of the statement which best tells how good a job this would be:

_____ This job is an excellent one, very much above the average
_____ This job is a fairly good one
_____ This job is only average
_____ This job is not as good as average
_____ This job is a very poor one, very much below the average

2. Place a check mark in front of the statement which best describes your feelings about this job:

_____ I would be very satisfied and happy on this job
_____ I would be fairly well satisfied on this job
_____ I would be neither satisfied nor dissatisfied - it would be just average
_____ I would be a little dissatisfied on this job
_____ I would be very dissatisfied and unhappy on this job

3. Place a check mark in front of the statement which best tells how you would feel about the work you would do on this job:

_____ The work would be very unpleasant - I would dislike it
_____ The work would not be pleasant
_____ The work would be just about average - I don't have any feelings about whether it would be pleasant or not
_____ The work would be pleasant and enjoyable
_____ The work would be very enjoyable - I would very much like to do the work called for on this job

4. Suppose you had a very good friend who was looking for a job and you knew of a vacancy for this job, which your friend was well qualified to fill. Would you:

_____ Recommend this job as a good one to apply for?
_____ Recommend this job but caution your friend about its shortcomings?
_____ Tell your friend about the vacancy but not anything else, then let him or her decide whether to apply or not?
_____ Tell your friend about the vacancy but suggest that he or she look for other vacancies elsewhere before applying?
_____ Try to discourage your friend from applying by telling the bad things about the job?

5. Place a check mark to show how well satisfied you would be with this job.

_____ Completely dissatisfied
_____ More dissatisfied than satisfied
_____ About half and half
_____ More satisfied than dissatisfied
_____ Completely satisfied

Crewman

What They Do

Crewmen are trained initially on one of two types of combat vehicles - the tank or reconnaissance vehicle. They:

- Drive and maintain the tank or reconnaissance vehicle
- Fire the tank's main gun
- Load the main gun and machine guns
- Maintain the vehicle's machine guns and communications equipment
- Gather and relay information and intelligence about the enemy and the terrain

Artilleryman

What They Do

- Position, load, aim and fire artillery systems
- Operate and maintain wheeled and air portable 105mm Howitzers and self-propelled 155mm Howitzers
- Handle, sort and store artillery ammunition
- Establish line communications using radios and field telephones
- Use and maintain personal weapons (up to and including anti-tank weapons)
- Drive and maintain various wheeled and tracked vehicles
- Operate and perform user maintenance on fire control computers, machine-guns and light anti-tank weapons
- May fight as combat soldiers in an operational situation
- Operate and maintain survey and location equipment

Infantryman

What They Do

- Use weapons such as rifle and pistol
- Use explosives and pyrotechnics
- Use mortars, machine guns, anti-tank weapons, missiles and grenades
- Use communication, navigation and riot control equipment
- Inspect and maintain weapon systems, vehicles and equipment (e.g. clothing, survival gear and personal equipment)
- Participate in airborne operations
- Operate with support elements such as fighter aircraft, helicopters (troop carrying and reconnaissance) and artillery
- Unarmed combat
- Fieldcraft and battle procedures including camouflage and concealment, internal security, patrol, escape and evasion tactics

Field Engineer

What They Do

- Construct accommodations in the field
- Construct runways
- Construct and maintain roads, airfields, heliports, bridges, causeways and rafts
- Construct and maintain buildings for the protection of personnel, equipment, aircraft and vehicles
- Construct field defences and obstacles
- Provide drinking water by testing, purification, filtration and construction of local distribution systems
- Detect and dispose of land mines, booby traps and bulk explosives
- Deny enemy mobility on the battlefield by demolishing roads and bridges, and laying minefields and booby traps
- Demolish enemy roads, airfields and buildings
- Maintain engineering equipment, weapons, vehicles and supplies
- Provide engineer communications on the battlefield
- Fight, if necessary to protect themselves, or in an infantry defensive role in land battles

Lineman

What They Do

- Operate construction vehicles and specialized plant equipment including backhoe, trencher, pole and cable trailers
- Operate commercial and military vehicles in operational and non-operational environments
- Construct, inspect and test overhead, underground and underwater communications wire and cable plants at both permanent and land operation locations
- Operate and perform user maintenance on tools of the trade such as power saws, jack hammers, compressors and cable pressurization equipment
- supervise, install and connect terminal and field telephone equipment to telephone lines, radio relay and line transmission equipment
- Acquire and apply the knowledge and skills required to function as a combat soldier, including the use of personal weapons, reconnaissance and tactics

Boatswain

What They Do

- Operate and maintain shipboard equipment associated with cargo handling, and intership transfer of personnel, fuel and material at sea
- Operate and maintain ships' anchor and cable equipment including that used in towing, launch and recovery of ships' boats and rescue operations
- Operate and navigate small craft including ships' boats, auxiliary vessels and tenders in enclosed waters
- Perform tasks associated with ships' rigging, ropework and life saving equipment
- Organize and conduct activities associated with storage, training and use of small arms, demolitions and ammunition
- Plan, organize, and conduct drill and ceremonies such as ceremonial salutes, honour guards and burials at sea
- Assist and supervise deck crews in cleaning, preserving and painting the ship and its equipment
- Operate a variety of the occupation-associated equipment such as outboard motors, sewing machines (to repair canvas) and fork lifts and cranes on replenishment ships
- Co-ordinate watchkeeping duties at sea and in harbour
- Organize internal security and boarding parties as required

Meteorological Technician

What They Do

- Observe, record and encode weather conditions including upper wind, sea surface and ice conditions
- Process, analyze and interpret meteorological information
- Plot meteorological charts and diagrams
- Operate and maintain specialized meteorological instruments and equipment
- Brief pilots, ships' officers and commanders on weather conditions
- Assist a ship's navigator in navigational chart work
- Provide wind and weather data to artillery regiments
- Plot and present data concerning the physics and chemistry of sea water for marine operations

Air Defence Technician

What They Do

- Operate ground/airborne radar, electronic display consoles, communications equipment, and command and control systems
- Operate Space tracking display consoles
- Scramble interceptors for ground or airborne control
- Interpret weather reports
- Maintain records and schedules required for operations

Oceanographic Operator

What They Do

- Start, stop and adjust oceanographic equipment in order to obtain the best displays of oceanographic data
- Operate data transmission systems
- Identify significant features of displayed oceanographic data
- Prepare and maintain visual displays of analyzed data using status boards, charts and watchkeeping records
- Convert analyzed data into comprehensive reports
- Perform administrative functions as necessary

Radio Operator

What They Do

- Send and receive voice, morse code and teletype messages
- Use tactical and authentication codes and operate cryptographic equipment
- Operate mobile radio stations
- Site, erect and maintain portable antennae
- Operate power generators and battery charging equipment
- Perform preventive maintenance routines and serviceability checks on all equipment associated with the trade
- Drive communications vehicles
- Maintain message centre files and operating logs
- Use and update communications publications including classified material
- May perform as a combat soldier in land operations

Naval Combat Information Operator

What They Do

- Operate and use warning and navigation radars, radar displays, identification of friend or foe (IFF), plotting tables, gyroscopes, electromagnetic logs, wind finding equipment, navigation equipment, external/internal equipment, digital displays, data link and information processing systems
- As members of the ship's Action Information Organization assist the ship's Command personnel in navigation and control of ships and aircraft by: sending, identifying, evaluating, classifying, tracking, and reporting radar and intelligence data
- Plot, record and display all ship's sensor and intelligence data
- Perform operator functional checks on equipment by using Built in Test Equipment, Integrated Test Equipment, and basic on-line fault diagnostic procedures

Communicator Research

What They Do

- Collect, process, report and disseminate signals throughout the radio frequency spectrum
- Prepare, transmit, receive, relay and process teleprinter message traffic
- Operate receivers, computers, tape recorders, antennae switches, video display units, coding and direction finding equipment
- analyze and report data on foreign communications systems
- Receive morse code, voice, teletype and data transmissions
- Apply knowledge of security and communications procedures
- Support national and international search and rescue agencies
- Use and maintain detailed records and publications

Teletype Operator

What They Do

- Receive, transmit or relay messages on cassette tape
- Operate and use codes and cryptographic equipment
- Operate and perform preventive servicing and maintenance on teletypewriters and teletypeprinter equipment
- Operate teleprinter line and equipment switchboards and manual and automatic telephone switchboards
- Operate primary and auxiliary power units
- Operate computers and their peripheral equipments
- Drive communications vehicles
- Type, compile and maintain files and material
- May provide direct support to land fighting forces and be required to fight the enemy as a soldier with a combat unit

Administrative Clerk

What They Do

- Draft, type and proof-read correspondence, documentation and records
- Operate typewriters, calculators, photocopiers, word processors and office computers
- Maintain centralized filing systems
- Receive, distribute, dispatch and control correspondence and other mail
- Amend and control publications
- Maintain personnel records; organize, receive and dispatch service documents and prepare inputs for the computerized Personnel Management Information System
- Interpret military regulations and orders
- Advise personnel on administrative procedures and assist with the completion of required documentation

Steward

What They Do

- Manage military accommodations including room allocation, reception, furnishings, key control, cleaning and maintenance
- Operate military clubs (known as Messes), including allocation and control of facilities, mess fund accounting, bar management and supervision of staff
- Operate and manage military retail outlets such as Canadian Forces Exchanges, supermarkets, snack bars, gas service stations and vending operations
- Prepare light meals, snacks and hors-d'oeuvres
- Serve food and alcoholic and non-alcoholic beverages on formal and informal occasions at sea and ashore and on board military aircraft, including VIP flights
- Maintain records, financial accounts, and filing systems relating to public and non-public fund activities

Postal Clerk

What They Do

- Perform all mail handling duties related to the receipt, dispatch and delivery of mail
- Operate a postal tracing service
- Maintain security of mail, Post Office accommodation, cash, postal valuables and sensitive equipment
- Prepare and distribute bills of lading for internal and domestic mail dispatched by road, rail, sea and commercial or Service equipment
- Operate a postal wicket service including financial, registered and special delivery items
- conduct postal inspections of mail rooms and other military postal facilities
- Conduct financial accounting and audit duties at Service post offices
- Type routine correspondence, forms and documents
- Operate office equipment including calculators, photocopiers and postage meters

Supply Technician

What They Do

- Receive, handle and prepare items for shipment
- Operate military vehicles and material handling equipment such as forklifts
- Prepare invoices and shipping documents
- Order material from internal a external sources and purchase supplies (by cash or contract)
- Deliver supplies to operational units
- Perform stock record keeping, stocktaking and inventory control
- Maintain accounting and financial records

Traffic Technician

What They Do

- Prepare, load, secure and off-load baggage, cargo and freight from road, rail, air or water transport vehicles
- Plan and arrange movements of personnel, furniture and effects, material and equipment, by military and commercial means
- Liaise with commercial moving, storage and transportation firms
- Prepare, process, record and account for all transportation documents and forms relating to personnel and material movements
- Process passengers for travel at a military air terminal and coordinate movement of passengers through commercial terminals
- Act as member of an Air Movements Team
- Operate miliary cargo and passenger vehicles and material handling equipment
- Maintain financial records

Avionics Systems Technician

What They Do

- Carry out performance tests, preventive/corrective maintenance and calibration of aircraft communication, intercom, search radar, fire control radar, acoustic sensing, infra-red radar, electronic warfare, navigation, compass and flight control systems and their associated components
- Set up and operate test equipment to maintain the above systems
- Operate and maintain computer controlled automatic test stations
- Serve as an instructor in field technical training units, training squadrons or basic training units
- Prepare and maintain aircraft forms and statistical data
- Operate aircraft support equipment
- Perform first line service tasks such as marshalling, parking, towing, starting, refuelling, cleaning and de-icing aircraft

Photographic Technician

What They Do

- Operate photographic, video and other imaging equipment
- Print and process photographic material using manual and automated printing and processing equipment
- Monitor and maintain the processing of monochrome and colour films and papers
- Perform preventative and corrective electrical, electronic and mechanical maintenance, modifications and repairs of photographic, video and other imaging equipment
- Test and evaluate photographic and video equipment, materials, techniques and processes

Naval Electronics Technician (Acoustic)

What They Do

- Maintain system readiness of all Acoustic equipment on board ships
- Perform preventive and corrective maintenance of Acoustic equipment
- Perform tests and trials of Acoustic equipment
- Use a wide variety of tools ranging from simple hand tools to electronic diagnostic instruments
- Remove, repair and reassemble precision electronic components

Construction Engineering Technician

What They Do

- Develop, produce and update drawings, sketches and blueprints
- Perform land surveys for works, buildings, roads, boundaries and utilities
- Apply knowledge of drawing procedures, building codes, and Computer Assisted Drafting (CAD) techniques
- Use and maintain draughting and surveying tools and equipment
- Conduct preventive maintenance and special inspections of facilities

Dental Clinical Assistant

What They Do

- Produce intra-oral radiographs (X-rays)
- Prepare and apply rubber dams and carry out other chairside duties
- Perform dental laboratory procedures at the clinical levels
- Assist in or carry out preventive dentistry procedures
- Maintain, replenish and account for general and technical dental supplies
- Initiate, maintain, distribute, and dispose of dental records, documents, reports, and returns,
- Carry out preventive maintenance on instrument and equipment used in dentistry
- Instruct Canadian Forces personnel, and in some instances their dependants, in preventive dentistry measures

Aerospace Telecommunications and Information Systems Technician

What They Do

- Perform system restoral, corrective and preventive maintenance, special inspections, modifications, installations and acceptance checks on all types of Air Force operational Command and Control Information Systems
- Use electronic test equipment, technical publications, hand/power tools, and vehicles
- Analyze and interpret test equipment results
- Perform troubleshooting techniques to do isolate faults on electronic equipment

Hull Technician

What They Do

- Maintain air conditioning and ventilation systems
- Test, maintain and repair ships' structure and hull fittings
- Maintain, repair and install ships' boats and liferafts
- Perform arc and oxyacetylene welding
- Perform carpentry and painting to maintain and repair ship fittings
- Operate and maintain fire-fighting and damage repair equipment
- Read and interpret sketches, engineering and mechanical drawings
- Maintain and repair ships' piping systems, pumping and flooding systems, steam heating and de-icing equipment

Weapons Technician (Land)

What They Do

- Inspect, repair and modify all army weapons and associated equipment
- Operate general and special tools and test equipment
- Test fire weapons
- Operate military vehicles
- Locate, diagnose, analyze and repair faults on weapons
- Maintain specialized equipment such as potable field kitchens, mobile laundry and shower units, security cabinets and miscellaneous equipment
- Perform required clerical duties

Aviation Systems Technician

What They Do

- Test aviation systems
- Inspect aviation systems for defects
- Fix defects in aviation systems
- Perform quality assurance checks
- Prepare and maintain aircraft forms and statistical data
- Perform aircraft handling tasks which include parking, towing, marshalling, starting, refuelling, cleaning and de-icing
- Operate aircraft support equipment

Medical Assistant

What They Do

- Care for medical and surgical patients
- Provide first aid and initial treatment to injured patients
- Transport and shelter the sick and injured
- Assist with the rescue of personnel from disabled or crashed vehicles, tanks, ships, aircraft and demolished structures
- Advise on disease prevention
- Collect specimens and carry out some laboratory procedures
- Operate and perform maintenance on medical/health/life support equipment
- Maintain, replenish and account for general and medical supplies
- Initiate, maintain, distribute and dispose of medical records, documents, reports and returns

Ammunition Technician

What They Do

- Store, package, issue, receive, ship and account for live and inert ammunition and related items including missiles, rockets and explosive components of torpedoes
- Utilize tools and specialized equipment to repair, inspect, modify, and manufacture ammunition
- Prepare sample and conduct tests, trials and proofs on all ammunition and related components
- Maintain and repair containers, tools and disposal equipment
- Locate, identify and dispose of dangerous and unexploded ammunition
- Operate military vehicles and material handling equipment used in the occupation
- Prepare and maintain technical ammunition publications, records and reports

Water, Sanitation and Petroleum, Oil, and Lubricants Technician

What They Do

- Operate, maintain and repair water treatment facilities
- Operate, maintain, and repair waste water treatment facilities
- Operate, maintain and repair swimming pool mechanical equipment
- Inspect and maintain petroleum, oil and lubricants systems
- Drive military vehicles in the performance of duties

Appendix C

Demographic Questions Used with the Student Sample

OTHER INFORMATION

1. Faculty: _____ Arts

_____ Commerce

_____ Science

_____ Not applicable

2. Student Status: _____ Full time _____ Part time

3. How many course credits have you completed to date, not including the courses that you are currently taking:

_____ 0 to 5 credits

_____ 5.5 to 10 credits

_____ 10.5 to 15 credits

_____ 15.5 or more credits

4. Sex: _____ Male _____ Female

5. Age _____

6. What is your First Official Language:

_____ English

_____ French

7. What is the first language you learned as a child, and still understand today:

____ English

____ French

Other (please specify) _____

8. Are you an Aboriginal person (First Nation/North American Indian, Inuit or Metis):

_____ Yes

_____ No

9. Are you, because of your race or colour, in a visible minority in Canada:

_____ Yes

_____ No

Appendix D

Rotated Factor Matrix of the Forced Five Factor Principal Components Analysis of the CWPI Responses of the Military Sample

Item Number	Item Type[a]	Factor 1	2	3	4	5
16	D	0.85	-0.02	0.14	0.03	0.05
5	D	0.77	-0.03	0.09	-0.00	0.05
38	D	0.76	-0.06	0.07	0.07	-0.06
8	D	0.74	0.00	0.27	-0.01	0.04
17	D	0.74	-0.02	0.12	0.17	0.08
41	D	0.70	-0.10	0.08	0.30	-0.03
10	D	0.66	0.02	0.24	0.18	0.02
42	D	0.63	-0.07	0.16	0.17	0.02
33	D	0.47	-0.02	0.32	0.07	-0.15
47	D	0.40	-0.06	0.06	0.17	0.00
7	I	0.29	0.19	0.07	0.22	0.27
12	O	0.07	0.85	-0.10	0.16	0.08
36	O	0.01	0.84	-0.09	0.16	0.11
26	O	-0.02	0.82	-0.00	0.08	0.07
31	O	-0.01	0.81	0.00	0.09	-0.01
2	O	0.05	0.79	-0.07	0.22	0.07
20	O	-0.05	0.76	-0.04	-0.04	0.19
37	O	-0.15	0.64	-0.35	-0.04	0.15
19	O	-0.11	0.62	-0.04	-0.21	0.23
50	O	-0.07	0.48	0.07	0.18	0.11
21	S	0.01	0.04	0.75	-0.06	0.07
25	S	-0.02	-0.07	0.72	0.13	0.06
23	S	0.16	-0.18	0.65	-0.01	0.09
44	S	0.30	-0.11	0.65	0.10	0.09
29	S	0.03	0.08	0.65	0.12	0.11
34	S	0.24	-0.09	0.59	0.18	0.02
39	S	0.19	0.06	0.57	0.03	-0.08
46	S	0.18	-0.12	0.54	0.04	0.01
30	S	0.16	-0.06	0.43	0.15	0.18
9	S	0.27	0.08	0.34	0.17	0.13

[a]D = Directive; O = Objective; S = Social; I = Innovative; M = Methodical.

Item Number	Item Type[a]	Factor 1	2	3	4	5
48	I	0.24	0.03	0.19	0.60	0.04
43	I	0.29	-0.06	0.17	0.58	0.17
40	I	0.08	0.06	0.19	0.58	-0.05
3	I	0.18	0.02	0.05	0.57	0.15
11	I	-0.01	0.16	-0.00	0.51	-0.04
27	O	0.01	0.45	-0.00	0.47	0.05
18	I	0.33	0.13	0.08	0.45	0.05
32	I	0.32	0.01	0.15	0.45	-0.08
24	I	0.01	0.25	0.03	0.37	0.05
14	I	0.31	0.15	-0.03	0.36	0.19
4	M	0.00	0.02	-0.08	0.12	0.61
49	M	0.05	0.09	0.00	0.04	0.60
15	M	0.09	0.08	-0.01	0.20	0.59
35	M	0.07	0.00	0.16	0.05	0.55
22	M	-0.03	0.09	0.21	-0.07	0.54
13	M	-0.03	0.18	0.01	0.09	0.51
6	M	0.01	0.06	-0.03	-0.17	0.51
28	M	-0.04	0.27	0.08	0.09	0.35
45	M	0.18	-0.00	0.26	0.12	0.35
1	M	-0.14	0.13	0.08	-0.10	0.30

[a]D = Directive; O = Objective; S = Social; I = Innovative; M = Methodical.

Appendix E

Rotated Factor Matrix of the Forced Five Factor Principal Components Analysis of the CWPI Responses of the Student Sample

Item Number	Item Type[a]	Factor 1	2	3	4	5
31	O	0.82	-0.04	-0.03	0.08	-0.07
12	O	0.82	0.13	-0.17	0.16	0.06
36	O	0.81	0.05	-0.17	0.15	0.14
26	O	0.80	-0.08	-0.02	0.01	-0.05
2	O	0.78	0.06	-0.16	0.17	-0.06
20	O	0.75	0.05	-0.02	0.06	0.15
19	O	0.73	0.02	-0.10	-0.04	0.18
37	O	0.64	-0.10	-0.42	0.06	0.14
27	O	0.54	-0.07	-0.02	0.32	0.11
50	O	0.48	-0.17	0.08	0.08	0.05
16	D	-0.01	0.83	0.04	0.05	-0.00
38	D	-0.02	0.83	0.01	0.03	-0.03
5	D	-0.07	0.76	0.11	-0.01	0.06
17	D	0.04	0.71	0.07	0.13	0.12
8	D	-0.02	0.71	0.23	0.07	-0.04
41	D	-0.07	0.62	0.10	0.35	0.05
33	D	0.01	0.59	0.24	0.01	-0.08
42	D	0.04	0.56	0.17	0.17	-0.03
10	D	-0.03	0.54	0.14	0.27	-0.07
47	D	-0.03	0.38	0.05	0.26	-0.14
44	S	-0.08	0.10	0.73	0.07	0.07
29	S	0.02	-0.03	0.71	0.11	0.05
21	S	-0.07	0.03	0.67	-0.05	0.11
34	S	-0.00	0.16	0.66	0.12	-0.00
25	S	-0.20	-0.02	0.65	0.01	0.09
39	S	0.02	0.14	0.60	0.02	0.10
23	S	-0.21	0.22	0.59	-0.02	0.05
30	S	-0.06	0.19	0.58	0.09	0.14
9	S	-0.04	0.18	0.49	0.14	0.06
46	S	-0.08	0.15	0.41	0.07	-0.02

[a]O = Objective; D = Directive; S = Social; I = Innovative; M = Methodical.

Item Number	Item Type[a]	Factor 1	2	3	4	5
48	I	0.06	0.09	0.14	0.71	0.01
3	I	0.06	0.09	-0.00	0.71	0.04
43	I	0.06	0.17	0.05	0.65	0.11
40	I	0.08	0.01	0.16	0.61	0.03
18	I	0.20	0.21	0.07	0.60	-0.03
11	I	0.35	-0.04	-0.07	0.49	-0.01
32	I	0.01	0.22	0.10	0.47	0.09
14	I	0.12	0.12	0.17	0.42	-0.12
7	I	0.13	0.14	-0.12	0.34	0.24
24	I	0.28	0.06	-0.27	0.30	0.25
49	M	0.02	-0.03	0.06	0.18	0.67
35	M	-0.02	-0.03	0.09	-0.02	0.64
4	M	-0.05	0.06	-0.02	0.04	0.61
13	M	0.15	-0.08	-0.11	0.05	0.59
28	M	0.33	0.01	0.06	0.12	0.51
22	M	-0.03	-0.08	0.11	-0.09	0.47
15	M	0.04	0.04	0.14	0.21	0.44
45	M	0.06	-0.01	0.25	0.04	0.43
6	M	0.06	0.02	0.09	-0.08	0.41
1	M	0.04	-0.01	-0.01	-0.02	0.40

[a]D = Directive; O = Objective; S = Social; I = Innovative; M = Methodical.

Appendix F

Classification Results for Discriminant Functions Derived from Interest Based Occupation Families

Table F1

Classification Results for Cases Selected for Use in the Analysis

Actual Group	N	Predicted Group Membership						
		1	2	3	4	5	6	7
1	75	0	55	0	0	20	0	0
		0.0%	73.3%	0.0%	0.0%	26.7%	0.0%	0.0%
2	175	0	132	0	0	43	0	0
		0.0%	75.4%	0.0%	0.0%	24.6%	0.0%	0.0%
3	18	0	14	0	0	4	0	0
		0.0%	77.8%	0.0%	0.0%	22.2%	0.0%	0.0%
4	57	0	56	0	0	1	0	0
		0.0%	98.2%	0.0%	0.0%	1.8%	0.0%	0.0%
5	166	0	69	0	0	97	0	0
		0.0%	41.6%	0.0%	0.0%	58.4%	0.0%	0.0%
6	42	0	14	0	0	28	0	0
		0.0%	33.3%	0.0%	0.0%	66.7%	0.0%	0.0%
7	11	0	8	0	0	3	0	0
		0.0%	72.7%	0.0%	0.0%	27.3%	0.0%	0.0%

Table F2

Classification Results for Hold-out Sample

Actual Group	N	Predicted Group Membership						
		1	2	3	4	5	6	7
1	25	0	18	0	0	7	0	0
		0.0%	72.0%	0.0%	0.0%	28.0%	0.0%	0.0%
2	80	0	67	0	0	13	0	0
		0.0%	83.8%	0.0%	0.0%	16.3%	0.0%	0.0%
3	10	0	7	0	0	3	0	0
		0.0%	70.0%	0.0%	0.0%	30.0%	0.0%	0.0%
4	23	0	22	0	0	1	0	0
		0.0%	95.7%	0.0%	0.0%	4.3%	0.0%	0.0%
5	48	0	18	0	0	30	0	0
		0.0%	37.5%	0.0%	0.0%	62.5%	0.0%	0.0%
6	12	0	6	0	0	6	0	0
		0.0%	50.0%	0.0%	0.0%	50.0%	0.0%	0.0%
7	7	0	6	0	0	1	0	0
		0.0%	85.7%	0.0%	0.0%	14.3%	0.0%	0.0%

Appendix G

Classification Results for Discriminant Functions Derived from Ability Based Occupation Families

Table G1

Classification Results for Cases Selected for Use in the Analysis

Actual Group	N	Predicted Group Membership				
		Mil	Oper	Admin	TechA	TechB
Military	155	28	0	47	0	80
		18.1%	0.0%	30.3%	0.0%	51.6%
Operator	43	9	0	19	0	15
		20.9%	0.0%	44.2%	0.0%	34.9%
Admin	153	23	0	95	0	35
		15.0%	0.0%	62.1%	0.0%	22.9%
Tech A	25	2	0	5	0	18
		8.0%	0.0%	20.0%	0.0%	72.0%
Tech B	155	25	0	28	0	102
		16.1%	0.0%	18.1%	0.0%	65.8%

Table G2

Classification Results for Hold-out Sample

Actual Group	N	Predicted Group Membership				
		Mil	Oper	Admin	TechA	Tech B
Military	51	11	0	14	0	26
		21.6%	0.0%	27.5%	0.0%	51.0%
Operator	15	2	0	5	0	8
		13.3%	0.0%	33.3%	0.0%	53.3%
Admin	59	14	0	27	0	18
		23.7%	0.0%	45.8%	0.0%	30.5%
Tech A	12	5	0	4	0	3
		41.7%	0.0%	33.3%	0.0%	25.0%
Tech B	71	14	0	13	0	44
		19.7%	0.0%	18.3%	0.0%	62.0%

Appendix H

T-tests of Occupation Ratings by Gender

Military Family

Gender	N	Mean	SD	t-value	df	p
Crewman						
Male	89	13.25	4.17	3.60	209	<0.001
Female	122	11.07	4.45			
Artilleryman (Field)						
Male	97	14.07	4.19	6.60	198	<0.001
Female	103	10.13	4.26			
Infantryman						
Male	97	13.77	4.80	4.87	211	<0.001
Female	116	10.48	5.00			
Field Engineer						
Male	92	13.98	4.49	4.22	206	<0.001
Female	116	11.35	4.43			
Lineman						
Male	90	11.91	3.79	3.79	210	<0.001
Female	122	10.04	3.36			
Boatswain						
Male	90	11.73	3.94	0.16	206	0.548
Female	118	11.64	3.90			

Operator Family

Gender	N	Mean	SD	t-value	df	p
Meteorological Technician						
Male	80	13.01	3.59	-1.32	207	0.188
Female	129	13.71	3.75			
Air Defence Technician						
Male	87	14.45	3.39	3.58	201	<0.001
Female	116	12.66	3.61			
Oceanographic Operator						
Male	83	12.69	3.85	-0.85	203	0.395
Female	122	13.15	3.77			
Radio Operator						
Male	88	13.45	3.35	3.14	207	0.002
Female	121	11.88	3.72			
Naval Combat Information Operator						
Male	86	14.23	3.56	3.18	208	0.002
Female	124	12.67	3.46			
Communicator Research						
Male	91	12.91	3.70	0.40	204	0.687
Female	115	12.70	3.92			

Administrative Family

Gender	N	Mean	SD	t-value	df	p
Teletype Operator						
Male	89	11.64	3.56	0.24	202	0.809
Female	115	11.52	3.40			
Administrative Clerk						
Male	98	10.23	4.57	-4.19[a]	186.60	<0.001
Female	107	12.68	3.70			
Steward						
Male	100	9.86	4.05	-6.23	203	<0.001
Female	105	13.34	3.96			
Postal Clerk						
Male	94	9.12	3.83	-5.18	200	<0.001
Female	108	11.93	3.86			
Supply Technician						
Male	81	11.26	4.00	-1.32	202	0.188
Female	123	11.98	3.74			
Traffic Technician						
Male	88	11.42	3.20	0.33	207	0.743
Female	121	11.26	3.53			

[a]Unequal variance

Technical A Family

Gender	N	Mean	SD	t-value	df	p
Aerospace Telecommunications and Information Systems Technician						
Male	96	13.04	3.65	2.11	212	0.036
Female	118	11.92	4.01			
Naval Electronics Technician						
Male	84	12.87	3.56	4.13	209	<0.001
Female	127	10.74	3.73			
Avionics Systems Technician						
Male	103	14.06	3.65	3.00	206	0.003
Female	105	12.58	3.46			
Photographic Technician						
Male	89	13.51	3.63	-1.27	201	0.206
Female	114	14.13	3.38			
Construction Engineering Technician						
Male	82	13.72	4.37	1.40	204	0.163
Female	124	12.85	4.39			
Dental Clinical Assistant						
Male	88	11.39	3.99	-5.33	202	<0.001
Female	116	14.34	3.85			

Technical B Family

Gender	N	Mean	SD	t-value	df	p
Hull Technician						
Male	80	11.64	4.20	3.30[a]	137.70	0.001
Female	131	9.82	3.30			
Weapons Technician						
Male	90	13.26	3.52	4.78	205	<0.001
Female	117	10.86	3.61			
Aviation Systems Technician						
Male	89	13.88	3.45	2.40	207	0.017
Female	120	12.68	3.66			
Water, Sanitation, and POL Technician						
Male	95	9.51	4.09	0.80	205	0.428
Female	112	9.08	3.60			
Medical Assistant						
Male	83	13.49	3.68	-3.58	212	<0.001
Female	131	15.38	3.81			
Ammunition Technician						
Male	91	12.67	4.11	2.74	200	0.007
Female	111	11.09	4.05			

[a]Unequal variance

Appendix I

Hierarchical Regression Analyses of Variables Predicting Occupation Rating

Military Family

Variable	B	SE B	β	p
Crewman (n = 192)				
Step 1				
Gender	-1.9811	0.6263	-0.2237	0.0018
Step 2				
Method.	-0.0306	0.0458	-0.0489	0.5056
Object.	0.0946	0.0404	0.1948	0.0204
Innov.	-0.0407	0.0436	-0.0775	0.3513
Direct.	0.0639	0.0417	0.1267	0.1267
Social	-0.0369	0.0457	-0.0677	0.4210
Gender	-1.3130	0.6973	-0.1482	0.0613
$R^2 = 0.0500$ for Step 1 ($p = 0.0018$); $\Delta R^2 = 0.0377$ for Step 2 ($p = 0.1822$).				
Artilleryman (Field) (n = 187)				
Step 1				
Gender	-4.0293	0.6076	-0.4382	<0.0001
Step 2				
Method.	-0.0644	0.0450	-0.1010	0.1544
Object.	0.1475	0.0388	0.2961	0.0002
Innov.	0.0181	0.0435	0.0310	0.6781
Direct.	0.0188	0.0405	0.0353	0.6425
Social	0.0485	0.0489	0.0781	0.3227
Gender	-3.1617	0.6891	-0.3439	<0.0001
$R^2 = 0.1921$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.0776$ for Step 2 ($p = 0.0026$).				

Variable	B	SE B	β	p
Infantryman (n = 200)				
Step 1				
Gender	-3.3251	0.7073	-0.3169	<0.0001
Step 2				
Method.	0.0890	0.0488	0.1186	0.0699
Object.	0.2013	0.0402	0.3632	<0.0001
Innov.	-0.0839	0.0450	-0.1389	0.0637
Direct.	0.0828	0.0437	0.1382	0.0600
Social	-0.0654	0.0496	-0.0989	0.1892
Gender	-1.7935	0.7609	-0.1709	0.0194
$R^2 = 0.1004$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.1366$ for Step 2 ($p < 0.0001$).				
Field Engineer (n = 197)				
Step 1				
Gender	-2.635	0.6450	-0.2808	0.0001
Step 2				
Method.	0.0287	0.0402	0.0495	0.4756
Object.	0.1678	0.0369	0.3440	<0.0001
Innov.	0.0620	0.0420	0.1151	0.1415
Direct.	0.0162	0.0420	0.0290	0.7004
Social	-0.0709	0.0502	-0.1126	0.1598
Gender	-0.5400	0.7203	-0.0575	0.4544
$R^2 = 0.0788$ for Step 1 ($p = 0.0001$); $\Delta R^2 = 0.1572$ for Step 2 ($p < 0.0001$).				

Variable	B	SE B	β	p
Lineman (n = 200)				
Step 1				
Gender	-1.8067	0.5075	-0.2453	0.0005
Step 2				
Method.	0.0267	0.0318	0.0543	0.4020
Object.	0.2048	0.0283	0.5180	<0.0001
Innov.	-0.0154	0.0293	-0.0375	0.6001
Direct.	0.0630	0.0297	0.1466	0.0352
Social	0.0356	0.0338	0.0740	0.2932
Gender	-0.3912	0.5048	-0.0531	0.4394
$R^2 = 0.0602$ for Step 1 ($p = 0.0005$); $\Delta R^2 = 0.2352$ for Step 2 ($p < 0.0001$).				
Boatswain (n = 194)				
Step 1				
Gender	-0.1374	0.5738	-0.0173	0.8111
Step 2				
Method.	0.0398	0.0416	0.0691	0.3399
Object.	0.1591	0.0368	0.3567	<0.0001
Innov.	-0.0212	0.0376	-0.0435	0.5741
Direct.	-0.0273	0.0359	-0.0583	0.4480
Social	0.0866	0.0441	0.1677	0.0509
Gender	0.1776	0.6179	0.0223	0.7741
$R^2 = 0.0003$ for Step 1 ($p = 0.8111$); $\Delta R^2 = 0.1298$ for Step 2 ($p = 0.0001$).				

Operator Family

Variable	B	SE B	β	p
Meteorological Technician (n = 197)				
Step 1				
Gender	0.6048	0.5358	0.0806	0.2604
Step 2				
Method.	-0.0223	0.0385	-0.0426	0.5621
Object.	0.0446	0.0354	0.1014	0.2098
Innov.	0.0968	0.0351	0.2181	0.0064
Direct.	-0.0316	0.0356	-0.0718	0.3751
Social	-0.0106	0.0403	-0.0216	0.7929
Gender	1.1033	0.6047	0.1470	0.0697
$R^2 = 0.0065$ for Step 1 ($p = 0.2604$); $\Delta R^2 = 0.0621$ for Step 2 ($p = 0.0301$).				
Air Defence Technician (n = 188)				
Step 1				
Gender	-1.9478	0.5139	-0.2677	0.0002
Step 2				
Method.	-0.0289	0.0333	-0.0615	0.3861
Object.	0.0984	0.0302	0.2536	0.0013
Innov.	0.1393	0.0340	0.3217	0.0001
Direct.	-0.0620	0.0304	-0.1505	0.0426
Social	0.0170	0.0335	0.0382	0.6118
Gender	-0.9061	0.5333	-0.1246	0.0910
$R^2 = 0.0717$ for Step 1 ($p = 0.0002$); $\Delta R^2 = 0.1836$ for Step 2 ($p < 0.0001$).				

Variable	B	SE B	β	p
Oceanographic Operator (n = 191)				
Step 1				
Gender	0.3394	0.5712	0.0432	0.5531
Step 2				
Method.	0.0132	0.0407	0.0241	0.7451
Object.	0.0605	0.0365	0.1378	0.0989
Innov.	0.0770	0.0362	0.1736	0.0349
Direct.	0.0334	0.0391	0.0728	0.3943
Social	0.0031	0.0455	0.0061	0.9456
Gender	0.8908	0.6698	0.1133	0.1851
$R^2 = 0.0019$ for Step 1 ($p = 0.5531$); $\Delta R^2 = 0.0744$ for Step 2 ($p = 0.0134$).				
Radio Operator (n = 193)				
Step 1				
Gender	-1.6711	0.5216	-0.2258	0.0016
Step 2				
Method.	0.0108	0.0345	0.0233	0.7545
Object.	0.0880	0.0323	0.2288	0.0071
Innov.	0.0333	0.0313	0.0876	0.2892
Direct.	-0.0242	0.0327	-0.0574	0.4603
Social	0.0921	0.0402	0.1910	0.0233
Gender	-1.4098	0.5728	-0.1905	0.0148
$R^2 = 0.0510$ for Step 1 ($p = 0.0016$); $\Delta R^2 = 0.0998$ for Step 2 ($p = 0.0009$).				

Variable	B	SE B	β	p
Naval Combat Information Operator (n = 200)				
Step 1				
Gender	-1.642	0.5061	-0.2247	0.0014
Step 2				
Method.	0.0356	0.0341	0.0743	0.2975
Object.	0.0489	0.0317	0.1252	0.1249
Innov.	0.0191	0.0343	0.0448	0.5783
Direct.	-0.0041	0.0334	-0.0097	0.9029
Social	0.0073	0.0386	0.0157	0.8506
Gender	-1.3187	0.5882	-0.1804	0.0261
$R^2 = 0.0505$ for Step 1 ($p = 0.0014$); $\Delta R^2 = 0.0282$ for Step 2 ($p = 0.3199$).				
Communicator Research (n = 193)				
Step 1				
Gender	-0.3789	0.5512	-0.0497	0.4927
Step 2				
Method.	-0.0138	0.0385	-0.0269	0.7201
Object.	0.0288	0.0331	0.0720	0.3845
Innov.	0.0861	0.0355	0.1887	0.0162
Direct.	-0.0430	0.0369	-0.0924	0.2454
Social	0.0705	0.0429	0.1381	0.1019
Gender	-0.4350	0.6179	-0.0570	0.4823
$R^2 = 0.0025$ for Step 1 ($p = 0.4927$); $\Delta R^2 = 0.0610$ for Step 2 ($p = 0.0373$).				

Administrative Family

Variable	B	SE B	β	p
Teletype Operator (n = 187)				
Step 1				
Gender	0.0273	0.5017	0.0040	0.9567
Step 2				
Method.	0.0610	0.0369	0.1295	0.1001
Object.	0.0149	0.0330	0.0395	0.6526
Innov.	0.0129	0.0393	0.0295	0.7425
Direct.	0.0480	0.0353	0.1142	0.1757
Social	0.0203	0.0427	0.0426	0.6342
Gender	0.1280	0.5661	0.0188	0.8213
$R^2 < 0.0001$ for Step 1 ($p = 0.9567$); $\Delta R^2 = 0.0438$ for Step 2 ($p = 0.1494$).				
Administrative Clerk (n = 191)				
Step 1				
Gender	2.5624	0.5858	0.3032	<0.0001
Step 2				
Method.	0.1504	0.0393	0.2743	0.0002
Object.	-0.0218	0.0372	-0.0468	0.5577
Innov.	-0.0137	0.0402	-0.0282	0.7334
Direct.	-0.0082	0.0401	-0.0170	0.8391
Social	0.0309	0.0462	0.0538	0.5048
Gender	2.2251	0.6430	0.2633	0.0007
$R^2 = 0.0919$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.0784$ for Step 2 ($p = 0.0050$).				

Variable	B	SE B	β	p
Steward (n = 191)				
Step 1				
Gender	3.5825	0.5767	0.4118	<0.0001
Step 2				
Method.	-0.0101	0.0430	-0.0165	0.8146
Object.	0.0306	0.0399	0.0657	0.4436
Innov.	-0.0954	0.0394	-0.1943	0.0163
Direct.	-0.0398	0.0384	-0.0746	0.3015
Social	0.0412	0.0454	0.0702	0.3658
Gender	3.2688	0.6748	0.3757	<0.0001
$R^2 = 0.1696$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.0410$ for Step 2 ($p = 0.0942$).				
Postal Clerk (n = 193)				
Step 1				
Gender	2.8506	0.5487	0.3519	<0.0001
Step 2				
Method.	0.0381	0.0390	0.0677	0.3299
Object.	0.0226	0.0347	0.0517	0.5170
Innov.	0.0037	0.0381	0.0074	0.9222
Direct.	-0.0874	0.0363	-0.1783	0.0171
Social	0.1003	0.0391	0.2033	0.0110
Gender	2.2496	0.6444	0.2777	0.0006
$R^2 = 0.1238$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.0553$ for Step 2 ($p = 0.0318$).				

Variable	B	SE B	β	p
Supply Technician (n = 192)				
Step 1				
Gender	0.8772	0.5600	0.1129	0.1189
Step 2				
Method.	0.0303	0.0427	0.0558	0.4788
Object.	0.0973	0.0359	0.2328	0.0074
Innov.	-0.0399	0.0375	-0.0914	0.2883
Direct.	-0.0271	0.0362	-0.0591	0.4545
Social	0.0547	0.0416	0.1083	0.1906
Gender	1.2108	0.6533	0.1559	0.0654
$R^2 = 0.0128$ for Step 1 ($p = 0.1189$); $\Delta R^2 = 0.0524$ for Step 2 ($p = 0.0704$).				
Traffic Technician (n = 195)				
Step 1				
Gender	-0.0846	0.4867	-0.0125	0.8621
Step 2				
Method.	0.0684	0.0328	0.1610	0.0383
Object.	0.0867	0.0310	0.2355	0.0057
Innov.	-0.0590	0.0357	-0.1327	0.1001
Direct.	0.0211	0.0334	0.0520	0.5293
Social	0.0532	0.0384	0.1194	0.1679
Gender	0.1365	0.5468	0.0202	0.8032
$R^2 = 0.0002$ for Step 1 ($p = 0.8621$); $\Delta R^2 = 0.0940$ for Step 2 ($p = 0.0022$).				

Technical A Family

Variable	B	SE B	β	p
Aerospace Telecommunications and Information Systems Technician (n = 201)				
Step 1				
Gender	-1.1497	0.5533	-0.1457	0.0390
Step 2				
Method.	0.0595	0.0363	0.1086	0.1034
Object.	0.1332	0.0357	0.2920	0.0003
Innov.	0.1130	0.0348	0.2387	0.0014
Direct.	0.0315	0.0344	0.0679	0.3606
Social	-0.0016	0.0430	-0.0030	0.9711
Gender	0.0680	0.5825	0.0086	0.9072
$R^2 = 0.0212$ for Step 1 ($p = 0.0390$); $\Delta R^2 = 0.2291$ for Step 2 ($p < 0.0001$).				
Naval Electronics Technician (Acoustic) (n = 199)				
Step 1				
Gender	-2.3874	0.5264	-0.3075	<0.0001
Step 2				
Method.	-0.0110	0.0377	-0.0198	0.7711
Object.	0.1167	0.0326	0.2806	0.0004
Innov.	0.0910	0.0334	0.1923	0.0070
Direct.	-0.0102	0.0348	-0.0213	0.7707
Social	0.0019	0.0379	0.0038	0.9602
Gender	-1.2786	0.6061	-0.1647	0.0362
$R^2 = 0.0945$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.1215$ for Step 2 ($p < 0.0001$).				

Variable	B	SE B	β	p
Avionics Systems Technician (n = 194)				
Step 1				
Gender	-1.6048	0.5072	-0.2226	0.0018
Step 2				
Method.	-0.0014	0.0369	-0.0027	0.9705
Object.	0.0949	0.0313	0.2492	0.0028
Innov.	0.0623	0.0358	0.1358	0.0833
Direct.	0.0139	0.0321	0.0318	0.6658
Social	0.0076	0.0393	0.0163	0.8480
Gender	-0.9209	0.5661	-0.1277	0.1055
$R^2 = 0.0496$ for Step 1 ($p = 0.0018$); $\Delta R^2 = 0.0992$ for Step 2 ($p = 0.0009$).				
Photographic Technician (n = 191)				
Step 1				
Gender	0.5607	0.5132	0.0792	0.2760
Step 2				
Method.	-0.0720	0.0364	-0.1492	0.0496
Object.	0.0849	0.0317	0.2368	0.0080
Innov.	0.0345	0.0355	0.0824	0.3329
Direct.	-0.0416	0.0364	-0.0911	0.2545
Social	0.0454	0.0378	0.0995	0.2316
Gender	0.8628	0.5611	0.1219	0.1259
$R^2 = 0.0063$ for Step 1 ($p = 0.2760$); $\Delta R^2 = 0.0736$ for Step 2 ($p = 0.0140$).				

Variable	B	SE B	β	p
Construction Engineering Technician (n = 190)				
Step 1				
Gender	-0.6829	0.6377	-0.0779	0.2856
Step 2				
Method.	0.0277	0.0417	0.0451	0.5074
Object.	0.1029	0.0362	0.2284	0.0050
Innov.	0.1719	0.0395	0.3407	<0.0001
Direct.	-0.0307	0.0375	-0.0616	0.4141
Social	-0.0228	0.0415	-0.0426	0.5844
Gender	1.0696	0.6543	0.1220	0.1038
$R^2 = 0.0061$ for Step 1 ($p = 0.2856$); $\Delta R^2 = 0.2130$ for Step 2 ($p < 0.0001$).				
Dental Clinical Assistant (n = 188)				
Step 1				
Gender	2.6343	0.5788	0.3166	<0.0001
Step 2				
Method.	-0.0253	0.0401	-0.0465	0.5291
Object.	0.0492	0.0376	0.1119	0.1932
Innov.	0.0052	0.0394	0.0109	0.8950
Direct.	-0.0102	0.0390	-0.0215	0.7939
Social	0.0678	0.0481	0.1189	0.1607
Gender	2.6817	0.6884	0.3223	0.0001
$R^2 = 0.1002$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.0178$ for Step 2 ($p = 0.6011$).				

Technical B Family

Variable	B	SE B	β	p
Hull Technician (n = 201)				
Step 1				
Gender	-1.8474	0.5362	-0.2373	0.0007
Step 2				
Method.	-0.0012	0.0378	-0.0021	0.9753
Object.	0.1437	0.0326	0.3420	<0.0001
Innov.	0.0392	0.0352	0.0882	0.2672
Direct.	-0.0207	0.0343	-0.0467	0.5462
Social	0.0630	0.0394	0.1260	0.1112
Gender	-0.9693	0.5756	-0.1245	0.0938
$R^2 = 0.0563$ for Step 1 ($p = 0.0007$); $\Delta R^2 = 0.1351$ for Step 2 ($p < 0.0001$).				
Weapons Technician (Land) (n = 198)				
Step 1				
Gender	-2.3932	0.5101	-0.3177	<0.0001
Step 2				
Method.	0.0035	0.0348	0.0070	0.9204
Object.	0.1335	0.0316	0.3278	<0.0001
Innov.	0.0385	0.0326	0.0896	0.2387
Direct.	0.0112	0.0308	0.0264	0.7156
Social	0.0171	0.0363	0.0363	0.6388
Gender	-1.4874	0.5563	-0.1975	0.0081
$R^2 = 0.1010$ for Step 1 ($p < 0.0001$); $\Delta R^2 = 0.1188$ for Step 2 ($p = 0.0001$).				

Variable	B	SE B	β	p
Aviation Systems Technician (n = 196)				
Step 1				
Gender	-1.3227	0.5218	-0.1791	0.0120
Step 2				
Method.	-0.0558	0.0359	-0.1119	0.1213
Object.	0.1359	0.0327	0.3442	<0.0001
Innov.	0.0442	0.0346	0.0983	0.2040
Direct.	0.0277	0.0362	0.0617	0.4446
Social	0.0560	0.0400	0.1204	0.1624
Gender	-0.5236	0.5890	-0.0709	0.3751
$R^2 = 0.0321$ for Step 1 ($p = 0.0120$); $\Delta R^2 = 0.1320$ for Step 2 ($p < 0.0001$).				
Water, Sanitation and POL Technician (n = 190)				
Step 1				
Gender	-0.8432	0.5418	-0.1128	0.1213
Step 2				
Method.	0.0331	0.0362	0.0649	0.3626
Object.	0.1587	0.0333	0.3811	<0.0001
Innov.	-0.0025	0.0351	-0.0059	0.9424
Direct.	-0.0013	0.0365	-0.0030	0.9707
Social	-0.0071	0.0417	-0.0142	0.8659
Gender	0.0766	0.5770	0.0102	0.8946
$R^2 = 0.0127$ for Step 1 ($p = 0.1213$); $\Delta R^2 = 0.1419$ for Step 2 ($p < 0.0001$).				

Variable	B	SE B	β	p
Medical Assistant (n = 191)				
Step 1				
Gender	1.6333	0.5546	0.2095	0.0036
Step 2				
Method.	-0.0208	0.0412	-0.0370	0.6142
Object.	0.0204	0.0344	0.0459	0.5529
Innov.	0.1032	0.0348	0.2338	0.0034
Direct.	-0.0181	0.0345	-0.0426	0.6000
Social	0.1149	0.0436	0.2138	0.0091
Gender	1.2360	0.6072	0.1585	0.0432
$R^2 = 0.0439$ for Step 1 ($p = 0.0036$); $\Delta R^2 = 0.0956$ for Step 2 ($p = 0.0015$).				
Ammunition Technician (n = 191)				
Step 1				
Gender	-1.5266	0.5990	-0.1823	0.0116
Step 2				
Method.	0.0703	0.0402	0.1245	0.0819
Object.	0.1931	0.0376	0.4203	<0.0001
Innov.	-0.0679	0.0393	-0.1351	0.0856
Direct.	-0.0060	0.0397	-0.0120	0.8797
Social	-0.0056	0.0443	-0.0101	0.9003
Gender	-0.1738	0.6614	-0.0208	0.7930
$R^2 = 0.0332$ for Step 1 ($p = 0.0116$); $\Delta R^2 = 0.1680$ for Step 2 ($p < 0.0001$).				