ABSTRACT

Smith, Alisa, R. The Structure and Relationship of Work-Related Interests & Needs. (Under the direction of J. W. Cunningham.)

Measures of work-related interests (the Interest Inventory, Career Orientation Profile-Work Activity Preferences, and US Employment Services Questionnaire) and measures of needs (the Inventory of Work-Related Needs, Career Orientation Profile-Benefits and Opportunities, and Minnesota Importance Questionnaire) were used to clarify the nature of these domains. Mired with inconsistencies in terminology, this study explored each domain separately by a) inspecting measurement characteristics, b) examining the underlying structure of the recently developed Interest Inventory and the newly developed I-WRN, c) identifying the cross instrument within domain factor structures, and d) investigating convergent-divergent validity. Because there had been very little previous research addressing the relationship between interests and needs, the relationship between these two domains was explored through e) cross-domain structural analysis of all six instruments, f) canonical correlation analyses and g) multiple regression analyses.   Data were collected from a sample of approximately 800 respondents drawn from the subject pool at North Carolina State University. The subject pool consisted of undergraduates and included students from 95 different curricular majors.

Internal consistency reliabilities from the various scales ranged from .28-.96 with the 68 percent of them ranging between .80-.90. Test-retest reliabilities for the I-WRN, Interest Inventory, and the CareerOp-Benefits and Opportunities ranged from .52-.89, and mean individual profile test retest correlations ranged from .66-.83. Factor analysis

of the 42 individual items of the Interest Inventory resulted in an eight-factor solution. The eight interest factors were Technical Activities, Business Management, Animal & Plant Life, Health Related, Arts & Humanities, Security & Enforcement, Architectural Design, Human Development & Assistance, and Physical Performing. Factor analysis of the 10 Interest Inventory scales resulted in a five-factor solution: Technical Activities, Human & Animal Care, Business Management, Humanities, and Security, Enforcement & Physical Performing. These two factor solutions explained 52 and 48 percent of the variance respectively. An overall factor analysis of the three work-related interest questionnaires resulted in an eight-factor solution that accounted for 73 percent of the total variance. The eight factors were Technical & Hardware Related, Business Detail, Leadership, Health Related, Liberal Arts, Protection, Enforcement & Physical Performing, Caring for Plants & Animals, and Customer Sales & Service. The factor structures from the above mentioned analyses were comparable to results from previous research in this area. Convergent-discriminant correlational analyses of the Interest Inventory with more established measures provided evidence for the construct validity of the Interest Inventory.

Factor analysis of the Inventory of Work-Related Needs resulted in a five-factor solution accounting for 72 percent of the total variance. The factors were titled Responsibility & Recognition, Comfort, Self-Actualization, Enriched Working Environment, and Helping. This structure closely resembles existent theory including Maslow's need hierarchy. Analysis of all three work-related need instruments together produced an eight-factor solution that accounted for 67 percent of the variance. The resultant factors were stable across sub-samples. Convergent-discriminant correlational

analyses of the I-WRN with more established measures provided evidence for the construct validity of the I-WRN.

In the investigation of cross-domain relationships an overall factor analysis was performed on all six interests and need questionnaires. This analysis produced a 14-factor solution accounting for 70 percent of the total variance. The factors were titled Responsibility & Recognition, Technical & Hardware Related, Business (low), Business (high), Humanitarian, Comfort, Artistic, Self-Actualization, Interpersonal Relations, Security & Physical Performing, Plants & Animals, Status, Autonomy, and Activity. This solution produced pure factors, in that the variables were grouped according to their domains, and only one mixed factor emerged that was marked by salient variables from both domains. In a second set of cross-domain analyses, canonical correlations revealed a number of statistically significant relationships. Across the three sets of equations there were eight statistically significant canonical correlation coefficients. However, correlations between the interest canonical variates and need variables were relatively low, suggesting that although some relationships existed between the interests and needs, these constructs fall into two distinct domains.

In a final set of cross domain analyses, multiple correlations again supported the conclusion that although needs and interests relate in a consistent way and appear to be components of the same motivational system they are distinct domains. In sum, the results emphasize the distinct nature of interests and needs and call for an expansion in the use of work-related needs in predicting outcomes such as vocational choice. Historically interests have been used to predict outcomes such as career choice and needs have been used as criterion variables (Dawis, 1991). However, needs are likely more

meaningful than unfamiliar interest activities and easier to rate especially for students

pursuing career exploration. Understanding the relationship between work-related

interests and needs is critical for organizations today. They are increasingly faced with

work role transitions due to attrition, mobility, de-layering activities and change in job

functionality due to technological changes.

The Structure and Relationship of Work-Related Interests & Needs

by

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DEDICATION

I would like to dedicate this project to my husband Jule whom I love with all of my heart. He has been a blessing from God, a wealth of comfort and understanding, and a best friend. Getting married and completing a dissertation are two life changing endeavors. Doing them in tandem was often too great to even comprehend. Yet through it all, he has been a constant calm and source of strength. He says he is my biggest fan and after witnessing all of his efforts to make me laugh deeply, encourage me compassionately, and to listen to me intently leaves no doubt.

BIOGRAPHY

Alisa Radziewicz Smith was born in El Paso, Texas along with her twin brother on January 23, 1969. She was raised in Garden City, New York. She attended the Catholic University of America in Washington D.C. where she majored in Political Science & Government, Economics, and English graduating magna cum laude.

Upon graduation she quickly realized that she wanted to identify and solve organizational problems and began working with Dr. Judith Komaki to understand what makes a leader effective. Soon thereafter, she enrolled in the PhD program at North Carolina State University and completed her Masters' degree in 1998.

Throughout her time at NC State, she was a research assistant, taught Industrial Organizational Psychology to undergraduates, and was an organizational consultant at a global technology company. Currently, she consults for the Department of Labor. She was married in the summer of 2002 to Fred Julius Smith III and makes Raleigh, North Carolina home.

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INTRODUCTION

The present study is concerned with investigating the definition and measurement of human attributes. These include investigation of (1) the structure of work-related interests, (2) the structure of work-related needs, and (3) the relationship between work-related interests and work-related need values.   The study also involves assessment of a recently developed instrument for collecting self-estimates of work-related needs, which will be employed in the above investigation.   The instrument developed draws upon considerable research (Cunningham, 2000) on taxonomical classification that can be used for the purpose of career guidance.

This research stems from the lack of clarity around vocational interests, values/needs, and preferences. Dawis (1991) wrote of the lack of well-articulated theoretical foundations for vocational interests, values/needs, and preferences indicating the need for clarification of the conceptual framework of vocational psychology. Carter (1944) stated,

> [We are] not concerned with verbal distinctions … [but] interested in the dynamics of behavior rather than in logical classification… [The] main concern is with what the standardized instrument measures, and what can be done with the results of such measures. (p. 9)

This study investigates vocational variables that are assumed to underlie vocational behavior by examining the relationships between the various concepts. The aim is not just to offer definitional explanation of these concepts but also to explain how work-related interests and needs relate to one another.

REVIEW OF PREVIOUS RESEARCH

The present study draws upon several topics of vocational literature and include (1) the structure of work-related needs (2) the structure of work-related interests and (3) the relationship between interests and needs. This chapter reviews the most representative research efforts in each of these areas.

STRUCTURE OF WORK-RELATED INTERESTS

Interests are human attributes that are useful in predicting occupational membership. Many interest definitions exist. At a basic level they are tendencies to approach or avoid certain types of activities (Cunningham, 2000). They are also referred to as preferences or choices among alternatives. Interests are manifested in attraction toward or repulsion by objects, situations or events (Dawis, 1991). Interests are typically assessed through questionnaires that tap verbal manifestations of preferences or self-report questionnaires that ask for expressions of preferences. The majority of research on interests investigates how self-expressed interests are related to vocational choice. Vocational interests relate to vocational choice as evidenced by E. Strong's finding that different professional groups can be differentiated on the basis of their responses to interest inventories (Dawis, 1991). A number of common personal dimensions have been found to characterize both people and occupations. This research rests on the existence of a stable structure among interest data.

Identification of the structure of interests dates back to the work Thurstone (1931). He identified interest dimensions by factor analyzing the Strong Vocational Interest Blank (SVIB). He found that 18 scales could be grouped into four factors that included science, people, business and language. Guilford and his associates also

investigated the structure of interests (Guilford, Christensen, Bond, & Sutton, 1954).

They developed a 1000-item inventory measuring interests among other motivational

concepts. Seven interest dimensions were identified and included Mechanical, Scientific,

Social Welfare, Aesthetic Expression, Clerical, Business and Outdoor-Work Interests.

Guilford and his associates concluded that interests constituted a 'large number of basic,

generalized dimensions that cut across many vocational lines, superimposed upon which

are few social stereotypes of broad job families whose existence as unities rests upon

knowledge of vocations' (p. 29).

J.W. Cunningham and his associates have also explored the structure of interests

using a series of instruments derived from job analytical research. The first of these

studies involved factor analysis of activity preference scales from the Occupation

Analysis Instrument based on factors derived from the Occupation Analysis Inventory

(OAI; (Cunningham, Slonaker, and Riegel, 1975), a 617 item structured questionnaire

containing both worker-oriented and job-oriented descriptors. The OAI has been used to

support the basic notion that jobs can be looked at in terms of meaningful and reliable

components (Cunningham, Boese, Neeb & Pass, 1983). Their efforts have not only

supported the validity and reliability of using job analysis to describe components of jobs

but also contributed to bridging the link between the world of work and human attributes.

Factor analysis of the OAI yielded seven factors and included Working with

Hardware, Working with People and Ideas, Caring for Living Things, Sales and

Organizational Activities, Scientific and Technical Activities, Artistic and Creative

Activities, and Operation of Vehicles and Mechanized Equipment. Another study

involved the Work Interest Questionnaire (WIQ), which is based on the OAI dimensions.

Factor analysis of the WIQ resulted in the interpretation of seven factors that include Working with Hardware, Clerical and Business Detail, Caring for Living Things, Artistic and Creative Activities, Scientific Activities, Leadership and Enterprise, and Human Development and Assistance (Smith, 1983).

Another study involved factor analysis of the Career Orientation Profile (COP; Cunningham, Smith and Augustin, 1984). Nine factors were interpreted and include Working with Hardware, Clerical and Business Detail, Caring for Living Things, Artistic and Creative Activities, Scientific Activities, Leadership and Enterprise, Human Development and Assistance, Protection, and Engineering and Technical Activities (1983). Convergent and discriminate correlation matrices provided evidence of a relationship between the CareerOp-Work Activity Preferences interest factors and the factors derived by Smith (1983). High correlations were also found between the CareerOp interest scales and corresponding WIQ scales. These results provided support for the construct validity of the CareerOp interest scales and factors.

Spetz (1987) under the direction of J.W. Cunningham also explored the structure of interests using the Career Orientation Profile (CareerOp)-Work Activity Preferences, the U.S. Employment Service Interest Inventory (USESII), and the Self-Directed Search (SDS). Her analyses reproduced the results from previous research in this area. Strong support for an eight-interest factor structure was found (Working with Hardware, Scientific, Artistic and Creative, Human Development and Assistance, Clerical and Business Detail, Caring for Plants and Animals, Leadership and Enterprise and Protection and Physical Feats).

Augustin (1983) under the supervision of J.W. Cunningham examined the structure of work-related interests by factor analyzing and comparing results from two inventories, the WIQ and the COP. The WIQ analysis produced a seven factor structure (Working with Hardware, Clerical and Business Detail, Caring for Living Things, Scientific Activities, Artistic and Creative Activities, Leadership & Enterprise and Human Development and Assistance). Upon analysis of the 35 work-activity area items of the COP, nine factors emerged (Working with Hardware, Leadership and Enterprise, Human Development and Assistance, Scientific Activities, Artistic and Creative Activities, Protection, Caring for Living Things, Clerical and Business Detail, Engineering and Technical).

Cunningham, Slonaker, and Riegel (1987), factor and cluster analyzed 21 activity preference scales that were constructed from factor analytic work on the Occupation Analysis Inventory (OAI). Six replicable scale factors and clusters were identified and five of the six factors corresponded with Holland's (1973) work-related personality types. This study represents a bridge between job analytic and interest research and is the first known effort to derive interest factors from job analytically induced scales. The six factors are Working with Hardware, Human Development & Assistance, Caring for Living Things, Sales, Office & Managerial Activities, and Scientific & Technical Activities.

The work of Cunningham and his associates identified a stable number of interest factors and provided support for the research of Holland who had developed a system for classifying occupations and occupational membership according to his six-category hexagonal model (Holland, 1976, 1985). John Holland's structural theory of career

choice explained relationships between vocational interests and vocational preferences. He identified six types of personality and corresponding environments (realistic, investigative, artistic, social, enterprising and conventional). According to Holland, people search for an environment that matches their type or allows them to exercise their skills, abilities, and values (Brown & Brooks, 1990). Members of each typological group approach certain kinds of activities while tending to avoid others. Attributes of people employed in various occupations reflect their occupations' characteristics and vocational interests and are positively related because they represent common personal dispositions (Cunningham, Slonaker & Riegel, 1987, pg. 271). Holland's work encompasses the integration of interests, competencies, self-perceptions and values that direct career decisions. One main difference between Cunningham's research and that of Holland is the identification of an additional factor: Caring for Living Things.

There is a wide range of evidence that suggests approximately four to ten dimensions of interest account for most interest inventory scales (see Table 1). The same dimensions seem to be expressed in many ways and a relatively small number of dimensions seem adequate to define vocational interest, preference and occupational choice (Holland, 1976). Outside of the research of Cunningham and his associates, very few studies have compared factor structures among various work-related interest inventories.

Problem 1: Measuring the underlying structure of interests is core to understanding them. The present study was designed to examine the dimensionality of work related interests to clarify the underlying structure and help add conceptualization to the notion of interests. This within-domain (within-instrument and across-instrument

within the interest domain) analysis will determine whether the same factors emerge

across different instruments. Of particular interest is the comparison of a new short-form

questionnaire with two more established and tested instruments. This instrument can be

readily used for career development purposes unlike most interest inventories which are

lengthy and often less applicable for use in applied settings. These efforts can be used

toward the development of a self-description system that allows respondents to rate their

individual preferences for certain activities that can then be used in matching them to a

suitable job (as long as the job has been suitably rated using a comparative job

description instrument such as the OAI) Cunningham, Slonaker, & Riegel (1987).

Table 1

Work-Related Interest Dimensions

	Thurstone (1931)	Droege & Hawk (1977)	Guilford, Christensen, Bond, & Sutton (1954)	Super & Crites (1962)	Holland (1973)	Edwards & Whitney (1972)
1					Realistic	Realistic-Investigative
2					Investigation	
3	Science	Scientific-Technical	Scientific	Scientific		
4						
5	People	Humanitarian	Social welfare	Social welfare		
6						
7					Enterprising	Social-Enterprising
8						
9	Business		Business			
10						
11					Social	
12		Social-Business		Contact-Business		
13	Language	Artistic-Literary		Literary	Artistic	Artistic
14			Aesthetic Expression	Aesthetic		
15		Nature-Outdoors	Outdoor work			
16		Protective				
17					Conventional	Conventional
18						
19		Mechanical-Technical	Mechanical			
20		Routine-Industrial				
21		Persuasive				
22		Accommodating				
23				Material		
24		Clerical-Business	Clerical	Systematic-Record keeping		
25						
	Factor analysis of 18 scales of the SVIB	*Factor analysis of 307 occupational activities from DOT 3rd edition*	*1000 item inventory*			*Factor analysis of the SDS*

Table 1 (continued)

	Cunningham, Slonaker & Riegel (1975)	Roe (1972)	Smith (1983)	Cunningham, Smith, Augustin (1984)
1				
2				
3	Scientific and Technical Activities	Science	Scientific Activities	Scientific Activities
4	Caring for Living Things		Caring for Living Things	Caring for Living Things
5		Service	Human Development & Assistance	Human Development & Assistance
6			Leadership & Enterprise	Leadership & Enterprise
7				
8	Sales and Organizational Activities			
9				
10		General Culture		
11	Working with People and Ideas			
12		Business contact		
13	Artistic and Creative Activities	Arts & Entertainment	Artistic and Creative Activities	Artistic and Creative Activities
14				
15		Outdoor		
16				
17				
18		Technology		Engineering and Technical Activities
19	Operation of Vehicles and Mechanized Equipment			
20	Working with Hardware		Working with Hardware	Working with Hardware
21				
22				
23				
24		Organization	Clerical and Business detail	Clerical and Business detail
25				Protection
	Factor analysis of 22 scales of the VAPP		*Factor analysis of the WIQ*	*Factor analysis of the COP*

Table 1 (continued)

	Spetz (1987)	Augustin (1983)	Augustin (1983)
1			
2			
3	Scientific Activities	Scientific Activities	Scientific Activities
4	Caring for Plants and Animals	Caring for Living Things	Caring for Living Things
5	Human Development & Assistance	Human Development & Assistance	Human Development & Assistance
6	Leadership & Enterprise	Leadership & Enterprise	Leadership & Enterprise
7			
8			
9			
10			
11			
12			
13	Artistic and Creative Activities	Artistic and Creative Activities	Artistic and Creative Activities
14			
15			
16			
17			
18			Engineering and Technical Activities
19			
20	Working with Hardware	Working with Hardware	Working with Hardware
21			
22			
23			
24	Clerical and Business detail	Clerical and Business detail	Clerical and Business detail
25	Protection & Physical Feats		Protection
		Factor analysis of 23 WIQ & COP scales	*Factor analysis of COP (35 work activity area items - interests)*

STRUCTURE OF WORK-RELATED NEEDS

Work-related needs have been an important variable in organizational psychology and like work-related interests are considered an important component of vocational attitudes and decision-making. Dating back to Maslow's research, needs are seen as instrumental to job satisfaction. Unfortunately, the writings on work values suffer from a lack of consensus regarding more specific definition and conceptualization (Dose, 1997). Many research studies contain 'need' in the title of the study, but investigation reveals that the term is used loosely. Need is used interchangeably with values and interests which makes it difficult to firmly conclude what needs are and how they relate to other variables.

Although there is agreement that work needs are thought of as motivational variables stable over time, researchers have not made specific distinctions about what actually constitutes a work-related need. Work needs have been broadly been defined as approach or avoidance tendencies relative to more general classes or rewards, work conditions and outcomes (Cunningham, 1971, 2000). They reflect the reinforcement effects of experience with situations and events. Similarly, Super (1970) defined them as work-goals that are attributes or qualities that are intrinsically desirable and something that people seek in the activities in which they engage. They are goals that an individual looks to attain in order to satisfy a need. It seems that needs are satisfied by more than one kind of activity or occupation.

Dawis and Lofquist (1984) unlike Super (1973) defined values as subsuming needs. Others such as Locke (1976) distinguished values and needs. Values relate to desires and needs are basic conditions required for sustaining life. Rokeach (1973) and

Allport (1961) related values to beliefs or standards while Maslow (1954) related them to needs. Pryor (1982) used the term 'preferences' to characterize values because he viewed work values as being concerned with what individuals like or prefer in a job instead of what they think is good or ought to be done.   These conceptualizations exemplify the differences in both terminology and description of how needs fit into the motivational space.

Recognizing the conceptual inconsistencies, Pryor (1982) integrated the concepts of values, preferences, and needs. Moving from the conceptual to the operational level of description, he empirically explored how these concepts might be integrated. Using the Work Aspect Preference Scale (WAPS), he investigated how the items clustered into levels to test the level of generality in which each operate. He concluded that all of these terms are related to liking or preferring between the person and work and that the terms differ in the level of generality. For example, if a person prefers altruistic work it is also probable that that person has a strong people orientation to work. He clustered 13 subscales of the WAPS into hierarchical groupings. For example, Life-style and Surroundings clustered together suggesting that individuals high on these preferences would have a concern for the environment in which they work and live. An overarching structure of two dimensions subsumed all levels and included a people (people/environment concern) and a things (power and privilege) category. These results parallel the findings of Roe (1956) and Prediger (1976). This research is useful for understanding how these variables group into more molar categories, yet was based on a within instrument design.

Lofquist and Dawis (1978) conceptually defined needs as preferences for reinforcers. They operationalized needs using the Minnesota Importance Questionnaire (MIQ) and used it for taxonomic development of needs. The MIQ measures needs (scales) which include Ability Utilization, Achievement, Activity, Advancement, Authority, Company Policies and Practices, Compensation, Co-Workers, Creativity, Independence, Moral Values, Recognition, Responsibility, Security, Social Service, Social Status, Supervision-Human Relations, Supervision-Technical, Variety and Work Conditions /(Autonomy). Factor analytic research produced a six- factor structure (Dawis, 1991) that includes Achievement, Comfort, Status, Altruism, Safety and Autonomy. Further investigation established a tripartite relationship (environment, people and self) among needs. In other words, the scores fit best in a three-dimensional space where each space is anchored by one of the six values (1. Achievement-Comfort, 2. Altruism vs. Status, 3. Safety vs. Autonomy). Although Lofquist and Dawis refer to their taxonomy as needs there is considerable overlap between their factor structure and that of Super's work values.

Lofquist and Dawis (1978) conducted a major study using the MIQ. Using four different subject groups and a total of 3033 employees they found that six factors emerged (Safety, Autonomy, Comfort, Altruism, Achievement and Aggrandizement). Analysis of 45 items as opposed to the fifteen scales they represent from the WVI resulted in six meaningful factors (Bolton, 1980). The factors are named Stimulating Work, Interpersonal Satisfaction, Economic Security, Responsible Autonomy, Comfortable Existence and Esthetic Concerns. However, there has been some criticism

that these factors are not specific enough for taxonomic purposes and little integration and examination across instruments occurs.

The lack of consistent conceptualization of needs suggests that the structure of needs is incomplete. Although there have been attempts to delineate the need and value realm, few cross instrument comparisons have been performed. Most research has involved a within instrument analysis. This provides little ability to link results and integrated findings in order to produce a comprehensive story about the domain of values and needs. Early on, Crites (1961) factored 11 variables as measured by scales on three different instruments and found that five factors emerged (Material Security vs. Job Freedom, Personal Status vs. Social Service, Social Approval, System and Structure). Not until the more recent work of Cunningham and his associates, have there been cross-instrument analyses. Specifically, Carter (1989), Augustin (1983), and Cunningham (2000) examined work-related need dimensions across a number of work-related need instruments.

Carter (1989) under the supervision of J.W. Cunningham performed factor and cluster analyses on a sample of 1,061 undergraduates who completed the Career Orientation Profile, the Minnesota Importance Questionnaire, the Work Aspect Preference Scale and a questionnaire designed at the Prudential Insurance Company. In addition to factor and cluster analyses that were performed on scales with the separate instruments, an overall analysis of the scales from all four instruments was performed and produced 21 first-order factors and clusters. Higher order analysis of the within instrument cluster scores produced nine stable higher order factors and clusters

(Pay/Future, Status & Recognition, Altruistic Concerns, Self-Actualization, Autonomy, Interpersonal Relations, Activity & Variety, Leadership Responsibility, and Structure.

Augustin (1983) under the direction of J.W. Cunningham concluded that although there appeared to be a relatively small number of value dimensions underlying a set of 20 more specific values or needs, the precise nature of those dimensions was not clear. Augustin (1983) conducted a within domain analysis by factor analyzing within each work-related need instrument in addition to a cross instrument study. Using the Career Orientation Profile (Benefits/Opportunities) and the Minnesota Importance Questionnaire, he found meaningful and stable factor structures. Factor analysis of the Benefits and Opportunities scale yielded 10 factors (Self-Actualization, Good Pay and Future, Variety, Recognition/Status, Social Interaction, Comfort, Leadership, Feedback, Autonomy, and Participation).

McNab & Fitzsimmons (1987) also conducted a cross-instrument study. They compared scales from the Minnesota Importance Questionnaire (MIQ), Work Values Inventory (WVI), VS, and the Work Aspect Preference Scale (WAPS) and found little difference between needs, values, and preferences as measured by these instruments. Eight factors emerged (authority, co-workers, creativity, independence, security, altruism, work conditions, and prestige).

Most recently Cunningham (2000) conducted a taxonomic study that compared factor structures among four work related need inventories (Minnesota Importance Questionnaire, INSUR – questionnaire developed at a large insurance company, the Work Aspect Preference Scale, and the Job Benefits/Opportunities section of the Career Orientation Profile). This study not only compared factor structures within need and

value instruments but also compared factor structures across questionnaires. Among the 31 factors and matching clusters that were produced, there were common constructs (Pay and Comfort, Status and Recognition, Altruistic Concerns, Autonomy, Growth, Interpersonal Concerns, Activity and Variety, and Leadership and Responsibility). All of these research endeavors (see Table 2) have sought to clarify the inconsistency and overlap in the definitions of need, value, and preference.

Problem 2: Defining needs has been as inconclusive an enterprise as defining interests. Dawis (1991) concluded that the variety of conceptual definitions demonstrate that these concepts are still very much in the early stages of evolution. In addition, only occasional validity-related experiments have appeared in the applied psychology literature (e.g. Heilman, 1979; Stulman & Dawis, 1976) and Dawis (1991, pg 862) considers them the exceptions not the rule.

The present study was designed to examine the dimensionality of work related needs for clarifying the underlying structure, to add to the conceptualization of needs, and extend the work conducted by Cunningham (2000). Of particular interest is the comparison of a newly developed questionnaire containing multiple-item scales with two more established instruments. Few studies have compared factor structures among various work-related need inventories. Instead, research has focused on within instrument analysis. MacNab & Fitzsimmons (1987) and Cunningham (2000) are two known attempts to look across questionnaires.

Table 2

Work-Related Need Dimensions

	Pryor (1983)	Dawis & Lofquist (1984)	Lofquist & Dawis (1978)	Cunningham & Augustin (1982)
1		Achievement	Achievement	
2	Self-development		Ability Utilization	Self actualization
3				
4	Creativity		Creativity	
5				
6				
7	Security	Safety	Security	
8	Independence	Autonomy	Independence	Autonomy
9	Altruism	Altruism	Social service	Altruism
10			Moral values	
11	Co-workers (working with friendly employees)		Co-workers	Interpersonal Relations
12				
13			Recognition	
14				Feedback
15	Managing		Supervision	
16			Supervision-Technical	
17			Responsibility	Leadership and Responsibility
18			Authority	
19				
20				
21	Money		Compensation	Pay and Future
22	Prestige	Aggrandizement	Social status	Status
23	Surroundings		Work Conditions	
24			Company policies & practices	
25				
26	Lifestyle (balance)			
27	Detachment (freedom from working in spare time)			
28		Comfort		Comfort
29				
30			Variety	Variety
31				
32	Physical activity			
33			Activity	
34			Advancement	
	Work Activity Preference Scale	*MIQ*	*20 MIQ Needs*	*Career Orientation Profile*

Table 2 (continued)

	Super (1962)	McNab & Fitzimmons (1987)	Cunningham (2000)	Bolton (1980)
1	Achievement		Growth	
2				
3				
4	Creativity	Creativity		
5				
6				
7	Security	Security		
8	Independence	Independence	Autonomy	Responsible Autonomy
9	Altruism	Altruism	Altruistic Concerns	
10				
11	Associates	Co-workers	Interpersonal Concerns	Interpersonal Satisfaction
12	Supervisory Relations			
13				
14				
15	Management		Leadership & Responsibility	
16				
17				
18		Authority		
19				
20				
21	Economic Returns		Pay & Comfort	Economic Security
22	Prestige	Prestige	Status & Recognition	
23	Pleasant Surroundings	Work Conditions		
24				
25	Esthetics			Esthetic Concerns
26	Way of life			
27				
28				Comfortable Existence
29	Intellectual Stimulation			Stimulating work
30	Variety		Variety	
31				
32				
33			Activity	
34				
	Work Values Inventory	*Factor analysis of MIQ, WVI and WAPS*	*Factor analysis of the MIQ, INSUR – questionnaire, Work Aspect Preference Scale, & the Job Benefits/Opportunities - Career Orientation Profile*	*Factor analysis of the WVI*

RELATIONSHIP AMONG WORK-RELATED INTERESTS & THE RELATIONSHIP AMONG WORK-RELATED NEEDS

Interests and needs have been traditionally treated as separate domains as outlined in the preceding literature sections. Comparisons of factor analytic results highlight differences in underlying structures. In addition, motivational models treat them as separate drivers of behavior. Locke and Henne's (1986) model of motivation conceptually depict needs as the driver of values which drive intentions or interests which drive actions. These authors do not suggest that the model is a complete theory but rather an organizing device which identifies the main motivational concepts and their major interrelationships (Locke & Henne, 1986).

Work-related interests and needs also have been used to predict different outcomes, supporting the notion that they although related they are distinct domains. Interests are used for predicting job satisfaction, occupational membership, change, and tenure, and job performance.   Relationships between work-related needs and occupational membership is less evident (Dawis, 1991), although relationships to job satisfaction exist (Rounds, 1990).   In fact, work needs accounted for variance in satisfaction in addition to interests. In addition, work-related needs have been found to account for additional variance accounted for in a person's vocational interest-job preference fit (Soh, 2000) suggesting that although work-related interests and needs appear to be part of the same motivational system they individually appear able to influence job choice decisions suggesting that interests and needs are distinct dimensions.

Although considered distinct domains, pioneers in the field have conceptually linked interests and needs. Thorndike (1917) classified interests, needs, wants, and desires together. Others like Super and Crites (1962) put forward a multilevel conception

of interests suggesting that one is embedded in the other, drives being the more fundamental and deeper part of a person's personality. Empirical research has sought to clarify the relationship between interests and needs. Results have been slightly mixed. Contrary to historical applications of these variables, some studies have concluded that interests and needs are not separate domains.

Specifically, the following studies found that interests and needs were not distinct domains. MacNab and Fitzsimmons (1987) used a multitrait-multimethod analysis of scales from the Minnesota Importance Questionnaire (MIQ), Work Values Inventory (WVI), Values Scale (VS), and the Work Aspect Preference Scale (WAPS) and found little difference between needs, values, and preferences as measured by these instruments. Eight factors emerged (authority, co-workers, creativity, independence, security, altruism, work conditions, and prestige). Through confirmatory factor analysis it was concluded that the four instruments were measuring similar constructs.

Similarly, research by Kinnane & Suziedelis (1962) found a high relationship between work values and inventoried interests and concluded that the individual's patterning of inventoried interests closely reflected his way of valuing work. A few years later, Thorndike, Weiss & Dawis (1968) published an article entitled "Canonical Correlation of Vocational Interests and Vocational Needs". They saw a discrepancy in theoretical postulates that stated that interests are closely related to other motivational terms such as needs and desires and empirical testing. Specifically, they were perplexed by the low correlations reported between interest inventories and other measures of motivational variables such as needs. They found that the canonical correlations between needs as measured by the Minnesota Importance Questionnaire (MIQ) and the Strong

Vocational Interest Blank (SVIB) were significant. They concluded that work-related interests and needs probably relate to the same motivational system and should not be considered distinct domains. Dagley, Super, and Lautenschlager (1990) analyzed four measures of interests and the VS and found evidence that interests and values are indistinguishable.

However, close examination reveals that the content of the items in the above mentioned studies are highly similar. It is not surprising that the scales correlate with each other across instruments and load on common factors. Concluding that interests and needs are the same is difficult because there are many discrepancies in the language surrounding interests, needs and values. Although interests and needs are cited as the variables of measurement the terms are operationally very similar. The items used in MacNab and Fitzsimmons' (1987) interest and need instruments have high content correspondence. Katz (1969) also noted that the items listed in the SVIB interest items are similar to the MIQ need items. Both studies have heavy representation of needs/values. This overlap distorts the conclusion that work-related interests and needs are similar. Dukes' (1955) similarly commented that the terms interests and values are often used interchangeably although no difference in item content are perceptible.

One purpose of this study is to revisit how interests and needs relate by examining their underlying structures. Few cross-domain analyses have been performed that examine at an empirical level the relationship between these concepts. Those studies that have been conducted suggest that interests and values are in fact distinct. For example, a cross-domain analysis assessed whether values were related to inventoried vocational interests. There were few high correlations between the Kuder Preference Record and

the Work Values Inventory (WVI) (Ivey, 1963). Clerical, artistic and social service were the only factors that related across domains.   According to these findings, the fields in which a person is interested appear to be relatively unrelated to what he values and holds important in his work. Additional cross instrument analyses include Guba and Getzels (1956), Stanley & Waldrop (1952) and Sarbin and Berdie (1940). They examined interests and values using the Strong Vocational Interest Blank and the Study of Values. Some significant relationships existed between interests and general values.

A number of years later, Breme & Cockriel (1975) tested whether work values and work interests were the same. They hypothesized that the Vocational Preference Inventory (VPI) and the Work Values Inventory (WVI) measured the same domain. However, they found that they were measuring two distinct domains. The VPI consists of Holland's RIASEC categories while the WVI contains fifteen scales (creative, manage, achieve, surroundings, supervisory relationships, way of life, security, associates, esthetics, prestige, independent, variety, economic ret., altruism, intellectual stimulation). The highest correlation was between Artistic interest and Aesthetic value (coefficient of .38). Aligning with Super (1973), they concluded that values were goals and interests reflected activities that lead to one goal or another.

Hurt and Holen (1976) also studied work values and vocational interests to determine whether the variance in inventoried interest can be more fully understood through the assessment of work values. They pursued the use of work values because they believed them to be supplemental to interests. They focused on whether work values supplied reliable information independent of inventoried interests. Using the Kuder Preference Record Vocational, Form C as a measure of expressed interest, they

designed a work values instrument. They determined that the common variance shared between work values and inventories interests shared was unimportant. Work values independently explained vocational choice. As such, the combination of work values and inventoried interests can be used to facilitate decision making in vocational guidance settings.

A number of years later, more research on the relationship between work values and occupational activity interests (Knapp & Knapp, 1979) ensued. Using the California Occupational Preference System (COP System) Inventory as a measure of interest they correlated the items with those contained in the Career Orientation Placement and Evaluation Survey (COPES). They postulated that interests measured by the COPS were based on job activity preferences while work values measured by the COPES were based on value statements about the importance, purpose, or personal worth of the activity and did not refer to preferences for activities specific to particular jobs. The results showed a generally low order of relationship between measures of interest and values. Correlations ranged from .01 to .47 (between the Arts interest scale and the Aesthetic value scale) and accounted for approximately 22% of the common variance.

In a thorough examination of the dimensions of vocational self-concept, Augustin (1983) under the guidance of J. W. Cunningham found that work-related interests and needs represented distinct vocational concepts when he factor analyzed all of the item-scales from the CareerOp. Needs, interests and abilities represented distinct parts of a person's occupational self-concept. Cross-domain analyses found low to moderate relationships between work-related interests and needs. The highest relationships were between Arts interest scale and the Aesthetic value (.47), Artistic interest and Aesthetic

value (.38), Art interest and Esthetic value (.49), and Art interest and Creative value (.37). Content analysis of the scales contained in the CareerOp reveals that they are in fact discrete unlike those found in early studies.

Problem 3: Research findings continually show the centrality of interests and values as separate domains involved in vocational psychology. In light of the lack of cross domain studies and loose terminology usage, this study extends Augustin's (1983) cross-domain and cross-instrument approach to determine how work-related interests and needs relate and provide further evidence to more recent findings that have shown interests and needs to be distinct domains. The present study was designed to compare factor structures among work-related need as well as interest inventories and provide further support that the confusion between interest and need findings stem from incongruous operations of these variables. Little overlap is expected except in the following areas:

- Artistic interest and Aesthetic type value scales similar to the findings of Ivey (1963) and Breme & Cockriel (1975).
- Human Development & Assistance interest and Altruistic Concerns (chance to help others) similar to Augustin (1983)
- Leadership & Enterprising interest and Leadership & Responsibility values similar to Augustin (1983)
- Caring for Living Things and valuing Being outdoors similar to Augustin (1983)

Based on the expectation that needs and interests are in fact distinct dimension as theoretical definitions have indicated, this study also examines whether a stable pattern

exists among them to further the understanding of the relationship between work-related interests and needs. A priori hypotheses of how the dimensions relate were tested. These hypotheses are based on both conceptual and empirical research and are summarized in the ensuing paragraphs. This research hopes to add understanding to the job choice process by evaluating what influences preferences.

Specifically, it is expected that needs relate to interests in a certain manner as supported by motivation theory that describes work-related needs as manifested in interests that serve as standards that determine behavior (Locke & Henne, 1986). Further evidence of the existence of this relationship comes from the following definitions and theory that describe interests as driven by needs. In treating these concepts as separate, these descriptions provide additional support that interests and needs are distinct yet related domains.

Stefflre (1959) believed that interests were derived from needs. Similarly, according to Rokeach (1973) work-related values were enduring beliefs that a specific mode of conduct or end state of existence was preferable to a converse end state of existence. Super (1973) suggested that needs drive values, which drive interests. In other words, interests are specific activities by which to attain values and meet needs. According to Dawis (1991), preferences are situation-specific and are more immediate to choices among stimuli than values. Accordingly, England (1967) suggested that values were manifested in preferences but were somewhat broader and more ingrained. Dawis (1991) noted that values represented the mediating belief system between more basic dispositions (traits) and the choice of preferred environments. Thus, preferences represent the transition from the person to the situation. Needs and values are translated

into behaviors by preference (Allport, 1937). Allport (1937) found that individuals seek out situations that are congruent with their personality.

In this vein, it follows that if needs are stable and core to an individual as personality they should have a similar influence on work preferences. In other words, work activities are a public expression of work-related needs/values (Judge & Cable, 1997). One caveat is that there are some work-related needs that might be more socially desirable as research has certainly shown that there are some activities that are more desirable than others. For example, physical activity generally has had a lower mean value than other values such as self-development (Hesketh & Gardner, 1993).

From a theoretical perspective, Roe's theory corroborates that needs and values drive interest preference (Roe, 1956, 1957). According to the theory a child's early experiences with his or her parents will foster basic attitudes, interests and capacities which will be given expression in the general pattern of the adult's life including his or her vocational preferences. The interaction between psychological predispositions and the environment lead to the development of a need hierarchy. Needs are then met through particular types of work environments. Roe (1956) classified occupations into eight occupational groups (service, business contact, organization, technology, outdoor, science, general culture and arts & entertainment) each spanning across six responsibility levels. Again, the idea that a need hierarchy is established in life, is stable, and influences job choice decisions is proposed.

Dawis (1991) too concluded that interests and needs are refined distillations from numerous and successive experiences, which manifest themselves in enduring preferences. This not only suggests that they can be considered stable dispositions but

that they are related in some manner. There seems to be some agreement that work

related needs and values function as the standards or criteria, by which persons evaluate

things and that this evaluation is based on the relative importance of things to the person

(Dawis, 1991). Cunningham, Slonaker & Reigel (1987) proposed that a profile of an

individual (needs, interests, abilities) could be compared to occupational profiles across

the same categories to study congruence and used for vocational exploration.

These theories and research suggest that work-related interests and needs should

be related in that they are developed through the same developmental process. A

predictive relationship between interests and needs is expected. Unfortunately, interests

have been traditionally used as a predictor (especially of later occupational membership)

unlike work-related needs and values that have typically been used as a criterion variable.

This is the case even though early assertions concluded that differences in the value

schemes are precursors of the different satisfaction individuals will seek and derive from

work (Ginzberg, Ginsburg, Axelrad, and Herma, 1951). According to Dawis (1991), no

data have been compiled for work-related need and values as predictors of later

occupational membership.

In addition, Crites (1961) hypothesized that needs such as security, status and

service are social and vocational motivators. Kinnane & Suziedelis (1962) concluded,

"different work value orientations are predicative of distinctive interest patterning as

represented by the groupings of occupations on the SVIB" (p.148). Suziedelis & Steimel

(1963) examined the relationship between need hierarchies on the Edwards Personal

Preference Schedule (EPPS) and interests as measured by the Strong Interest Inventory

Blank (SVIB). They recognized that needs likely play a role in the process of vocational

development as an implementation of self-concept. They reasoned that while the importance of relationships between needs and vocational choice seems well recognized, specific relationships between particular needs and particular vocational choices have not been clearly established. In their search to study the relationship between needs and inventories interests they found that specific predominant needs are related to inventoried interests. For example, they found that individuals with scores high on the need for endurance and achievement preferred biological and physical sciences as measured by the SVIB.

Breme & Cockriel (1975) made a similar conclusion in thinking that it would be possible to predict interest scores from value scores. They found that the only patterns that were readily observable were the correlations between the Artistic and Esthetic and the Enterprising and Economic Return scales (from the VPI and WVI). The discriminant function analysis indicated that 42 out of 57 people pre-grouped as socials looked like socials as indicated by their WVI scores. Deductively, occupational interests should reflect values, needs and motivation and as such values and needs are the mean toward which interests regress or are the framework of interests. It follows that interest patterns should reflect work values.

Part of the difficulty in prediction is that there is likely a many to one relationship between needs and interests (Super 1973). Although values are objectives sought to satisfy needs and interests are specific activities and objects through which to attain values and meet needs there are many ways to satisfy values and needs. Values are goals and interests reflect activities that have only a potential of leading one to the goal (Super, 1973). He suggested that there would be some variety of work activities that would

satisfy an individual and a number of possible occupations where they could be successful. Super (1973) speculated that there was a hierarchy of needs, values, interests, traits, and attitudes. He believed that needs are the fundamental yet remote motivators of behavior that help us understand the make-up of people. Although useful, he believed they were less useful in predicting educational or occupational behavior. Super had come to call this the onion model of vocational motivation (Zytowski, 1994).

It should be noted that constraining factors could mask the existent relationship between interests and needs. Low relationships could relate to the difference between intrinsic versus expressed interests (or choice). There are other factors that influence expressed interests such as self-esteem (Korman 1967) or opportunities available. There might be some complicating factors such that preferences may not always result in choices that are behavioral manifestations in part because they are constrained by the environment.

Another constraint may relate to the scale differences used in interest and need questionnaires. An evaluation of work-related needs/values and interests shows that needs can be differentiated from interests in that the latter refer to liking disliking, and the former relate to importance-unimportance. Dawis (1991) concluded in his evaluation of interests, values and preferences that values can be differentiated from interests in that the latter refer to liking/disliking, whereas the former refer to importance/unimportance (Dawis, 1991). In addition, the lack of consistency in the use of terms such as interests, needs, preference, values, and activities has made it difficult to clearly deduce what relationships really exist between these constructs.

More recently, Rounds (1990) found that work needs accounted for significantly more of the variance in satisfaction than did interests. In addition, interests were not as good a predictor for men as they were for women. Kanchier and Unruh (1989) found that job changers reported greater value on creativity, independence, and intellectual stimulation than did nonchangers. Lokan (1986) established that work need patterns among Australian high school students were distinguishable for students expressing preferences for different life roles. Students preferring a worker role valued achievement, creativity, and ability utilization whereas students preferring a leisure role valued physical activity, aesthetics, and social relationships.

In the current environment, individuals often have more than one career, making timely the study of how work needs and values might predict career decisions. In the past, individuals chose one career based on their predominant interests and pursued them across their work-life. Similarly, Zytowski (1994) not too long noted that in the 40 years since the concepts of work-related values and needs were introduced into vocational theory, little empirical research exists. As a step in that direction, this study investigates how work-related needs relate to interests.

Problem 4: Although past investigations have made important contributions, research is needed to explicate the system of relationships surrounding the job choice process. This study examined whether work-related needs (defined by responses to a structured questionnaire) can be used to predict interests (defined by responses to a structured questionnaire).

Inventoried interests were expected to relate to particular work-related needs. It is expected that individuals with particular predominate needs will have specific likes and

dislikes for certain interests. Although relationships might prove to exist, this does not imply that a specific need can be satisfied in only one interest or expressed in one occupation type. Rather this study tested whether predominant needs may be more readily implemented in certain interest areas. Table 3 depicts the hypothesized relationship between work-related needs and interests.

They hypothesized relationships were developed from the work of Roe (Roe & Klos, 1972) who developed a two-way classification table containing the relationship between occupations and nine molar needs (Service, Business Contact, Organization, Technology, Outdoor, Science, General Culture, and Arts & Entertainment). In addition, the following findings were used as a basis for prediction:

- Relationship between artistic interests and creative & aesthetics needs (Breme & Cockriel, 1975; Ivey, 1963) and autonomy (Suziedelis & Steimel, 1963)

- Relationship between enterprising interests with the need for economic return (Breme & Cockriel, 1975)

- Relationship between clerical interests and need for planning (Ivey, 1963)

- Relationship between social service interests and concern for others' social welfare (Ivey, 1963) and the need for affiliation

- Relationship between science interest (biological and physical) and need for theoretical stimulation (Ivey, 1963) and need for achievement (Suziedelis & Steimel, 1963)

- Relationship between technical interests and the need for order/structure (Suziedelis & Steimel, 1963)

- Relationship (negative) between interests related to business detail and autonomy needs (Suziedelis & Steimel, 1963)

- Relationship between social service interests and the need for affiliation (Suziedelis & Steimel, 1963)

Table 3

Expected Relationship between Work-Related Interests and Needs

INTEREST	NEEDS								
	Income & Comfort	Status & Recognition	Altruistic	Autonomy	Growth	Activity & Variety	Interpersonal Concerns	Leadership & Responsibility	Structure
Arts & Humanities			(+)	(+)					(-)
Working with Things						(+)			
Office & business detail				-					
Science & Math					(+)				
Engineering & Technology		(+)			(+)				(+)
Animals & Plant life					(+)				
Leadership & Enterprise	+	(+)			+			(+)	
Human Developement & Assistance			(+)				+		
Health-related			(+)				+		
Security, Protection, Outdoor						(+)	+		

+   Positive relationship
-   Negative relationship

Note: Interest dimensions based on factor-analytic research (Spetz, 1987); Need dimensions based on Cunningham (2000) factor analytic research.

Relationships contained in (parentheses) reflect supported expectations as found in this study.

PRIMARY RESEARCH QUESTIONS

The present study is a multi-faceted research project that includes examining a recently developed work-related needs inventory through exploratory factor analysis, investigating the construct validity of vocational interest and value dimensions across six instruments and examining the relationship between work-related interests and needs. All activities are aimed at elaborating vocational taxonomic structure. Investigating work-related interest and needs not only within each instrument but also across instruments (and domains) contributes to our understanding of the structure of these constructs. The specific objectives of the study are to:

(1) Investigate the reliability and other psychometric characteristics of work-related interests (Interest Inventory, CareerOp- Work Activity Preferences, US Employment Services)

(2) Examine the structure of the newly created Interest Inventory (within instrument analyses)

(3) Examine the structure across work-related interest questionnaires through a cross instrument analysis)

(4) Determine the stability of work-related interests

(5) Investigate the reliability and other psychometric characteristics of work-related needs

(6) Examine the structure of the newly developed Inventory of Work- Related Needs ((I-WRN)

(7) Compare the structure of the newly developed work-related needs instrument (I-WRN) with existing instruments (MIQ, CareerOp-Benefits & Opportunities) through cross instrument analysis

(8) Determine the stability of work-related needs

(9) Examine the joint factor structure of work related needs and interests to determine whether a differentiated need and interest pattern emerges (cross domain and cross instrument analysis)

(10) Investigate the relationship between work-related interests and needs to assess whether work-related needs predict interests

PROCEDURES

The study entails the collection of data on work-related variables. A recently developed work-related needs instrument was used in this study along with existing questionnaires. Specifically, three interest questionnaires (Career Orientation Profile-Work Activity Preferences, US Employment Services Questionnaire, and Interest Inventory) and three work-related needs questionnaires (Inventory of Work-Related Needs, Career Orientation Profile-Benefits and Opportunities, and MIQ) as outlined below were used.

Data Collection

Data was collected from approximately 800 subjects. Subjects were taken from the subject pool at North Carolina State University. The subject pool consisted of undergraduates enrolled in Psychology. Each subject was required to complete six questionnaires across two sessions totaling three hours. Each subject completed three work-related need and three work-related interest questionnaires and a Background Information Questionnaire. The order of the questionnaires was altered across sessions. In the first session subjects were provided with an explanation of the purpose of the study, what was expected of them and how many research credits they would receive for participation. Instruction sheets were also provided to clearly delineate all rating tasks. Second sessions were scheduled approximately two weeks apart. Each session consisted of 9-75 students and extended for approximately one and one-half hour. All responses were recorded on OPSCAN answer sheets. A different answer sheet was used for every questionnaire. The survey order was altered for each administration session.

To collect rate re-rate reliability data, forty students participated in a test retest group. They received the same three instruments on both administrations which included the I-WRN, Interest Inventory and the Career Orientation Profile. Questionnaires were administered in a different order across testing sessions.

Sample Characteristics

The main sample consisted of approximately 800 students enrolled in undergraduate studies at North Carolina State University. Males comprised 60 percent of the sample while 40 percent were females. The majority of participants had an age that ranged between 19-24 years, comprising 96 percent of the sample. In addition, 60 percent of the sample had an age that ranged between 19-20 years.   Table 4 presents the age distribution. The respondents represented 95 different curricular majors. The majority of subjects were Psychology, Electrical Engineering, Mechanical Engineering, Computer Engineering, Business Management, and Computer Science students. Nearly 50 percent of the participants were freshman. Table 5 presents the grade level distribution.

Table 4

Sample Distribution According to Age

Age	n	Percent
19	131	16.27
20	252	31.30
21	234	29.07
22	100	12.42
23	37	4.60
24	19	2.36
Other	32	3.97

Table 5

Sample Distribution According to Grade Level

Grade Level	n	Percent
Freshman	372	46.5
Sophomore	269	33.63
Junior	96	12
Senior	49	6.13
Other	14	1.74

Instruments

Background Information Questionnaire – A background information questionnaire was administered at each session to collect demographic data. The questionnaire requested information on subjects' grade level, age, gender, and curricular major.

Career Orientation Profile-Work Activity Preferences (CareerOp) – The CareerOp is a questionnaire developed in 1987 based on the work activity section of the Career Orientation Profile (COP) and the Work Interest Questionnaire. It is composed of 11 interest scales with 24 to 25 items per scale. A five point rating scales is used:

    A – Dislike Very Much
    B – Dislike
    C – Uncertain or Neutral
    D – Like
    E – Like Very Much

Based on previous factor analytic research (States, 1993) 33 items were dropped from analysis. Those items deleted from analysis loaded on more than one factor. The instructions and a sample of work-related need items are contained in Appendix A.

US Employment Services (USES) – The USES Interest Inventory (U.S. Department of Labor, 1981) consists of 162 work activities that correspond to 12 interest scales (Artistic, Scientific, Plants & Animals, Protective, Mechanical, Industrial, Business Detail, Selling, Accommodating, Humanitarian, Leading-Influencing, and Physical Performing. Scales are based on factor analytic work of items that correspond to groupings of occupations of the Dictionary of Occupational Titles. A three point rating scale is used:

    A – Dislike
    B – Uncertain
    C – Like

The instructions and a sample of work-related need items are contained in Appendix B.

Interest Inventory – This questionnaire consists of 42 items that reflect 10 scales (Arts & Humanities, Working with Things, Office & Business Detail, Science & Math, Engineering & Related Technologies, Animals & Plant Life, Leadership & Enterprise, Human Development & Assistance, Security, Enforcement, or Physical Performing, and Health Related. Items not usually selected on a statistical basis. Usually overlap within a scale. Every item represents a different content area, hence, there is no redundancy in content area. Each item is rated on a five point scales:

      A - Dislike Very Much
      B - Dislike
      C - Uncertain or Neutral
      D - Like
      E - Like Very Much

The instructions and a sample of work-related need items are contained in Appendix C.

Inventory of Work Related Needs (I-WRN) - The I-WRN is a recently developed questionnaire consisting of 196 items and 22 scales. Each scale contains 13-15 items. It is based upon previous research on the structure of work related needs and conceived to serve as a comprehensive instrument for use across work environments. The questionnaire lists a wide variety of characteristics (such as conditions, benefits, advantages, and opportunities) that can be part of a work situation. Individuals are required to rate the importance of various characteristics using a five-point scale:

      A - Not Important
      B - Somewhat Important
      C - Moderately Important

D - Important

E - Very Important

The instructions and a sample of work-related need items are contained in Appendix D.

Career Orientation Profile – Benefits and Opportunities (CareerOp) – consists of single-item descriptors that are divided among three sections (Job Benefits/Opportunities (needs or values), Work-Activity Areas (interests), and Mental and Physical Activities (abilities). The Benefits/Opportunities section contains 30-item scales describing rewards found in occupations. Each item is rated on a five-point scale:

A - Not Important

B - Somewhat Important

C - Moderately Important

D - Important

E - Very Important

The instructions and a sample of work related need items are contained in Appendix E.

Minnesota Importance Questionnaire (MIQ) – The MIQ is a self-report instrument containing 21 statements of work reinforcers or conditions that make work satisfying. Originally designed as a paired form where a person responds by indicating the work reinforcer in each pair that is more important in an ideal job. A profile of work needs can then be compared for 1769 occupations as categorized in the Minnesota Occupational Classification System III (MOCS III).

The MIQ is also available in ranked form. Each item is rated on a five-point scale:

A - Not Important

B - Somewhat Important

C - Moderately Important

D - Important

E - Very Important

The instructions and a sample of work related need items are contained in Appendix F.

ANALYSES AND RESULTS

Item and Scale Analyses

Item analyses were performed to test the integrity of the instruments and to reduce the number of items per scale. To this aim, all items containing missing data were replaced with the mean of the remaining items constituting the scale. Scale scores consisting of the mean of the items in the scale were computed and used in all subsequent analyses. Specifically, item-total correlations, correlations between an individual item and the sum of the remaining items that constitute a scale were computed for the newly created I-WRN as well as for the Interest Inventory and the CareerOp--Work Activity Preferences. All items had item-total correlations above .40 and most were in the .70 range except for those removed from the scales. Six items were dropped from the I-WRN and include three items from the Activity scale, one item from the Compartmentalization scale, one item from the Culture & Aesthetic Concerns scale, and one item from the Teamwork scale. Three items were dropped from the CareerOp-Work Activity Preferences and include one item from each of the following scales: Human Development and Assistance, Protection, Enforcement & Physical Feats and Scientific Activities.

Scale intercorrelations were also computed for all instruments and the correlations for the revised instruments are contained in Tables 6-11. Particular attention was paid to items that correlate too highly with scales other than their own. The I-WRN had some high correlations which warrant their collapse into fewer factors.

Reliability Analyses

Reliability was measured using three indices. Rate-re-rate measures were

obtained for the Interest Inventory, CareerOp (Benefits & Opportunities and Work

Activity

Table 6

Correlations among the 10 CareerOp-Benefits & Opportunities Scales

	Autonomy1	Comfort2	Feedback3	Interpersonal Relationships 4	Leadership & Responsibility 5
Autonomy1	1.00	0.2697	0.2524	0.2842	0.3701
Comfort2	0.2697	1.00	0.4153	0.5199	0.1946
Feedback3	0.2524	0.4153	1.00	0.5675	0.4747
Interpersonal relations4	0.2842	0.5199	0.5675	1.00	0.5076
Leadership & Responsibility 5	0.3701	0.1946	0.4747	0.5076	1.00
Pay & Future6	0.2227	0.5174	0.5090	0.5705	0.4033
Self Actualization7	0.3348	0.3284	0.5177	0.6097	0.5129
Status8	0.3511	0.2912	0.4976	0.3652	0.5241
Variety9	0.3282	0.1410	0.2441	0.2536	0.2684
Altruism10	0.1668	0.2119	0.2075	0.3965	0.3268

Table 6 (continued)

	Pay & Future6	Self Actualization 7	Status8	Variety 9	Altruism 10
Autonomy1	0.2227	0.3348	0.3511	0.3282	0.1668
Comfort2	0.5174	0.3284	0.2912	0.1410	0.2119
Feedback3	0.5090	0.5177	0.4976	0.2441	0.2075
Interpersonal Relations4	0.5705	0.6097	0.3652	0.2536	0.3965
Leadership & Responsibility5	0.4033	0.5129	0.5241	0.2684	0.3268
Pay & Future6	1.00	0.4157	0.4449	0.0833	0.1015
Self Actualization7	0.4157	1.00	0.3676	0.3288	0.3803
Status8	0.4449	0.3676	1.00	0.2370	0.1963
Variety9	0.0833	0.3288	0.2370	1.00	0.2854
Altruism10	0.1015	0.3803	0.1963	0.2854	1.00

Table 7

Correlations among the 10 Interest Inventory Scales

	Arts & Humanities1	Working with Things2	Office & Business Detail3	Science & Math4	Engineering & Related Technologies 5
Arts & Humanities1	1.00	-0.1318	0.0079	-0.0739	-0.0066
Working with Things2	-0.1318	1.00	0.0520	0.496	0.6760
Office & Bus. Detail3	0.0079	0.0520	1.00	0.0721	0.0258
Science & Math4	-0.0739	0.496	0.0721	1.00	0.4924
Engineering & Related Technologies5	-0.0066	0.6760	0.0258	0.4924	1.00
Animals & Plant Life6	0.1882	0.1455	-0.002	0.2815	0.1537
Leadership & Enterprise7	0.0101	-0.0334	0.5469	-0.0211	0.0126
Human Dev & Assistance8	0.4311	-0.2420	0.2341	-0.070	-0.1781
Security Enforcement or Physical Performing9	0.0222	0.3740	0.086	0.2055	0.2380
Health Related10	0.0949	-0.0095	0.0452	0.3845	0.0079

Table 7 (continued)

	Animals & Plant Life6	Leadership & Enterprise 7	Human Development & Assistance8	Security, Enforcement, or Physical Performing9	Health Related 10
Arts & Humanities1	0.1882	0.0100	0.4311	0.0221	0.095
Working with Things2	0.1455	-0.0334	-0.2420	0.3740	-0.0095
Office & Business Detail3	-0.0019	0.5469	0.2341	0.0867	0.0451
Science & Math4	0.2815	-0.0211	-0.070	0.2055	0.3845
Engineering & Related Technologies 5	0.1537	0.0126	-0.1781	0.2380	0.0078
Animals & Plant Life6	1.00	-0.0649	0.2428	0.2349	0.4192
Leadership & Enterprise7	-0.0649	1.00	0.2540	0.1972	0.0508
Human Development & Assistance 8	0.2428	0.2540	1.00	0.1892	0.3340
Security, Enforcement, or Physical Performing9	0.2349	0.1972	0.1892	1.00	0.2236
Health Related10	0.4192	0.0508	0.3340	0.2236	1.00

Table 8

Correlations among the 12 US Employment Service Scales

	Artistic1	Scientific 2	Plants & Animals3	Pro-tective4	Mechanical 5	Industrial 6
Artistic1	1.00	0.3556	0.4789	0.3815	0.3962	0.2757
Scientific2	0.3556	1.00	0.4343	0.4327	0.3999	0.3508
Plants & Animals3	0.4789	0.4343	1.00	0.528	0.5646	0.4958
Protective4	0.3815	0.4327	0.5279	1.00	0.5853	0.5255
Mechanical5	0.3962	0.3999	0.5646	0.5853	1.00	0.5229
Industrial6	0.2757	0.3508	0.4958	0.5255	0.5229	1.00
Business Detail 7	0.2473	0.3244	0.3590	0.3996	0.3725	0.7088
Selling8	0.2153	0.2229	0.3578	0.4350	0.3125	0.5201
Accommodating 9	0.3360	0.3300	0.5188	0.5368	0.4461	0.7085
Humanitarian 10	0.4312	0.4782	0.4537	0.3578	0.1869	0.3067
Leading Influence11	0.3985	0.4265	0.3090	0.4633	0.3233	0.4044
Physical Performing12	0.5392	0.3221	0.5237	0.6115	0.5509	0.3032

Table 8 (continued)

	Business Detail7	Selling8	Accommo-dating 9	Human-itarian 10	Leading Influence11	Physical Perf-orming12
Artistic1	0.2473	0.2153	0.3360	0.4312	0.3985	0.5392
Scientific2	0.3244	0.2229	0.3300	0.4782	0.4265	0.3221
Plants & Animals3	0.3590	0.3578	0.5188	0.4537	0.3090	0.5237
Protective 4	0.4000	0.4350	0.5368	0.3578	0.4633	0.6115
Mechan-ical5	0.3725	0.3125	0.4461	0.1869	0.3233	0.5509
Industrial6	0.7088	0.5201	0.7085	0.3067	0.4044	0.3032
Business Detail 7	1.00	0.5169	0.6835	0.4101	0.5922	0.1559
Selling8	0.5169	1.00	0.5094	0.2593	0.5694	0.3119
Accommo dating 9	0.6835	0.5094	1.00	0.4188	0.4380	0.3303
Human-itarian 10	0.4101	0.2593	0.4188	1.00	0.4267	0.2170
Leading Influenc-ing11	0.5922	0.5694	0.4379	0.4267	1.00	0.3275
Physical Perform-ing12	0.1559	0.3119	0.3303	0.2170	0.3275	1.00

Table 9

Correlations Among the 11 CareerOp-Work Activity Preference Scales

	Artistic & Creative Activities 1	Caring for Plants & Animals 2	Clerical & Business Detail3	Customer Sales & Service4	Engineering & Technical Activities5	Health Related Activities 6
Artistic & Creative Activities1	1.000	0.4299	0.2246	0.4942	0.1238	0.3182
Caring for Plants & Animals 2	0.4299	1.000	0.1907	0.4524	0.2724	0.5449
Clerical & Business Detail3	0.2246	0.1907	1.000	0.6661	0.3415	0.2688
Customer Sales & Service4	0.4942	0.4524	0.6661	1.000	0.1616	0.4540
Engineering & Technical Activities5	0.1238	0.2724	0.3415	0.1616	1.000	0.1135
Health Related Activities6	0.3182	0.5449	0.2688	0.4540	0.1135	1.000
Human development & Assistance 7	0.5196	0.3267	0.3123	0.5282	-0.0374	0.52148
Leadership & Enterprise8	0.2277	0.0594	0.6098	0.4448	0.1987	0.1519
Protection, Enforcement, & Physical Feats 9	0.2869	0.4530	0.2734	0.4295	0.4240	0.3451
Scientific Activities10	0.2449	0.5068	0.2441	0.2182	0.6304	0.5488
Working with Hardware 11	0.0814	0.4025	0.2718	0.2292	0.7676	0.0848

Table 9 (continued)

	Human development & Assistance 7	Leadership & Enterprise8	Protection, Enforcement, & Physical Feats 9	Scientific Activities10	Working with Hardware 11
Artistic & Creative Activities1	0.5196	0.2277	0.2869	0.2449	0.0814
Caring for Plants & Animals 2	0.3267	0.0594	0.4530	0.5068	0.4025
Clerical & Business Detail3	0.3123	0.6098	0.2734	0.2441	0.2718
Customer Sales & Service4	0.5282	0.4448	0.4295	0.2182	0.2292
Engineering & Technical Activities5	-0.0374	0.1987	0.4240	0.6304	0.7676
Health Related Activities6	0.52148	0.1519	0.3451	0.5488	0.0848
Human development & Assistance 7	1.000	0.3691	0.2946	0.2530	-0.1091
Leadership & Enterprise8	0.3691	1.000	0.3136	0.0959	0.0309
Protection, Enforcement, & Physical Feats 9	0.2946	0.3136	1.000	0.3924	0.5132
Scientific Activities10	0.2530	0.0959	0.3924	1.000	0.4574
Working with Hardware 11	-0.1091	0.0309	0.5131	0.4574	1.000

Table 10

Correlations among eight MIQ Scales

	Autonomy1	Achievemt2	Activity3	Altruism4
Autonomy1	1.00	0.2731	0.3262	0.1457
Achievemt2	0.2731	1.00	0.1968	0.3570
Activity3	0.3262	0.1968	1.00	0.1325
Altruism4	0.1457	0.3570	0.1325	1.00
Pay5	0.2708	0.2768	0.1766	0.1893
Quality of Mangmt 6	0.1615	0.3111	0.1905	0.3497
Recognition & Status 7	0.4198	0.1855	0.2435	0.1049
Interpers Rel8	0.2432	0.2644	0.2207	0.3553

Table 10 (continued)

MIQ	Pay & Future/Comfort5	Quality of Management6	Recognition & Status7	Interpsonal relations8
Autonomy1	0.2708	0.1615	0.4198	0.2432
Achievemt2	0.2768	0.3111	0.1855	0.2644
Activity3	0.1766	0.1905	0.2435	0.2207
Altruism4	0.1893	0.3497	0.1049	0.3553
Pay5	1.00	0.5063	0.4499	0.3071
Quality of Mangmt 6	0.5063	1.00	0.2886	0.3400
Recognition & Status 7	0.4499	0.2886	1.00	0.2951
Interpers Rel8	0.3071	0.3400	0.2951	1.00

Table 11

Correlations among the 22 I-WRN Scales

	Achievement1	Acivityt2	Advancement3	Altruism4	Autonomy5
Achievement1	1.000	0.175	0.588	0.608	0.504
Acivityt2	0.175	1.000	0.228	0.368	0.365
Advancement3	0.588	0.228	1.000	0.283	0.528
Altruism4	0.608	0.368	0.283	1.000	0.411
Autonomy5	0.504	0.365	0.528	0.411	1.000
Compartmentalization6	0.468	0.125	0.406	0.345	0.465
Compensation7	0.463	0.118	0.746	0.148	0.470
Creativity8	0.648	0.290	0.462	0.448	0.599
Culture9	0.374	0.428	0.236	0.613	0.443
Growth10	0.817	0.192	0.556	0.560	0.484
Leadership11	0.574	0.401	0.674	0.515	0.667
Participation12	0.796	0.220	0.633	0.544	0.576
Prestige13	0.643	0.306	0.766	0.481	0.594
Quality of Management14	0.744	0.162	0.534	0.532	0.393
Recognition15	0.656	0.249	0.700	0.355	0.505
Responsibility16	0.667	0.372	0.702	0.549	0.618
Security17	0.530	-0.013	0.539	0.260	0.290
Social Interaction18	0.579	0.286	0.378	0.566	0.382
Structure19	0.424	0.353	0.535	0.439	0.549
Teamwork20	0.548	0.408	0.454	0.599	0.370
Variety21	0.615	0.529	0.484	0.507	0.620
Work Conditions22	0.544	0.227	0.547	0.458	0.522

Table 11 (continued)

	Compart-mental-ization 6	Comp-ensation7	Creat-ivity8	Cul-ture9	Growth 10	Leader-ship11
Achievmt1	0.468	0.464	0.649	0.374	0.818	0.574
Acivityt2	0.126	0.119	0.291	0.429	0.193	0.400
Advance-ment3	0.407	0.746	0.462	0.237	0.556	0.674
Altruism4	0.346	0.149	0.448	0.614	0.561	0.516
Autonmy5	0.465	0.471	0.600	0.443	0.485	0.668
Compart-mentaliza-tion6	1.000	0.490	0.388	0.236	0.424	0.294
Compensation7	0.490	1.000	0.328	0.105	0.398	0.509
Creativity8	0.388	0.328	1.000	0.543	0.732	0.538
Culture9	0.236	0.105	0.543	1.000	0.453	0.450
Growth10	0.424	0.398	0.732	0.453	1.000	0.519
Leadership11	0.294	0.509	0.538	0.450	0.519	1.000
Part-icipation12	0.479	0.499	0.674	0.427	0.746	0.717
Prestige13	0.390	0.662	0.521	0.412	0.556	0.786
Quality of Mgmt14	0.629	0.461	0.500	0.324	0.680	0.460
Recgntn15	0.481	0.663	0.500	0.299	0.557	0.621
Respon-sibility16	0.309	0.518	0.595	0.463	0.605	0.892
Security17	0.578	0.652	0.282	0.013	0.437	0.279
Social Interaction18	0.550	0.332	0.430	0.351	0.535	0.399
Structure19	0.610	0.526	0.370	0.400	0.392	0.564
Teamwork20	0.342	0.313	0.489	0.453	0.556	0.601
Variety21	0.441	0.377	0.661	0.524	0.643	0.562
Work Conditions22	0.630	0.543	0.438	0.368	0.524	0.503

Table 11 (continued)

	Participa-tion12	Pres-tige13	Quality of Management14	Recog-nition15	Responsib-ility16
Achievement1	0.796	0.643	0.745	0.657	0.668
Acivityt2	0.220	0.307	0.163	0.250	0.372
Advancement3	0.634	0.767	0.535	0.700	0.703
Altruism4	0.545	0.482	0.532	0.356	0.549
Autonomy5	0.576	0.595	0.393	0.506	0.619
Compartmentaliz ation6	0.479	0.390	0.629	0.481	0.309
Compensation7	0.499	0.662	0.461	0.663	0.518
Creativity8	0.674	0.521	0.500	0.500	0.595
Culture9	0.427	0.412	0.324	0.299	0.463
Growth10	0.746	0.556	0.680	0.557	0.605
Leadership11	0.717	0.786	0.460	0.621	0.892
Participation12	1.000	0.673	0.706	0.663	0.791
Prestige13	0.673	1.000	0.525	0.806	0.765
Quality of Managemnt14	0.706	0.525	1.000	0.642	0.522
Recognition15	0.663	0.806	0.642	1.000	0.645
Responsibility16	0.791	0.765	0.522	0.645	1.000
Security17	0.486	0.426	0.633	0.502	0.341
Social Interaction18	0.558	0.425	0.757	0.478	0.442
Structure19	0.490	0.558	0.550	0.563	0.546
Teamwork20	0.626	0.511	0.590	0.490	0.634
Variety21	0.628	0.528	0.539	0.509	0.585
Work Conditions22	0.576	0.560	0.701	0.592	0.509

Table 11 (continued)

	Secur-ity17	Social Interaction18	Struct-ure19	Team-work20	Var-iety21	Work Conditions 22
Achievemt1	0.531	0.580	0.424	0.549	0.615	0.544
Acivityt2	-0.014	0.286	0.354	0.409	0.529	0.227
Advancent3	0.539	0.378	0.535	0.454	0.484	0.547
Altruism4	0.261	0.567	0.440	0.599	0.508	0.459
Autonomy5	0.291	0.383	0.550	0.370	0.621	0.522
Compartmentalization6	0.578	0.550	0.610	0.342	0.441	0.630
Compensation7	0.652	0.332	0.526	0.313	0.377	0.543
Creativity8	0.282	0.430	0.370	0.489	0.661	0.438
Culture9	0.013	0.351	0.400	0.453	0.524	0.368
Growth10	0.437	0.535	0.392	0.556	0.643	0.524
Leadership11	0.279	0.399	0.564	0.601	0.562	0.503
Participation12	0.486	0.558	0.490	0.626	0.628	0.576
Prestige13	0.426	0.425	0.558	0.511	0.528	0.560
Quality of Management14	0.633	0.757	0.550	0.590	0.539	0.701
Recognition15	0.502	0.478	0.563	0.490	0.509	0.592
Responsibility16	0.341	0.442	0.546	0.634	0.585	0.509
Security17	1.000	0.468	0.476	0.303	0.290	0.568
Social Interaction18	0.468	1.000	0.519	0.692	0.530	0.703
Structure19	0.476	0.519	1.000	0.532	0.471	0.716
Teamwork20	0.303	0.692	0.532	1.000	0.564	0.547
Variety21	0.290	0.530	0.471	0.564	1.000	0.547
Work Conditions22	0.568	0.703	0.716	0.547	0.547	1.000

Preferences), and for the I-WRN for 40 participating subjects. Table 12 contains the reliability coefficients. Reliability coefficients were obtained for each of the above listed instruments by correlating scores from the first session with second session scores for each of the scales to produce a coefficient of stability. Reliabilities ranged from .59-.89 with the mean reliability .76. A second index of reliability using coefficient alpha was computed and listed in table 13. This measurement of internal consistency reliability ranged from .60-.80 for the CareerOp-Benefits & Opportunities, .92-.96 for the CareerOp-Work Activity Preferences, .84-.93 for the US Employment Services Questionnaire, .63-.83 for the Interest Inventory, .87- .95 for the I-WRN, and .28-.73 for the MIQ. Comparator results where applicable are also presented showing that coefficients alpha ranges are consistent across previous results from past research.

To improve the reliability, any item that once deleted from the scale increased the coefficient alpha was removed. These items did not appear to measure the construct as assessed by the other items. As mentioned above a total of nine items were dropped based on the criteria of lowering the coefficient alpha and demonstrating a poor item-total correlation.

In addition, the stability of individual scores was examined by correlating each individual's profile from the first session with his/her second session profile, another measure of rate-rerate reliability. Seven students consistently had low correlations across all instruments. Examination of demographic information suggests that these subjects are foreign students. Unfamiliarity with the English language might be a contributing factor to the low correlations. The mean profile correlations after those subjects were removed are

Table 12

Rate-ReRate Reliabilities of the CareerOp-Benefits & Opportunities Scales

CareerOp-Benefits & Opportunities	Number of items	Reliability
Autonomy1	2	0.59
Comfort2	3	0.69
Feedback3	2	0.69
Interpersonal Reations4	4	0.80
Leadership & Responsibility5	2	0.68
Pay & Future6	4	0.52
Self Acualizationt7	5	0.73
Status8	2	0.61
Variety9	4	0.79
Altruism10	1	0.77

Rate-ReRate Reliabilities of the Interest Inventory Scales

Interest Inventory	Number of items	Reliability
Arts & humanities1	4	0.81
Working with things2	4	0.87
Office & business detail3	4	0.68
Science & math4	5	0.79
Engineering5	4	0.76
Animals & Plant life6	5	0.77
Leadership & Enterprise7	4	0.76
Human Development8	4	0.81
Security, Enforcement or Physical Performing9	4	0.85
Health Related10	4	0.79

Table 12 (continued)

Rate-ReRate Reliabilities of the I-WRN Scales

I-WRN	Number of items	Reliability
Achievement1	13	0.72
Acivityt2	8	0.86
Advancement3	11	0.71
Altruism4	14	0.84
Autonomy5	13	0.76
Compartmentalization6	12	0.79
Compensation7	15	0.82
Creativity8	13	0.83
Culture9	13	0.89
Growth10	15	0.75
Leadership11	15	0.80
Participation12	15	0.74
Prestige13	15	0.78
Quality of Management14	14	0.80
Recognition15	12	0.72
Responsibility16	13	0.77
Security17	13	0.61
Social Interaction18	13	0.78
Structure19	15	0.76
Teamwork20	12	0.77
Variety21	13	0.72
Work Conditions22	13	0.83

Table 13

Internal Consistency Reliabilities for Three Interest and Three Need Scales Compared with Previous Research

Scale	Coefficient Alpha # of items (coefficient alpha) CareerOp- Benefits/Opp (n=807) CareerOp-Work Act. Pref. (n=751) USES(n=762) MIQ (n=754) I-WRN (n=808) Interest Inventory(n=800)	Spetz # of items (coefficient alpha) CareerOp (n=839) USES (n=859)	Augustin # of items (coefficient alpha) (n=927)	States # of items (coefficient alpha) (n=627-639)
CareerOp -				
Benefits/Opportunities				
1. Self Actualization	5(.80)		(.74)	
2. Good Pay & Future	4(.77)		(.62)	
3. Variety	4(.74)		(.74)	
4. Recognition/ Status	2(.68)		(.65)	
5. Interpersonal Relations/Social Interaction	4(.79)		(.45)	
6. Comfort	3(.67)		(.60)	
7. Leadership & Responsibility	2(.72)		(.64)	
8. Feedback	2(.64)		(.64)	
9. Autonomy	2(.60)		(.61)	
10. Participation	na		(.61)	
11. Altruism	1(na)			
CareerOp--Work				
Activity Preferences				
1. Artistic & Creative	24(.92)	24(.93)		24(.94)
2. Working with Hardware	17(.95)	22(.96)		22(.96)
3. Clerical & Business Detail	20(.94)	20(.94)		20(.94)
4. Scientific Activities	19(.94)	24(.96)		24(.95)
5. Plants & Animals	20(.95)	20(.94)		20(.93)
6. Leadership & Enterprise	23(.94)	23(.94)		23(.95)
7. Human Development & Assistance	24(.94)	24(.94)		24(.95)

Table 13 (continued)

Scale	Coefficient Alpha # of items (coefficient alpha)	Spetz # of items (coefficient alpha)	Augustin # of items (coefficient alpha)	States # of items (coefficient alpha)
8. Protection & Physical Feats	24(.92)	24(.93)		24(.93)
9. Sales & Service Activities	24(.93)	24(.92)		na
10. Health-Related Activities	22(.96)	22(.91)		22(.96)
11. Engineering & Technical	21(.95)	na		18(.95)
US Employment Services Questionnaire:				
1. Artistic	15(.89)	15(.87)		
2. Scientific	13(.89)	13(.86)		
3. Plants & Animals	15(.90)	15(.86)		
4. Protective	13(.88)	13(.82)		
5. Mechanical	15(.91)	15(.89)		
6. Industrial	11(.89)	11(.83)		
7. Business Detail	14(.91)	14(.91)		
8. Selling	11(.86)	11(.81)		
9. Accommodating	10(.87)	10(.82)		
10. Humanitarian	15(.93)	15(.93)		
11. Leading-Influencing	15(.84)	15(.84)		
12. Physical Performing	15(.89)	15(.85)		
Interest Inventory:				
1. Arts & Humanities	5(.62)			
2. Working with Things	5(.79)			
3. Office & Business Detail	4(.80)			
4. Science & Math	4(.68)			
5. Engineering & Related Technologies	4(.73)			
6. Animal & Plant Life	4(.83)			
7. Leadership & Enterprise	4(.72)			
8. Human Development & Assistance	4(.72)			

Table 13 (continued)

Scale	Coefficient Alpha # of items (coefficient alpha)	Spetz # of items (coefficient alpha)	Augustin # of items (coefficient alpha)	States # of items (coefficient alpha)
9. Security, Enforcement or Physical Performing	4(.63)			
10. Health Related	4(.86)			
I-WRN:				
1. Achievement	13(.92)			
2. Activity	11(.89)			
3. Advancement	11(.93)			
4. Altruism	14(.95)			
5. Autonomy	13(.91)			
6. Compart-mentalization	13(.87)			
7. Compensation	15(.94)			
8. Creativity	13(.94)			
9. Culture & Aesthetic Concerns	14(.91)			
10. Growth	15(.93)			
11. Leadership	15(.94)			
12. Participation	15(.94)			
13. Prestige	15(.94)			
14. Quality of Management	14(.92)			
15. Recognition	12(.93)			
16. Responsibility	13(.93)			
17. Security	13(.93)			
18. Social Interaction	13(.94)			
19. Structure	15(.89)			
20. Teamwork	13(.94)			
21. Variety	13(.92)			
22. Work Conditions	13(.90)			
Minnesota Importance Questionnaire:				
1. Autonomy	4(.65)			
2. Achievement	2(.62)			
3. Activity	2(.28)			
4. Altruism	2(44)			
5. Pay &	4(.64)			

Future/Comfort
Table 13 (continued)

Scale	Coefficient Alpha # of items (coefficient alpha)	Spetz # of items (coefficient alpha)	Augustin # of items (coefficient alpha)	States # of items (coefficient alpha)
6. Quality of Management	3(.73)			
7. Recognition & Status	3(.60)			
8. Interpersonal Relations	1(na)			

.72 for the I-WRN, .83 for the Interest Inventory and .66 for the CareerOp-Benefits & Opportunities. Twenty six of the remaining 33 subjects had profile correlations above .70 for the Interest Inventory and the I-WRN. Twenty two of the remaining 33 subjects had profile correlations above .70 for the Career Orientation Profile.

Structure of Work-Related Interests: Factor Analyses of the Interest Inventory

The present study examined the dimensionality of work-related interests to clarify the underlying structure and add to the conceptualization of interests. In accordance with Problem Statement 1, this study examined the factor structure of a recently developed Interest Inventory. The analyses were as follows:

- An intercorrelation matrix was computed.

- Eigenvalues were extracted by the principal components procedure using one's as communality estimates.

- Eigenvalues were plotted in order of their extraction. A scree test (Cattell, 1966) was used to determine the number of factors for rotation along with the Kaiser criteria of eigenvalues greater than 1.00.

- Factors were rotated orthogonally using a varimax criterion.

- Intercorrelation matrices were recalculated using squared multiple correlations in the major diagonal. The principal axes method of extraction was then conducted and multiple factor solutions were rotated.

- Matrices were cluster analyzed using SAS Varclus (SAS, 1988) to determine the robustness of the solution and aid in interpretability. This procedure performs a hierarchical clustering of variables based on the intercorrelation matrix.

The Interest Inventory was first analyzed using all 42 interest items. After following the above listed procedures a number of factors were rotated using principle axes method of extraction. Communalities of the squared multiple correlation were placed on the main diagonal of the correlation matrix. Rotations were based upon the Kaiser Criteria (eigenvalues greater than 1.00) and eigenvalue plots using the scree technique. Multiple factors structures were rotated using the varimax solution (SAS, 1988). The most interpretable was the nine-factor solution which resembled the 10 a priori scales and accounted for 52 percent of the total variance. Table 14 contains the factor titles, salient interests and their loadings, and percentages of total variance explained. The data were also cluster analyzed using VARCLUS (SAS, 1988) to examine the robustness of the dimensions across different methods of data reduction and aid in interpretability of results. The cluster R^2 is presented for each item that was placed into the matched cluster for that factor and is contained in table 14. A dash appears in the column if the cluster does not contain the item. Results are contained in Appendix G.

The factor stability was also examined by dividing the total sample into odd and even subgroups. Each sub sample was subjected to the factor analyses steps described previously. Congruence coefficients (Gorsuch, 1974) were then calculated except for 8th and 9th factors which did not match across the odd and even subgroups. Congruence coefficients ranged from .91-.98 for matched factors across the odd and even sub-samples and are listed in parenthesis in Table 14 adjacent to the factor titles.

Second, the 10 Interest Inventory scales were analyzed according to the steps outlined above. The factor patterns of multiple rotations were examined and a five-factor solution was most interpretable and accounted for 48 percent of the total variance. Using

VARCLUS procedure (SAS, 1988) cluster analyses were performed to aid in interpretability of results. Table 15 summarizes the results by presenting the factor titles, interest scale salient loadings and percentages of total variance explained. Results are contained in Appendix H.

The stability of the factor structure of the Interest Inventory was assessed by dividing the sample in half. Odd numbered subjects constituted one sample while even numbered subjects constituted the second sample. For each sample a principle component analyses was first conducted to examine the eigenvalues and scree plot test. Principle axes analyses were then conducted. Squared multiple correlations were placed in the main diagonal and rotated using a varimax solution. Multiple solutions were rotated and the most interpretable, a five-factor solution which matched the analyses for the entire sample as listed above was retained. Indices of the stability of the factor structure were obtained by calculating a coefficient of congruence (Gorsuch, 1974) between the factor pattern of matched odd and even sub-samples. Congruence coefficients ranged from .96-.99 as contained in table 15.

Table 14

Factor Analysis of the 42 Interest Inventory Items: Factor Titles, Congruence
Coefficients, Salient Loadings, Percent of Variance and Cluster R^2

Factor Titles and Congruence Coefficients	Rotated Loading	% Variance	Cluster R^2
Factor 1 Technical Activities (Working With Things) (.96)		10.25	
12. Electrical/electronic activities—repairing, maintaining, assembling, or installing equipment	.76		.68
5. Engineering activities (in such areas as aeronautical, civil, chemical, electrical/electronic, industrial, materials, mechanical, and nuclear engineering	.74		.67
2. Mechanical activities	.69		.62
34. Activities requiring knowledge and use of Mathematics and statistics—applying mathematical principles and formulas in the various fields of science, industry, business, government, or education, including such areas as: engineering; banking; finance; insurance; the physical, biological, and social sciences	.61		.42
22. Operating machines/equipment—such as motor vehicles, mobile work equipment, heavy construction equipment.	.60		.53
4. Activities requiring knowledge and use of physics and chemistry	.59		.39
32. Building activities—constructing, assembling, or repairing--- structures such as houses, boats, cabinets, furniture, bridges, buildings, etc.	.54		-
41. Computer-related activities—such as analyzing data with existing computer programs, writing new computer programs life.	.54		.35
35. Surveying activities—locating, positioning, and planning land tracts and areas, natural and constructed features, and coastlines.	.42		.30
Factor 2 Business Management (.96)		7.91	
17. Activities related to economics and finance	.71		-
13. Bookkeeping, accounting, and record keeping activities	.71		.66
23. Money handling and recording activities—such as receiving money from bank customers, cashing winning tickets at a race track…	.69		.62
33. Interpersonal clerical and recording activities—receiving, giving, and recording information through communication with others.	.58		.60
27. Activities related to sales, merchandising, and enterprise	.58		-
7. Management and supervisory activities	.53		-
3. Daily office activities	.52		.55
37. Legal and contractual activities—applying knowledge of laws, legislation, and court rulings	.49		-
Factor 3 Animal & Plant Life (.98)		7.76	
6. Activities related to animal care, maintenance, and propagation.	.73		.64

Table 14 (continued)

Factor Titles and Congruence Coefficients	Rotated Loading	% Variance	Cluster R^2
26. Training, judging, observing, or studying animals.	.73		.67
42. Activities related to the study and treatment of plant	.71		.62
16. Activities related to the care, maintenance, and propagation of plant life	.70		.57
36. Treating sick or injured animals	.67		.62
24. Activities requiring knowledge and use of the earth and astronomical sciences (geology, oceanography, meteorology, astronomy)—such as: studying the ocean bottom and currents; applying geological knowledge to problems in dam, tunnel, and bridge construction…	.37		.30
Factor 4 Health-Related Activities (.97)		7.69	
20. Activities in medical technology—using laboratory techniques and equipment to run diagnostic tests and treatments on patients.	.82		.77
10. Activities in medical practice	.79		.74
40. Medical research and development activities - studying the nature and causes of diseases and other disorders;	.78		.73
14. Activities requiring knowledge and use of biological science—such as doing research on plant or animal breeding, developing methods of weed control, developing ways to prevent bacteria increase in food…	.58		.54
30. Activities in nursing and therapy—providing general care and treatment or special therapy to patients.	.55		.50
Factor 5 Arts & Humanities (.94)		5.64	
31. Literary art activities—such as writing newspaper articles, magazine ads, short stories, books, plays, movie and TV scripts, or poetry	.71		.66
21. Activities related to liberal arts and humanities—such as studying and restoring historical sites, teaching literature, translating foreign languages…	.67		.63
11. Performing art activities	.60		.49
1. Visual art activities	.57		.47
18. Teaching and instructing	.48		-
38. Activities requiring knowledge and use of social science (sociology, social psychology, anthropology, political science)	.46		.30
Factor 6 Security & Enforcement (.91)		4.15	
9. Activities related to enforcement, protection, and security	.66		.73
29. Military activities	.58		.56
19. Investigative activities—conducting systematic inquiries about people, organizations, incidents, etc.,	.48		.49
Factor 7 Architectural Design (--*)		3.62	
15. Architectural and design activities—designing houses, buildings and related structures, ships, landscapes, environments, products, visual effects, etc.	.70		.71
25. Technical drawing—preparing detailed drawings and blueprints of buildings and other structures, tools, equipment,	.63		.76

Table 14 (continued)

Factor Titles and Congruence Coefficients	Rotated Loading	% Variance	Cluster R^2
machines, vehicles, aircraft, furniture, heating and electrical systems, landscapes, maps, etc.			
Factor 8 Human Development & Assistance (.91)		2.86	
28. Personal assistance and service activities—providing assistance or service to others;	.54		.59
8. Helping people with their personal problems through advising, counseling, or psychotherapy.	.41		.64
Factor 9 Physical Performing (--*)		1.72	
39. Activities related to sports and physical feats—physical activities performed before audiences.	.30		-

Note: The values in parenthesis following each factor title are the congruence coefficients between odd and even sub sample factor analyses

* Factors did not match across the odd and even subsamples.

Table 15

Factor Analysis of the 10 Interest Inventory Scales: Factor Titles, Congruence
Coefficients, Salient Loadings, Percent of Variance and Cluster R^2

Factors Titles, Scales & Congruence Coefficients	Rotated Loading	% Variance	Cluster R^2
Factor1 Technical Activities (.99)			
Working with Thing 2	.79	16.9	.76
Engineering & Related Technologies 5	.77		.76
Science & Math 4	.56		.60
Factor2 Human & Animal Care (.99)		10.76	
Health Related 10	.68		.71
Animal & Plant Life 6	.49		.71
Factor3 Business Management (.99)		10.16	
Leadership& Enterprise 7	.68		.77
Office & Business Detail 3	.66		.77
Factor4 Humanities (.99)		7.35	
Arts & Humanities 1	.56		.72
Human Development & Assistance 8	.55		.72
Factor5 Security, Enforcement, or Physical Performing (.96)		2.8	
Security, Enforcement, or Physical Performing 9	.43		1.00

Note: The values in parenthesis following each
factor title are the congruence coefficients between
odd and even sub sample factor analyses

Structure of Work-Related Interests: Joint Factor Analyses of three Work-Related Interest Instruments (Interest Inventory, CareerOp-Work Activity Preferences, and US Employment Services Questionnaire)

Analysis of interests typically reveals that a large number of factors are needed to describe the interest content domain (Dawis, 1991). However, there have been very few studies that have sought to compare factor structures among various work-related interest inventories. Examining the underlying structure of interests helps to identify basic dimensions for use in practice and theory building. Factor analyses were performed for this purpose, as well as, to provide evidence of the construct validity of the instruments. As outlined above similar analytic steps were followed to examine the underlying structure of interests. First, principal components method of extraction was applied and communality estimates of one were place in the main diagonal of the correlation matrix. The Kaiser criterion and scree test plot were examined. Principal axes method of extraction was then applied and squared multiple correlations were placed in the main diagonal. Multiple factor solutions were rotated to a varimax solution. Results are contained in Appendix I. Cluster analyses were also performed as an aid in interpretability of results. An eight factor solution was most meaningful and explained 72.53 percent of the total variance. Table 16 presents a summary of the factor titles, loading and percent of variance explained.

Table 16

Joint Factor Analysis of three Work-Related Interest Inventory Scales: Factor Titles, Salient Loadings, Percent Variance Explained, and Cluster R^2

Factor Titles, and Salient Interest Scales	Rotated Loading	% Variance	Cluster R^2
Factor 1 Technical & Hardware Related Activities		14.31	
sp_Engineering & Technical Activities5	.88		.77
sp_Working with Hardware11	.84		.83
in_Working with Thing2	.79		.78
in_Engineering & Related Technologies5	.74		.67
in_Science & Math4	.67		.48
us_Mechanical5	.62		.59
Factor 2 Business Detail		12.52	
us_Business Detail7	.80		.78
us_Accomodating9	.78		.79
us_Industrial6	.78		.81
us_Selling8	.56		-
Factor 3 Leadership		10.14	
sp_Leadership & Enterprise8	.86		.75
in_Leadership & Enterprise7	.83		.70
sp_Clerical & Business Detail3	.67		-
in_Office & Business Detail3	.67		-
us_Leading & Influencing11	.55		.65
Factor 4 Health Related Activities		10.02	
in_Health Related10	.82		.71
sp_Health Related Activities6	.80		.80
us_Scientific2	.70		.70
sp_ScientificActivities10	.61		.48
us_Humanitarian10	.49		.41
Factor 5 Liberal Arts		8.6	
sp_Artistic & Creative Activities1	.85		.73
in_Arts & Humanities1	.81		.67
us_Artistic1	.73		.53
sp_Human_Development & Assistance7	.52		.59
in_Human Development & Assistance8	.45		.51
Factor 6 Protection, Enforcement & Physical Performing		7.0	
in_Security, Enforcement or Physical Performing9	.78		.69
sp_Protection, Enforcement & Physical Feats9	.78		.82
us_Protective4	.56		.69
us_Physical Performing12	.50		.62

Table 16 (continued)

Factor Titles, and Salient Interest Scales	Rotated Loading	% Variance	Cluster R^2
Factor 7 Caring for Plants & Animals		6.38	
sp_Caring for Animals or Plants2	.79		.86
in_Animals & Plant Life 6	.78		.82
us_Plants & Animals	.61		.71
Factor 8 Customer Sales & Service		3.56	
sp_Customer Sales & Service4	.49		-

sp=CareerOp-Work Activity Preferences, in=Interest Inventory,
us=US Employment Services Questionnaire

Construct Validity of Work-Related Interests

After investigating the factor structures underlying the Interest Inventory, the convergent discriminant validity of the interest questionnaires was examined. A Monte Carlo procedure for multitrait multimethod analysis (Knoeller & Iwaniszek, 1990) was applied to the heterotrait-heteromethod correlation matrix and heterotrait-monomethod triangles. A total of five relationships were examined and outlined below. Table 17 presents the scale titles and their corresponding matched scale for each paired instrument.

- 10 Interest Inventory scales were matched to 11 CareerOp-Work Activity Preference scales. A total of nine scales corresponded and were used for analysis (A).

- 10 Interest Inventory were matched to 12 US Employment Services scales. Scale scores for the collapsed categories were obtained. A total of eight scales corresponded and were used for analysis (B).

- 11 CareerOp-Work Activity Preference scales were collapsed into five Interest Inventory factors that were derived previously in the study and scale scores were calculated. A total of five matched factors were used for analysis (C).

- Five Interest Inventory factors were matched to 12 US Employment Service scales were collapsed and matched to five Interest Inventory factors and scales scores were calculated. Five factors were used for analysis (D).

- 12 US Employment Services scales were matched to 11 CareerOp-Work Activity Preference scales. Scale scores were computed for the collapsed categories. A total of nine scales matched and were used for analysis (E).

Pearson correlation coefficients were obtained for each of the above listed pair and the Monte Carlo procedure was applied. First, examined for each analysis was trait contribution to find evidence for convergent validity. The p values obtained were significant for all five analyses listed above (A. p=.001, B. p=.002, C. p=.008, D. p=.008, E. p=.008). These results provide evidence of good convergent validity as the validity diagonal elements are sufficiently large. This statistic also evaluates discriminant validity by comparing the validity diagonal elements to their corresponding heterotrait-heteromethod triangle elements. It determines whether the mean of the validity coefficients (the main diagonal elements, representing matched constructs) in the heterotrait-heteromethod matrix was significantly different from zero and from the other off-diagonal values. Further evidence of discriminant validity is established by a qualitative comparison of trait contribution and method contribution statistics. Even though this indicator of method contribution is significant for all analyses (A.-E. p=.001) and ideally one would like to see a non-significant method contribution the results still demonstrate convergent and discriminant validity as evidenced by the final indicator of discriminant validity. Each triangle is compared with every other triangle for consistency in patterning. This patterning statistic is identical to that used by Hubert and Baker (1978). None of the triangle comparison across all analyses had a p values exceeding .10 as listed in Appendix J.

Table 17

Matched scales for Multitrait Multimethod Analyses of Work-Related Interests (A)

11 CareerOp (Work Activity Preferences) scales matched to 10 Interest Inventory scales	
CareerOp	**Interest Inventory**
Artistic & Creative Activities_1	Arts & Humanities_1
Caring for Animals & Plants_2	Animal & Plant Life_6
Clerical & Business Detail_3	Office & Business Detail_3
Customer Sales & Service_4	-not available-
Engineering & Technical Activities_5	Engineering & Related Technology_5
Health Related Activities_6	Health_10
Human Development & Assistance_7	Human Development & Assistance_8
Leadership & Enterprise_8	Leadership & Enterprise_7
Protection, Enforcement & Physical Performing_9	Security, Enforcement & Physical Performing_9
Scientific Activities_10	Science&Math_4
Working with Hardware_11	Working with things_2

Matched scales for Multitrait Multimethod Analyses of Work-Related Interests (B)

10 Interest Inventory scales matched to 12 US Employment Services scales	
US Employment Services	**Interest Inventory**
Artistic_1	Arts & Humanities_1
Scientific_2	Science&Math_4
Plants & Animals_3	Animal & Plant Life_6
Protective_4, Physical Performing_12	Security, Enforcement & Physical Performing_9
Mechanical_5	Working with things_2 Engineering & Related Technology_5
Industrial_6	-not available-
Business Detail_7	Office & Business Detail_3
Selling_8	-not available-
Accomodating_9	-not available-
Humanitarian_10	Health_10 Human Development & Assistance_8
Leading & Influencing_11	Leadership & Enterprise_7

Table 17 (continued)

Matched scales for Multitrait Multimethod Analyses of Work-Related Interests (C)

11 CareerOp Scales (Work Activity Preferences) scales matched to 5 Interest Inv. factors	
CareerOp Scales	**Interest Inventory Factors**
Engineering & Technical Activities_5 Working with Hardware_11	**Factor 1:** Working with things_2 Engineering & Related Technology_5 Science&Math_4
Caring for Animals & Plants_2 Health Related Activities_6 Scientific Activities_10	**Factor 2:** Health_10 Animal & Plant Life_6
Clerical & Business Detail_3 Customer Sales & Service_4 Leadership & Enterprise_8	**Factor 3:** Leadership & Enterprise_7 Office & Business Detail_3
Artistic & Creative Activities_1 Human Development & Assistance_7	**Factor 4** Arts & Humanities_1 Human Development & Assistance_8
Protection, Enforcement & Physical Performing_9	**Factor 5:** Security, Enforcement & Physical Performing_9

Matched scales for Multitrait Multimethod Analyses of Work-Related Interests (D)

12 US Employment Services scales matched to 5 Interest Inventory factors	
US	IN
Mechanical_5	**Factor 1:** Working with things_2 Engineering & Related Technology_5 Science&Math_4
Plants & Animals_3 Scientific_2	**Factor 2:** Health_10 Animal & Plant Life_6
Industrial_6 Business Detail_7 Selling_8 Accomodating_9 Leading & Influencing_11	**Factor 3:** Leadership & Enterprise_7 Office & Business Detail_3
Artistic_1 Humanitarian_10	**Factor 4:** Arts & Humanities_1 Human Development & Assistance_8
Protective_4, Physical Performing_12	**Factor 5:** Security, Enforcement & Physical Performing_9

Table 17 (continued)

Matched scales for Multitrait Multimethod Analyses of Work-Related Interests (E)

11 CareerOp (Work Activity Preference) scales matched to 12 US Employment Service Scales	
CareerOp	**US Employment Service Scales**
Artistic & Creative Activities_1	Artistic_1
Caring for Animals & Plants_2	Plants & Animals_3
Clerical & Business Detail_3	Business Detail_7 Industrial_6
Customer Sales & Service_4	Selling_8 Accomodating_9
Engineering & Technical Activities_5	
Health Related Activities_6	Humanitarian_10
Human Development & Assistance_7	
Leadership & Enterprise_8	Leading & Influencing_11
Protection, Enforcement & Physical Performing_9	Protective_4, Physical Performing_12
Scientific Activities_10	Scientific_2
Working with Hardware_11	Mechanical_5

Structure of Work-Related Needs: Factor Analyses of the Inventory of Work-Related Needs (I-WRN)

Consistency of definitions of work-related needs and values is lacking. The variety of conceptual definitions shows that these concepts are still very much in the early stages of evolution (Dawis, 1991). In accordance with Problem Statement 2, the present study is designed to examine the structure of work-related needs to clarify the underlying structure and add to the conceptualization of needs. A recently developed work-related needs inventory (I-WRN) was developed to measure the domain of needs. The inventory consists of twenty-two a priori scales. The following analyses were performed on the instrument scales to assess the structure of needs.

- Every variable was intercorrelated.

- Eigenvalues were extracted by the principal components procedure where priors of one were placed on the main diagonal of the correlation matrix.

- Eigenvalues were plotted in order of their extraction. A scree test (Cattell, 1966) was used to determine the number of factors for rotation along with the Kaiser criteria of eigenvalues greater than 1.00.

- Factors were rotated orthogonally using a varimax criterion.

- The intercorrelation matrices were recalculated using squared multiple correlations in the major diagonal. The principal axes procedure of extraction was then applied and identified factors were rotated using a varimax criterion.

- Cluster analysis was conducted using SAS Varclus (SAS, 1988) to determine the robustness of the solution and aid in interpretability. This procedure performs a hierarchical clustering of variables based on the intercorrelation matrix.

Initially, principal components analysis was conducted on the 22 a priori need scales of the I-WRN. Examination of the eigenvalues identified four factors with values larger than 1.00. Interpretation of the scree plot identified that four to six factors would be appropriate for rotation. Principal axes analyses were then performed with multiple rotations and a five-factor solution was most meaningful. A total of 72.4 percent of the variance was explained. Results are contained in Appendix K. Cluster analyses were also conducted to aid in interpretability and are contained in table 18 along with factor titles, loadings and variance explained.

The stability of the factor structure of the I-WRN was assessed by dividing the sample in half. Odd numbered subjects constituted one sample while even numbered subjects constituted the second sample. Principal axes method of extraction and prior communalities equal to the squared multiple correlation were placed on the main diagonal of the correlation matrix. Each sub-sample followed this pattern. A varimax rotation followed. Five factors emerged in each sub-sample as emerged in the analyses conducted on the entire sample. Indices of the stability of the factor structure were obtained by calculating a coefficient of congruence between the factor loadings of matched odd and even sub-samples. Congruence coefficients ranged between .93 and .99 and are presented in Table 18.

Table 18

Factor Analysis of 22 I-WRN Scales: Factor Titles, Congruence Coefficients, Salient
Loadings, Percent of Variance Explained and Cluster R^2

Factors and Item	Rotated Loading	% Variance	Cluster R^2
Factor1 Responsibility & Recognition (.99)		20.14	
Prestige13	.77		.83
Advancement3	.75		.82
Leadership11	.73		-
Responsibility16	.71		-
Compensation7	.68		.74
Recognition15	.65		.79
Factor2 Comfort (.98)		16.88	
Compartmentalization6	.74		.66
Work conditions22	.69		.78
Security17	.68		.56
Quality of Management14	.62		.76
Structure19	.59		.62
Social Interaction18	.57		.67
Factor3 Self-Actualization (.98)		14.61	
Growth10	.75		.85
Achievement1	.69		.83
Creativity8	.67		.72
Participation12	.59		.81
Factor4 Enriched Working Environment (.97)		12.85	
Culture & Aesthetic Concerns9	.64		.61
Activity2	.63		.47
Variety21	.56		.66
Autonomy5	.53		-
Factor5 Helping (.93)		7.96	
Teamwork20	.58		-
Altruism4	.52		-

Note: The values in parenthesis following each
factor title are the congruence coefficients
between odd and even sub sample factor
analyses

Structure of Work-Related Needs: Joint Factor Analyses of three Work-Related Need Questionnaires (Inventory or Work Related Needs, CareerOp-Benefits & Opportunities, and the Minnesota Importance Questionnaire)

Similar to the domain of interests, there have been very few studies that have sought to compare factor structures among various work-related need inventories. Factor analyses were performed for this purpose. As outlined in the section examining the structure of the Interest Inventory and the I-WRN, similar procedures were followed to examine the underlying structure of all three need inventories. First, principal components method of extraction was applied with one's as prior communality estimates and varimax rotation. Principal axes method of extraction was then applied with squared multiple correlations as prior communality estimates and varimax rotation. Multiple factor solutions were rotated involving different numbers of factors as estimated by examination of the eigenvalue pattern (Cattell, 1966). Cluster analyses were also performed as an aid in interpreting results. An eight factor solution was most meaningful and explained 66.5 percent of the total variance. Table 19 presents a summary of factor titles, salient loadings, percent of variance explained and cluster R^2. Results are contained in Appendix L.

Table 19

Joint Factor Analysis of three Work-Related Need Inventory Scales: Factor Titles, Salient
Loadings, Percent of Variance Explained and Cluster R^2

Factor Titles and Salient Need Scales	Rotated Loading	% Variance	Cluster R^2
Factor 1 Responsibility & Recognition		14.64	
iw_prestige13	.79		.88
iw_leadership11	.79		.74
iw_responsibility16	.74		.71
iw_advancement3	.71		.75
iw_recognition15	.62		.71
iw_compensation7	.60		.59
mi_recognition & status7	.59		.71
ca_status8	.57		.49
ca_leadership & responsibility5	.52		-
Factor 2 Comfort		11.48	
iw_compartmentalization6	.75		.66
iw_work conditions22	.70		.78
iw_security17	.66		.57
iw_structure19	.62		.61
iw_quality of management14	.58		.74
iw_social_interactions18	.58		.66
ca_comfort2	.56		-
Factor 3 Self-Actualization		10.36	
iw_growth10	.77		.83
iw_achievement1	.72		.81
iw_creativity8	.65		.68
iw_participation12	.61		.80
Factor 4 Rewarding Environment (CareerOp specific)		6.91	
ca_pay_future6	.69		.59
ca_interpersonal_relations4	.61		.72
ca_feedback3	.58		.62
ca_self_actualization7	.58		.58
Factor 5 Helping		6.5	
iw_altruism4	.72		.48
ca_altruism10	.68		.63
mi_altruism4	.47		.82
iw_culture & aesthetic concerns9	.47		.53
iw_teamwork20	.38		-
Factor 6 Enriched Work Environment		6.19	
iw_activity2	.76		.66
ca_variety9	.75		.73

Table 19 (continued)

Factor Titles and Salient Need Scales	Rotated Loading	% Variance	Cluster R^2
iw_variety21	.57		.67
mi_activity3	.33		.34
Factor 7 Interpersonal Relations (MIQ specific)		5.71	
mi_quality of management6	.57		.61
mi_interpersonal_relations8	.57		.46
mi_pay5	.55		.57
mi_achievement2	.45		.37
Factor 8 Autonomy		4.73	
ca_autonomy1	.67		.73
iw_autonomy5	.64		.79
mi_autonomy1	.53		.55

mi=Minnesota Importance Questionnaire,
ca=CareerOp-Benefits & Opportunities,
iw=Inventory of Work-Related Needs (I-WRN)

Construct Validity of Work-Related Needs

After investigating the factor structure of the I-WRN and that of the MIQ and CareerOp-Benefits and Opportunities, construct validity was examined. There have been very few studies that have sought to compare factor structures among various work-related need inventories. Research has focused on the examination of needs by looking within an instrument. Augustin (1983), MacNab and Fitzsimmons (1987), Carter (1989), and Cunningham (2000) are known attempts to look across questionnaires. This research reaches toward the development of a comprehensive taxonomic structure that is sufficiently specific for use in applied and other research settings. In that vein, a comprehensive instrument based on previous factor analytic work was used for assessing and researching values (I-WRN). As Dawis points out, 'Occasional validity-related experiments have appeared in the applied psychology literature (e.g. Heilman, 1979; Stulman & Dawis, 1976). Unfortunately, these are the exceptions not the rule' (Dawis, 1991, pg. 862). This study compared three work-related need instruments and tested whether the factor structure of the newly created work-related needs instrument (I-WRN) agrees with previously derived factors using multitrait multimethod analyses. First, scales and factors were judgmentally matched as outlined below and presented in table 20.

- All need scales in the I-WRN were judgmentally matched to nine-higher order factors (Income & Comfort, Status & Recognition, Altruistic Concerns, Autonomy, Growth, Activity & Variety, Interpersonal Concerns, Leadership & Responsibility, and Structure). These factors were derived from estimated scores on 31 within-instrument factors that

were subjected to principal components analyses (Cunningham, 2000). All scales in the CareerOp-Benefits & Opportunities were also judgmentally matched to the nine higher order factors and scale scores created. Pearson correlation coefficients were then obtained (A).

- All MIQ scales were also judgmentally matched to the nine higher order factors mentioned above and scale scores calculated. Pearson correlation coefficients were then obtained for these MIQ nine factors and the collapsed I-WRN factors described above (B).

- Pearson correlation coefficients were derived for five I-WRN factors which were derived previously in this study, and five CareerOp-Benefits & Opportunities after the 10 scales were judgmentally collapsed into the five I-WRN factors and scale scores calculated (C).

- Pearson correlation coefficients were computed for five I-WRN factors and five MIQ factors after the 10 MIQ scales were judgmentally collapsed into the five I-WRN factors and scale scores created (D).

- 10 CareerOp-Benefits & Opportunities scales were matched to 10 MIQ scales and scale scores were obtained. A total of eight scales corresponded and Pearson correlation coefficients were computed (E).

A Monte Carlo procedure for multitrait multimethod analysis (Knoeller & Iwaniszek, 1990) was used to examine convergent discriminant validity (Cunningham, Powell, Wimpee, Wilson & Ballentine, 1996). Convergent validity was first examined and support found in trait contribution. All p values obtained were significant (A. p=.002, B. p=.001, C. p=.008, D. p=.008, E. p=.003). These results provide evidence of good

convergent validity as the validity diagonal elements are sufficiently large. This statistic also evaluates discriminant validity by comparing the validity diagonal elements to their corresponding heterotrait-heteromethod triangle elements. It determines whether the mean of the validity coefficients (the main diagonal elements, representing matched constructs) in the heterotrait-heteromethod matrix was significantly different from zero and from the other off-diagonal values.

Further evidence of discriminant validity is established by a qualitative comparison of trait contribution and method contribution statistics. Even though this indicator of method contribution is significant for all analyses (A-E. p=.001) and ideally one would like to see a non-significant method contribution the results still demonstrate convergent and discriminant validity as evidenced by the final indicator of discriminant validity. Each triangle is compared with every other triangle for consistency in patterning. This patterning statistic is identical to that used by Hubert and Baker (1978). Few of the triangle comparison across all analyses had a p values exceeding .10 as listed in Appendix M.

Table 20

Matched scales for Multitrait Multimethod Analyses of Work-Related Interests (A-B).
All Need Scales Matched to Higher-Order Factors Derived from Estimated Scores on 31
Within Instrument Factors

I-WRN	CareerOp-Benefits & Opportunities	Minnesota Importance Questionnaire	Nine Higher-Order Factors
Compensation_7, Security_17	Comfort_2, Pay & Future_6	Pay & Future/Comfort_5	I. Income & Comfort
Prestige_13, Recognition_15, Advancement_3,	Status_8, Feedback_3	Recognition & Status_7	II. Status & Recognition
Altruism_4, Teamwork_20	Altruism_10	Altruism_4	III. Altruistic Concerns
Autonomy_5	Autonomy_1	Autonomy_1	IV. Autonomy
Growth_10, Achievement_1, Creativity_8, Participation_12	Self Actualization_7	Achievement_2	V. Growth
Variety_21, Activity_2, Culture & Aesthetic Concerns_9	Variety_9	Activity_3	VI. Activity & Variety
Work Conditions_22, Compartmentalization_6, Quality of Management_14, Social Interaction_18	Interpersonal Relationships_4	Quality of Management_6, Interpersonal Relations_8	VII. Interpersonal Concerns
Leadership_11, Responsibility_16	Leadership & Responsibility_5	-not applicable-	VIII. Leadership & Responsibility
Structure_19	-not applicable-	-not applicable-	IX. Structure

Table 20 (continued)

<u>Matched scales for Multitrait Multimethod Analyses of Work-Related Interests.
CareerOp-Benefits & Opportunities and the Minnesota Importance Questionnaire
collapsed into five I-WRN factors (C-D)</u>

I-WRN	CareerOp-Benefits & Opportunities	Minnesota Importance Questionnaire
Prestige_13, Advancement_3, Responsibility_16, Leadership_11, Compensation_7, Recognition_15, Autonomy_5	Status_8, Autonomy_1, Leadership & Responsibility_5	Autonomy_1, Recognition & Status_7
Growth_10, Creativity_8, Achievement_1, Participation_12	Self Actualization_7, Feedback_3	Achievement_2
Culture & Aesthetic Concerns_9, Variety_21, Activity_2	Variety_9	Activity_3
Compartmentalization_6, Security_17, Work Conditions_22, Structure_19, Quality of Management_14	Interpersonal Relationships_4, Comfort_2, Pay & Future_6	Quality of Management_6, Interpersonal Relations_8, Pay & Future/Comfort_5
Social Interaction_18, Teamwork_20, Altruism_4	Altruism_10	Altruism_4

Table 20 (continued)

Matched scales for Multitrait Multimethod Analyses of Work-Related Interests. 10 CareerOp-Benefits & Opportunities scales matched to eight Minnesota Importance Questionnaire scales (E)

CareerOp-Benefits & Opportunities	Minnesota Importance Questionnaire
Autonomy_1	Autonomy_1
Self Actualization_7, Feedback_3	Achievement_2
Variety_9	Activity_3
Altruism_10	Altruism_4
Pay & Future_6	Pay & Future _5
Comfort_2	Quality of Management_6
Status_8, Leadership & Responsibility_5	Recognition & Status_7
Interpersonal Relationships_4	Interpersonal Relations_8

Relationship between Work-Related Interests & Needs: Joint Factor Analyses of Six Instruments

In accordance with Problem Statement 3, joint factor analyses of three work-related interest (CareerOp-Work Activity Preferences, US Employment Services Questionnaire, and the Interest Inventory) and three need inventories (I-WRN, CareerOp– Benefits and Opportunities, Minnesota Importance Questionnaire) were conducted to compare the domains of work-related interests and values and to clarify terminology that often links the two domains and treats them as indistinguishable. The present study is designed to compare factor structures among work-related need and interest inventories to determine whether work-related interests and needs relate to each other or are distinct. The joint factor analyses were conducted to determine whether mixed or pure factors exist.

As outlined in the section examining the structure of the Interest Inventory and the I-WRN, similar procedures were followed to examine the underlying structure of six inventories. First, principal components method of extraction was applied with one's as prior communality estimates and varimax rotation. Principal axes method of extraction was then applied with squared multiple correlations as prior communality estimates and varimax rotation. Multiple factor solutions were rotated involving different numbers of factors as estimated by examination of the eigenvalue pattern (Cattell, 1966). Cluster analyses were also performed as an aid in interpreting results. A 14 factor solution was most meaningful and explained 70 percent of the total variance as contained in Appendix N. The factors were grouped according to their domain and only 1 mixed factor emerged. Table 21 presents a summary of factor titles, loading, percent of variance explained, and cluster R^2.

Table 21

Joint Factor Analysis of Six Instruments: Factor Titles, Salient Scales, Rotated Loading, Percent Variance and Cluster R^2

Factor Titles and Salient Need Scales	Rotated Loading	% Variance	Cluster R^2
Factor 1 Responsibility & Recognition (I-WRN specific)		14.84	
iw_Responsibility16	.83		.68
iw_Participation12	.82		.80
iw_Achievement1	.82		.76
iw_Growth10	.81		.77
iw_Leadership11	.76		-
iw_Creativity8	.73		.67
iw_Prestige13	.72		-
iw_Teamwork20	.70		.55
iw_Variety21	.69		.62
iw_Recognition15	.68		-
iw_Quality of Management4	.66		-
iw_Advancement3	.64		-
iw_Altruism4	.62		-
iw_Social Interaction18	.56		-
iw_Culture & Aesthetic Concerns9	.54		-
Factor 2 Technical & Hardware Related		7.09	
sp_Engineering & Technical Activities5	.89		.76
sp_Working with Hardware11	.84		.82
in_Working with Things2	.79		.78
in_Engineering & Related Technologies5	.73		.67
in_Science & Math4	.68		.48
sp_Scientific Activities10	.62		-
us_Mechanical5	62		.60
Factor 3 Business – Low (USES specific)		6.14	
us_Business Detail7	.79		.76
us_Industrial6	.78		.69
us_Accomodating9	.76		.69
us_Selling8	.58		.58
us_Leading & Influencing11	.57		.54
Factor 4 Business - High		5.36	
sp_Leadership & Enterprise8	.83		.70
in_Leadership & Enterprise7	.76		.58
sp_Clerical & Business Detail3	.75		.74
in_Office & Business Detail3	.71		.67
sp_Customer Sales & Service4	.56		.51

Table 21 (continued)

Factor Titles and Salient Need Scales	Rotated Loading	%Variance	Cluster R^2
Factor 5 Humanitarian Concerns		5.2	
in_Health Related10	.83		.72
sp_Health Related Activities 6	.82		.80
us_Scientific2	.67		.70
us_Humanitarian10	.51		.41
sp_Human Development & Assistance7	.49		-
in_Human Development & Assistance 8	.40		-
Factor 6 Comfort		5.05	
iw_Compartmentalization6	.71		.66
iw_Security17	.66		.57
ca_Comfort2	.63		-
iw_Work Conditions22	.59		.78
iw_Structure19	.54		.61
iw_Compensation7	.51		-
Factor 7 Artistic		4.39	
sp_Artistic & Creative Activities1	.86		.73
in_Arts & Humanities1	.80		.67
us_Artistic1	.70		.53
Factor 8 Self-Actualization (CareerOp specific)		3.49	
ca_Self Actualization7	.63		.58
ca_Interpersonal Relations14	.60		.72
ca_Pay and Future6	.58		.59
ca_Feedback3	.54		.62
ca_Leadership & Responsibility5	.52		.48
ca_Altruism10	.36		-
Factor 9 Interpersonal Relationships (MIQ specific)		3.42	
mi_Interpersonal relations8	.59		.46
mi_Quality of Management6	.58		.54
mi_Altruism4	.54		.43
mi_Pay & Future Comfort 5	.49		.44
mi_Achievement2	.46		.40
mi_Activity3	.29		.18
Factor 10 Security & Physical Performing		3.4	
in_Security9	75		.69
sp_Protection, Enforcement & Physical Feats9	72		.82
us_Physical Performing	.52		.62
us_Protective	.52		.60
Factor 11 Plants & Animals		3.17	

Table 21 (continued)

Factor Titles and Salient Need Scales	Rotated Loading	%Variance	Cluster R²
sp_Caring for Animals & Plants2	.76		.86
in_Animals & Plant Life 6	.72		.82
us_Plants& Animals3	.58		.72
ca_Variety 9	.34		-
Factor 12 Status		3.10	
mi_Recognition and Status7	.57		.46
ca_Status8	.49		.52
Factor 13 Autonomy		2.84	
ca_Autonomy 1	.68		.73
iw_Autonomy5	.64		.79
mi_Autonomy1	.49		.55
Factor 14 Activity		2.16	
iw_Acivity2	.39		.49

Need Inventories: iw=Inventory of Work Related Needs, ca=CareerOp-Benefits & Opportunities, mi=Minnesota Importance Questionnaire
Interest Inventories: in=Interest Inventory, sp=CareerOp-Work Activity Preferences, us=US Employment Services Questionnaire

Relationship between Work-Related Interests &Needs: Canonical Correlations

To further assess the relationship between work-related interests and needs canonical correlation analyses were performed using the CANCORR procedure (SAS, 1988). The canonical correlations analyzed the relationship between the two sets of variables (needs and interests) where each set contained several variables. This procedure assessed how work-related needs relate to interests. The canonical correlation procedure finds a linear combination from each set, called the canonical variable, so that the

correlation between the two canonical variables is maximized. This procedure tested the hypotheses that all the canonical correlations are zero in the population.

Three canonical equations were examined and results are contained in Appendix O-Q. The first analysis examined how the eight need factors (derived from the joint factor analysis of three work-related need instruments) related to the eight interest factors (derived from the joint factor analysis of three work-related interest instruments). Correlations between the interest and need factors are low with the largest being .41 between the need for leadership and health-related activities. Three sets of weights yielded statistically significant canonical correlation coefficients of .621, .563 and .513, accounting for 39, 32, and 26 percent of the variance respectively.

The second analyses involved calculating the relationship between five need factors (derived from factor analyses of the I-WRN as described previously in the study) and 10 interest scales (CareerOp – Work Activity Preferences). Two sets of weights yielded statistically significant canonical correlation coefficients of .61and .45, accounting for 37, 21 percent of the variance respectively.

The last relationship involved the relationship between 11 CareerOp-Work

Activity Preference scales and 22 I-WRN scales that were sorted into nine higher order

factors (Cunningham, 2000). Three sets of weights yielded statistically significant

canonical correlation coefficients of .63, .55, and .44, accounting for 40, 31, and 20

percent of the variance of the canonical variates, respectively.

Relationship between Work-Related Interests &Needs: Regression Analysis

Finally, in accordance with Problem Statement 4, this study examined whether there is a stable pattern in how interests and needs relate. The specific relationships between particular work-related needs and particular interests were examined to determine whether certain needs are related to activity preferences. This helps answer whether work-related needs (defined by responses to a structured questionnaire) can dependably (reliably and validly) predict interests (defined by responses to a structured questionnaire). In accordance with Holland's theory, choices are not made by an unconscious process but rather are driven by preferred methods for dealing with daily problems (Suziedelis & Steimel, 1963). Regression analyses were performed using PROC REG (SAS, 1988) to determine whether work-related values differentiate interests.

The first set of analyses examined how the eight need factors (derived from the joint factor analysis of three work related need instruments previously in the study) predicted each of the eight need factors (derived from the joint factor analysis of three work-related interest instruments previously in the study). Appendix R contains the results from these analyses. Multiple relationships in the expected direction were identified. Table 22 presents summary results from the eight above listed regression analyses.

The second set of analyses studied the relationship between each of the CareerOp-Work Activity Preference scales and the five need factors derived previously in this study from factor analyses of 22 I-WRN scales. Results from each of the 11 regression analyses are contained in Appendix S. This set of analyses produced more moderate and

high relationships among needs and interests. Table 23 presents summary results for each of the 11 regression analyses. All of the 19 multiple regressions performed produced statistically significant multiple correlations (p,.001). These significant correlations ranged from .26-.44 with a mean of .36.

Table 22

Summary Table of Parameter Estimates for Eight Regression Analyses

8 Interest Factors	Responsibility & Recognition	Comfort	Self Actual-ization	Rewarding Envirnmnt	Helping	Enriched Work Environmt .	Interpersnl Relation-ship	Autonomy	Multiple R
1.Technical Activities			.091*		-.33*	.25*			.42
2. Office Low			-.21*		.12*	.16*			.30
3. Health Related					.30*	-.12*			.35
4. Office High	.43*		-.11*						.45
5. Liberal Arts & Humanities	-.20*		.20*		.21*			.15*	.39

Table 22 (continued)

	Responsibility & Recognition	Comfort	Self Actual- ization	Rewarding Envirnmnt	Helping	Enriched Work Environmt	Interpersnl Relation- ship	Autonomy	Multiple R
6. Plants & Animals	-.15*				.10*	.30*			.37
7. Security & Physical Performing	-.16*				.10*	.31*			.37
8. Selling	.14*		-.19*		.17*			-.11*	.31

*p<.01

Table 23

Summary Table of Parameter Estimates for 11 Regression Analyses

11 CareerOp–Work Activity Preference Scales	22 I-WRN Factors collapsed into 9 Higher Order Factors									Multiple R
	Income	Status	Altruism	Autonomy	Growth	Activity & Variety	Inter-personal Relation-ships	Leader-ship	Structure	
1. Artistic			.46*					.42*	-.17*	.38
2. Plants & Animals					.38*				-.18*	.41
3. Clerical					-.32*			.21*	.18*	.28
4. Customer Sales & Service			.27*		-.38*		.20*			.33
5.Engineering & Technical Activities			-.29*		.28*	.26*				.26
6. Health Related Activities			.44*		-.23*				-.15*	.33

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Table 23 (continued)

	Income	Status	Altruism	Autonomy	Growth	Activity & Variety	Inter-personal Relation-ships	Leader-ship	Structure	Multiple R
7. Human Devopmt & Assistance		.63*				-.26*			-.16*	.43
8. Leadership & Enterprise	.21*				-.28*	-.13*		.54*		.44
9. Protective				-.17*	-.19*	.40*				.37
10. Scientific					.23*	.16*				.23
11. Working with Hardware			-.28*	-.15*		.51*				.41

*p<.01

DISCUSSION

Work-related interests and needs can be used to explain relations between humans and work. They are among the most salient elements of vocational career choices (Super, 1962). However, there are many problems with this domain of research as evidenced in the review of the literature. Research has used interests and needs interchangeably making application of findings a challenge. By focusing on the relationships within and across these dimensions, the present study attempts to clarify an area that is terminologically and conceptually unclear. The proliferation of interest inventories and occupational data accelerates the need for classification systems to organize and interpret this information (Holland, 1976). Holland's conclusion made nearly 30 years ago is still relevant. There continues to be confusion around the relationship of work-related interests and needs.

Work-Related Interests

To investigate these domains, this study first investigated work-related interests. According to Problem Statement 1, the factor structure of a recently developed Interest Inventory was examined. This inventory was found to have rate rerate reliability coefficients ranging form .76-.87 suggesting they are sufficient for research purposes and have some potential for individual decision-making. Internal consistency coefficients are also sufficient for research purposes and ranged form .62-.86. The other two work-related interest inventories (CareerOp-Benefits & Opportunities and the USES) used in this study had internal consistency reliabilities predominately greater than .85 and can be used not only for research but for individual decision-making such as career counseling. These results are also comparable to previous research as listed in table 13.

Initially, all 42 items in the Interest Inventory were analyzed and a nine-factor solution resembling the a priori scales was identified as most meaningful and interpretable. These factors were titled 1. Technical Activities/Working with Things, 2. Business Management, 3. Animal & Plant Life, 4. Health-Related Activities, 5. Arts & Humanities, 6. Security & Enforcement, 7. Architectural Design, 8. Human Development & Assistance, and 9. Physical Performing. One distinction between the factor solution and the a prior scales is that Working with Things/Mechanical and Engineering collapsed into a Technical Activities/Working with Things factor. Science & Math also dispersed across the Technical, Plants & Animals and Health Related factors. In addition, Office Detail and Leadership collapsed into one Business Management factor. Finally, Architectural Design separated from the Engineering & Technical Activities scale into a distinct factor. These results might reflect changes in the world of work. With the advent of computers, working with hardware might be construed as working with computers which falls into the Engineering scale. Architectural design might be becoming a distinct field apart from Engineering. In addition, management activities span complexity levels as individuals often serve as their own administrators, a change due to the widespread use of computers. Both of these changes reflect shifts in the nature of work that should be accounted for when identifying job requirements, educational training and job transferability.

Overall, these factors are comparable to the literature reviewed in Table 1 except where noted above. Approximately, eight factors emerged consistently across the different studies presented in table 1 such as the WIQ, COP, CareerOp-Work Activity Preference factors and were found to be common to the factor analysis of the 42 Interest

Inventory items. The results from the cluster analysis revealed that most salient loadings matched the cluster solution which seeks simple solution. Although there are consistencies with previous findings, the entire set of the domain of interests is likely not being captured as only 52 percent of the variance is accounted. This warrants the development of a broader and more updated instrument that reflects the nature of work in organizations today.

The scales of the Interest Inventory were also factor analyzed and five factors were judged to be most meaningful. The factor structure identically matched the cluster solution in that all variables fell within the same factor/cluster across procedures indicating that simple structure was approached. Interestingly, the five factors resembled Holland's typology. Factor 1 resembles Realistic. Factor 2 resembles Investigative. Factor 3 is a combination of Enterprising and Conventional (which are adjacent on the hexagonal model). Factor 4 is a combination of Artistic and Social which are also adjacent on the hexagonal model. This analysis produced fewer factors than other studies where scales were factor analyzed, however, the Interest Inventory has only ten scales while other instruments like the Work Instrument Questionnaire (WIQ) has a greater number of scales, specifically 23 scales. Stability of the factor structure was supported for both the five and nine factor solutions described above. Congruence coefficients ranged from (.91.99).

Within instrument factor analyses are often the norm although comparing across instruments helps identify whether the breadth of the interest realm is captured. Very few cross instrument studies have been conducted. In this vein, this study compared factors derived across scales to find similarities. With one exception, Customer Sales &

Service, the factors were marked by scales from different instruments. The eight factors were 1. Technical & Hardware Related, 2. Business Detail, 3. Leadership, 4. Health Related 5. Liberal Arts, 6. Protection, Enforcement, & Physical Performing, 7. Caring for Plants & Animals, and 8. Customer Sales & Service. Nearly 73 percent of the variance was accounted for suggesting that this solution better captured the domain of interests. The factor structure closely resembled the cluster solution which sorted variables into mutually exclusive categories.   The factors correspond with the factors obtained from the analysis of the 42 items, as well as, those contained in table 1.

The construct validity of the recently developed Interest Inventory was also examined. Monte Carlo procedures were conducted and five different relationships were examined (A-E) across the three different work-related interest instruments as listed in table 17. The results of each analysis supported convergent-divergent validity. Although, method effects were detected it should be noted that the scales within each instrument logically relate and might explain the within method relationships. For example, within the CareerOp instrument moderate correlations were found between the Engineering and Scientific and between the Health Related and Scientific scales. The correlations between the five interest factors and scales (after being judgmentally matched) produced the lowest within instrument correlations reflecting the distinct nature of the factors. Overall, the Interest Inventory is a reliable instrument that corresponds to known instruments that measure work-related interests.

Work-Related Needs

The present study was also designed to examine the dimensionality of work-related needs for the purpose of clarifying the underlying structure and extending the

work conducted by Cunningham (2000) as cited in Problem Statement 2. This research stems from the lack of consistency in terminology between work-related values, needs and interests and necessitated by the scarcity of cross instrument analyses. Of particular interest is the comparison of a newly developed questionnaire, the Inventory of Work-Related Needs (I-WRN) containing multiple-item scales with two more established instruments. This instrument was designed to capture the breadth of the need domain and included scales such as teamwork that were absent from previously developed instruments. Scale reliability was assessed for the I-WRN. Internal consistency reliability coefficients ranged from .87-.95. All but three of the 22 scales had a coefficient greater than .90. Test retest reliability coefficients ranged form .61-.89. Not surprisingly the rate rerate reliabilities were lower than the internal consistency scores. Mean profile correlations measuring individual profile reliabilities were .72. This instrument appears useful not only for research purposes but also for individual decision-making. The reliabilities for the CareerOp-Benefits and Opportunities and the MIQ were not as large and should be used primarily used for research purposes, although it should be noted that because the rating procedure for the MIQ was designed specifically for this study, these reliabilities do not apply to the original MIQ. As noted previously when seven students were removed from analysis individual profile reliabilities increased. These students, due to unfamiliarity with the English language might have had difficulty understanding the instrument content.

The I-WRN scales were first factor analyzed and a five-factor solution was most interpretable. The five factors are Responsibility & Recognition, Comfort, Self-Actualization, and Enriched Working Environment, and Helping. This solution

explained nearly 73 percent of the variance and corresponded to the cluster solution. As a test for stability, the sample was divided into odd and even sub-samples. Separate factor analyses were conducted for each sample and their corresponding congruence was assessed. The coefficients ranged from .93 for the Helping factor to .99 and support factor stability.

Overall, this factor solution is analogous to those contained in table 2 and especially resembles the structure of Dawis & Lofquist (1984) and Bolton (1980). Fewer factors emerged as compared to other structures listed in the table, which is likely a result of analyzing fewer variables. Interestingly, the Teamwork scale paired with Altruism in the Helping factor. The Enriched Working Environment factor closely corresponds to components of the job characteristics model of work motivation (Hackman & Oldham, 1976) which posits that duties and responsibilities of a job have the capacity to motivate. This model for enrichment highlights the importance of providing maximum amounts of intrinsic satisfaction which may require redesigning a job to provide opportunities for skill variety and autonomy.

This structure also resembles Maslow's Need Hierarchy (1.Physiological, 2. Safety, 3. Love, 4. Esteem and 5.Self-Actualization Needs) in that four of Maslow's needs are represented. Basic Physiological needs like food, water and sleep are not expected to be expressed in work settings and are not represented in this factor structure. Comfort matches the Safety need as it contains the Security, Compartmentalization, and the Work Conditions scales. Helping corresponds to Love needs as it consists of Teamwork and Altruism scales. Enriched Working Environment and Responsibility & Recognition match to Esteem needs. They correspond to an individual's need to occupy

a position that reflects his/her capabilities. Finally, Self-Actualization corresponds to Maslow's Self-Actualization need.

This factor structure also corresponds with a process-oriented model developed by Schein (1971). This three dimensional model of an organization purports individual movement across an organization that aligns with their career anchors. The five basic types of anchors are: 1. autonomy, 2. creativity, 3. technical competence, 4. security, and 5. general management (movement through the corporate ranks). The five factors correspond with the anchors except for technical competence which may be summarized by the Self-Actualization factor. All of these comparators highlight the meaningfulness of the five-factor solution and the potential usefulness for explaining career decisions.

This study also compared factor structures among three work-related need inventories to fill a gap in this type of cross instrument within domain analyses. Outside of the research by MacNab & Fitzsimmons (1987) and Cunningham (2000), most studies pertain to within instrument designs. A total of 30 scales were factor analyzed and an eight-factor solution was most interpretable. The eight factors are Responsibility & Recognition, Comfort, Self-Actualization, Rewarding Environment, Helping, Enriched Work Environment, Quality of Management, and Autonomy. This solution explained 67 percent of the variance and is consistent in composition to the cluster solution. This structure resembles those listed in table 2 and especially matches the higher-order factors derived from analysis of 31 within instrument factors (Cunningham, 2000).

This type of within domain yet across instrument research can aid in the development of a comprehensive taxonomic structure for use in applied and other research settings. For example, value/need research is being applied to the measurement

of organizational culture. Preliminary research found organizational culture an important determinant in attracting, retaining and motivating talent. Typically, culture is studied through a cross-cultural lens. However, as organizations expand in size and geographical boundaries the traditional value set used to explain cross-cultural variations are not sufficient to account for the nuances within an organization's culture. Studies examining the structure of work-related needs will likely prove promising in organizational culture research as well.

Finally, the construct validity of the recently developed Interest Inventory was also examined. Monte Carlo procedures were conducted and five different relationships were examined (A-E) across the three different work-related interest instruments as listed in table 20. The results of each analysis supported convergent-divergent validity. Method effects were detected. Overall, the I-WRN is a reliable instrument that corresponds to known instruments that measure work-related needs. It has considerable promise as a comprehensive measure of work-related needs.

Relationship between Work-Related Interests and Needs

Intuitively, one would expect that the underlying structure of work-related interest and needs would overlap since needs have often been defined as broader domains encompassing interests. Stefflre (1959) concluded that interests stem from values, which in term stem from needs. Kinnane and Suziedelis (1962) offered the possibility that occupational interests reflect values, needs and motivation (Breme & Cockriel, 1975).

In some cases, relationships between work-related interests and needs have been found while in others none existed. There is no easy answer to that inconsistency except to mention that many of the studies that did find a relationship between interests and

needs were using measures that contained very similar items. For example, relationships between the Strong Interest Blank (SVIB) and the Minnesota Importance Questionnaire may be attributable to the similarities between items in the two instruments. The SVIB is not a pure measure of vocational interests (Katz, 1969). Conclusions drawn by these studies do not resolve whether there is a true distinction between work-related interests and needs.

In conjunction with Problem Statement 3, this study conducted cross-domain analyses to address this question from an underlying structural perspective. All six instruments (three work-related interest and three need questionnaires) were analyzed. A 14-factor solution was most meaningful and explained 70 percent of the variance. For the most part, pure factors emerged that were marked by salient loadings on scales from either one domain or the other. The one exception was the Plants & Animals factor for which Variety had a loading of .34. However, Variety did not appear in the corresponding cluster. Overall, items with salient loadings grouped within their respective domains.

Specifically, seven interest (Technical & Hardware, Business (low), Business (high), Humanitarian Concerns, Artistic, Security & Physical Performing and Caring for Plants & Animals) and seven need factors (Responsibility & Recognition, Self-Actualization, Interpersonal Relations, Status, Autonomy, Activity, and Comfort) emerged. These results correspond to the results found by Augustin (1983) who jointly analyzed the COP interest and need items. Overall, he found nine need factors and eight interests factors most interpretable. All of the need factors identified in table 21 matched Augustin's (1983) factors except for the Interpersonal Relations factor. In addition, all

of the interest factors corresponded to factors contained in Augustin's structure, except that the current study produced fewer factors. Moreover, none of the expected relationships such as the anticipated correlation between Human Development & Assistance and Altruistic Concerns, along with others hypothesized under Problem 3, were supported in this study. The lack of overlap between interests and needs and the correspondence with Augustin's structure supports the conclusions that needs and interests are distinct dimensions.

In addition, this study explored the relationship between interests and needs in conjunction with Problem 4 to further understand how these domains interrelate. First, canonical correlations which break down the association for two sets of variables were employed. This procedure was used to parsimoniously describe the number and nature of mutually independent relationships existing between interests and needs (Stevens, 1996). The first pair of canonical variates tells what type of interest profile (as revealed by the linear combination, and named by determining which of the original variables correlate most highly with this linear combination) is maximally associated with a given profile of needs. Three canonical equations were examined. Across all of them 2-3 relationships were significant. However, the correlation between the original interests and needs were low overall.

Interpretation of results also requires examination of the standardized coefficients and the canonical variate-variable correlations. The first set assessed the relationship between eight need factors and eight interest factors. Three sets of weights yielded statistically significant canonical correlation coefficients that were of moderate size (.62, .56 and .51). In this set, the first canonical variate for the interest variables is primarily a

weighted difference of Liberal Arts & Humanities (.48), Office-high (.45), and Health Related (-.44). The remaining variables have smaller coefficients. Examination of the correlation between this canonical variable and those contained in the first canonical variable on the need side reveals that Helping has the largest correlation (.48). The second canonical variate is primarily a weighted combination of Technical Activities (.56), Security, Enforcement and Physical Performing (.51), and Office-high (-.47). The remaining coefficients have smaller values. The need for Enriched Work Environment (Activity) & Stimulation has the highest correlation with the second canonical variable. The third canonical variable for the interest variables is predominately a weighted difference of Caring for Plants & Animals (.52) and Office-low (.43). Self-Actualization has the highest correlation with the second canonical variable (-.34) followed by Helping (.21).

The second set of analyses examined the relationship between 11 CareerOp-Work Activity Preference scales and 5 need factors derived from factor analysis of the I-WRN as mentioned previously in the study.   The first two canonical correlation coefficients are statistically significant and moderate in size (.61, 45). The first canonical variable for the interest variables is a combination predominately of Leadership/Enterprise (.89), Human Development & Assistance (-.46) and Artistic (.40). Leadership has the highest correlation with the first canonical variable (.54). The second canonical variable is a weighted combination primarily of Customer Sales & Service (.56), Artistic (-.45), Clerical (.43), Engineering & Technical Activities (.43), and Leadership & Enterprise (-.42). Self-Actualization (-.33) and Helping (.22) had the highest correlations with the second canonical variable.

The third relationship studied involved the 11 CareerOp-Work Activity

Preference scales and the 22 I-WRN scales that were sorted into nine higher order factors

(Cunningham, 2000). Three sets of weights yielded statistically significant canonical

correlation coefficients of .63, .55, and .44 and were moderate in size. The first canonical

variable is a weighted combination primarily of Leadership & Enterprise (.65), Human

Development & Assistance (-.55), Artistic (-.49), Protective (.41). The remaining

coefficients are smaller in size. Leadership (.27) had the highest correlation with the first

interest canonical variable. The second canonical variable is predominately a

combination of Leadership & Enterprise (-.66) and Caring for Plants & Animals (.47).

The remaining variables had considerably smaller coefficients. Examination of the

correlations between the Need variables reveals Enriching Work

Environment/Activity/Variety (.30), Status (-.23), and Leadership (-.23) had the highest

correlation with the second canonical variable. The third canonical variable is

predominately a combination of Health Related (.50), Customer Sales & Service (.44)

and Engineering & Technical Activities (-.43) as evidenced by the canonical coefficients.

Altruism (.19), Structure (.13), and Growth (-.13) had the highest correlations with the

third canonical variable.

Overall, a number of meaningful patterns were revealed, however, the size of the

correlations between the interest canonical variates and the need variables were low to

moderate. Across all three sets of analyses the canonical redundancy analyses showed

that each pair of canonical variables demonstrated consistency in the way the two

domains related. Yet, overall each pair were not a very strong predictors of the opposite

set of canonical variables. The canonical correlations may be strong enough for practical

interests but not large enough to draw explicit conclusions. As mentioned previously, constraining factors might have masked the existent relationship between interests and needs. Low relationships could relate to the differences between intrinsic and expressed interest (Korman, 1967).

Finally, this study clarified the relationship between interests and needs through examination of multiple regression analyses also in conjunction with Problem 4. These analyses indicate that activities provide some opportunities to meet needs. One of the central tenets of Schneider's (1987) attraction-selection-attrition framework is that individuals are attracted to work environments that are compatible with their personal characteristics (Judge & Cable, 1997, pg. 389). Although interests and needs are considered distinct they have often been conceptually linked, yet few studies explicate the exact relationship between the two sets of variables. This study was conducted to address this gap in understanding.

A number of relationships were identified across the two sets of regression analyses. The first set examined the relationship between eight interest factors and eight need factors derived through two joint factor analyses of the respective domains. The second set examined 11 relationships between the CareerOp scales and the nine I-WRN factors which were judgmentally collapsed into nine higher-order factors (Cunningham, 2000). Patterns in the way needs relate to interests across the two sets were examined.

To identify consistencies in the prediction of interests, these dependent variables were judgmentally matched across the two sets of analyses and patterns detected. For example, the dependent variable Technical Activities in the first set was matched to Engineering & Technical Activities in the second set. However, not all dependent

variables matched across the two sets of regression analyses. The following highlights the consistencies found.   Across these sets of analyses Technical/Engineering & Technical interest was predicted by needs for Self-Actualization/Growth, Enriched Work Environment/Activity & Variety, and a lack of need for Helping/Altruism. Office (low)/Clerical interest was consistently predicted by a lack of need for Self-Actualization/Growth. Health Related interest was consistently predicted by Helping/Altruism. Office (high) was consistently predicted by Leadership, and a lack of need for Self-Actualization/Growth. Liberal Arts & Humanities/Human Development & Assistance interest was consistently predicted by Helping/Altruism. Interest in Plants & Animals was consistently predicted by the need for an Enriched Work Environment/Activity & Variety. In the set of analyses between the eight interest factors and eight need factors, interest in Plants & Animals was also predicted by the need for Helping. Interest in Security and Physical Performing was consistently predicted by the need for an Enriched Work Environment/Activity & Variety.

All of the 19 multiple regressions across the two sets of analyses performed produced statistically significant multiple correlations (p,.001). These significant correlations ranged from .26-.44 with a mean of .36. In addition, many of the expected relationships listed in Table 3 were supported. Those underlined in the table identify the relationships that were detected. Overall, the results produced many meaningful patterns that suggest that interests and needs are part of the same motivational system. Yet the results also point to the promise in using needs as predictors instead of simply criterion variables.

In sum, the results emphasize the distinct nature of interests and needs and call for an expansion in the use of work-related needs in predicting outcomes such as vocational choice. Interests unlike needs have been used to predict job satisfaction, occupational membership, tenure and job performance (Dawis, 1991). One application of this research is to collect individual profiles of both needs and interests that could then be compared to occupational profiles on these same variables to assess congruence and aid in job matching (Cunningham, 1987). These results are also important because interests are often difficult to rate due to little exposure to many of the activities that describe interest areas. This might be especially useful for students who have less experience with interest activities and who find it difficult to rate such inventories for use in career counseling. Overall, needs are more salient to individuals and might prove more helpful in career management. This study is timely in light of downsizing where many workers face work role transitions.

IMPORTANCE OF STUDYING WORK-RELATED INTERESTS AND NEEDS

Understanding the relationship between work-related interests and needs is critical for organizations today. They are increasingly faced with work role transitions (attrition and mobility) and reflect an age of boundary-less careers that takes people across different employer boundaries and across different types of work. This notion of career emerges from increasing global competition, de-layering activities and rapid change in job functionality due to technological changes and downsizing.

The literature on job and organizational choice indicates that applicants are attracted to work environments that are compatible with their personal characteristics (Kristof, 1996). Research has considered fit as congruence between a diverse collection of applicant and organizational attributes. Job seekers' goals, values, needs, interests and personalities have compared with organizations' culture, pay systems, sizes, structures and values. Fit ensues from a similarity between individual and organizational values. Similarly, fit results from a similarity between individual and organizational interests. Interest measures still leave unanswered the question of importance of the activity, which requires a measure of value. Both measures are necessary for an indication of eventual job satisfaction. Through use of both kinds of information better decisions and ultimate fit can be achieved.

Understanding the structure of work needs and interests through a comprehensive examination of multiple measures of these dimensions can facilitate integration of theory and aid in the developing items for research and evaluation. In addition, it has practical application in the world of work. This research can be used by organizations to help understand the attraction process, job choice decisions and later satisfaction.

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APPENDICES

CAREER ORIENTATION PROFILE (CAREER OP)
WORK ACTIVITY PREFERENCES

INSTRUCTIONS

Task 1: Provide Background Information

Please provide the background information (name, sex, birth date, curricular major code, Social Security number, and class standing) in the appropriate spaces provided on the op-scan answer sheet.

Task 2: Complete the Questionnaire

This questionnaire is divided into two parts. Each part consists of a list of work activity items and a computer scored answer sheet. **Part 1** contains 240 items, and **Part 2** contains 30 items.

Now, read each work-activity and indicate how much you would like or dislike doing the activity. Do not consider the education or training needed for the activity – assume you have that. **Think only about how much you would like or dislike the activity itself.** In making your decision, choose one of the following answers:

> **A = Dislike Very Much**
> **B = Dislike**
> **C = Uncertain or Neutral**
> **D = Like**
> **E = Like Very Much**

Blacken in the letter corresponding to your answer. Do not spend too much time on any one item, and please complete all **270** (Part 1= 240 & Part 2 = 30) items**.**

After you have completed Part 1, continue to Part 2.

EXAMPLE OF ITEMS

37. Conduct physics experiments.
51. Manage an office.
56. Paint portraits or landscapes.
227. Negotiate business contracts.

APPENDIX B

US EMPLOYMENT SERVICES (USES)

This booklet consists of Work Activities, Occupations and job-related Life Experiences.

Task 1: Provide Background Information
Please provide the background information (name, sex, birth date, curricular major code, Social Security number, and class standing) in the appropriate spaces provided on the op-scan answer sheet.

Task 2: Complete the Questionnaire
Read each item carefully and decide whether or not you would like to do the activity described. Don't think about how much money you would make or whether you have enough education or training for it. And don't be concerned about whether the activity or occupation has been commonly thought of as "male" or "female". Rather consider each activity or occupation as a possible choice open to members of both sexes, and think only about whether you would like the activity.

*If you think you would **DISLIKE** the activity, blacken circle **A** on your Opscan answer sheet.*

*If you are **NOT CERTAIN** whether you would like the activity, blacken circle **B**. This response should be used as little as possible. Use it only when you have no idea about what the activity is or if you just can't decide whether you would like it or not.*

*If you think you would **LIKE** the activity, blacken circle **C** on your Opscan answer sheet.*

EXAMPLE OF ITEMS

31. Protect other people.

44. Sell houses.

51. Conduct studies on economics

67. Make change and cash checks in a bank.

INTEREST ITEMS: INSTRUCTIONS

This questionnaire contains descriptions of different kinds of activities that occur in the world of work. **How do you think you would like doing different kinds of work activities?**

Task 1: Provide Background Information

Please provide the background information (name, sex, birth date, curricular major code, Social Security number, and class standing) in the appropriate spaces provided on the op-scan answer sheet.

Task 2: Complete the Interest Items Questionnaire

Then carefully blacken in the corresponding letters and numbers using a soft-lead pencil. This information is for record keeping and research purposes only. Your questionnaire responses will be kept strictly confidential.

Now, read each work-activity and indicate how much you would like or dislike doing the activity. Do not consider the education or training needed for the activity – assume you have that. And do not think about how much it would pay or whether it is usually thought of as a "male" or "female" activity. **Think only about how much you would like or dislike the activity itself.**

In making your decision, choose one of the following answers:

> **A = Dislike Very Much**
> **B = Dislike**
> **C = Uncertain or Neutral**
> **D = Like**
> **E = Like Very Much**

Blacken in the letter corresponding to your answer on the separate answer sheet.

Do not spend too much time on any one item, and please complete all **42 items**.

EXAMPLE OF ITEMS

1. **Visual art activities**—such as oil painting; sculpting; potting; decorating; cartoon drawing; jewelry and clothing design; magazine, book, and ad illustration; stage set design; art restoration; carving; engraving; photography; etc.

2. **Mechanical activities**—repairing, maintaining, assembling, or installing equipment such as motorized vehicles, boats, aircraft, heavy equipment, industrial machinery, farm equipment, power tools, building equipment (such as elevators, air conditioning systems, or furnaces), etc.

3. Daily office activities—such as typing letters, taking notes and messages, filing correspondence, photocopying, collating or assembling pages, maintaining appointment calendars, taking dictation, answering the phone, sorting mil, etc.

4. **Activities requiring knowledge and use of physics and chemistry**—including such topics as radiation, lasers, optics, acoustics, hydraulics, the composition of substances, the chemical properties of materials, chemical processes, etc. Involves such activities as analyzing liquids or gases, developing a new paint or plastic, testing metal ore samples, experimenting on the chemistry of substances, observing the structure of materials through an electronic microscope, etc.

5. **Engineering activities** (in such areas as aeronautical, civil, chemical, electrical/electronic, industrial, materials, mechanical, and nuclear engineering)—planning, designing, or directing the development/production/construction of machinery, equipment, vehicles, structures and facilities (such as bridges, roads, dams, tunnels, etc.), utility systems, materials, manufacturing processes, etc.

APPENDIX D

INVENTORY OF WORK-RELATED NEEDS (I-WRN)

This inventory lists a wide variety of characteristics (such as conditions, benefits, advantages,
and opportunities) that can be part of a work situation. Different people prefer different characteristics in their work. Which characteristics do you most prefer?

In this exercise, you will be rating how important each of these characteristics is to you, according to the scale shown below:

A = Not Important
B = Somewhat Important
C = Moderately Important
D = Important
E = Very Important

Using the Importance Scale and the attached machine-scoreable sheets, please answer the following questions:

EXAMPLE OF ITEMS

How important is a work situation in which you…

1. …have secure employment?
2. …can do things your own way?
3. …help others in difficulty?
4. …hold a position of importance?
5. …are learning new things?
6. …direct the work of others?
7. …have a chance to be original?
8. …can keep a sense of balance between work and your personal life?
9. …have a considerate boss?
10. …work with friendly people?
11. …are located in a safe part of town?
12. …have a chance to try new things?
13. …are able to succeed at what you do?
14. …receive good pay for you work?
15. …are recognized for good work?

APPENDIX E

CAREER OP - JOB BENEFITS/OPPORTUNITIES

Attached is a list of **30 job benefits/opportunities**. How important are these different benefits/opportunities to you?

Task 1: Identify the least and most important job benefit/opportunity

Please read the entire list of 30 job benefit/opportunity items and choose the one that is **most** important and the one that is **least** important to you. Write the numbers and titles of your two selected items in the spaces provided below.

The job benefit/opportunity that is **most important** to me:

_____

The job benefit/opportunity that is **least important** to me:

_____

HAVE YOU COMPLETED TASK 1? PLEASE FINISH THIS TASK BEFORE GOING ANY FURTHER.

Task 2: Provide Background Information

Please provide the background information (name, sex, birth date, curricular major code, Social Security number, and class standing) in the appropriate spaces provided on the op-scan answer sheet.

Then carefully blacken in the corresponding letters and numbers using a soft-lead pencil.

Task 3: Complete the Questionnaire

Now, please read the list of 30 job benefit/opportunity items again. As you read down the list, rate **how important** each benefit/opportunity is to you. Use the following rating code:

> **A = Not Important**
> **B = Somewhat Important**
> **C = Moderately Important**
> **D = Important**
> **E = Very Important**

Please record your rating by filling in the appropriate circles (A, B, C, D, or E) on your machine-scored answer sheet. Use the item numbers on your answer sheet that corresponds to the number on the job benefit/opportunity list.

EXAMPLE OF ITEMS

1. Good Pay and Benefits – (Examples: high salary/income, incentive pay or bonuses, a good retirement plan, a medical-care plan, financial aid for education, etc.)

7. Chance to Lead – to organize/direct the work of others. (Examples: assigning work to others, organizing the work of a group, deciding on work objectives, observing and evaluating job performance, making decisions about promotions, etc.)

10. Job Prestige – social position or respect given a person solely because of the job held. (Examples: doctor, lawyer, clergy member, college president, airline pilot, commander, congressional representative, etc.)

11. Team Membership – chance to work as a team member, where interaction and cooperation with others is necessary to get the job done. (Examples: surveying crew, rescue squad, bomber crew, operating-room team, research team, management team etc.)

APPENDIX F

CAREER OP – WORK ACTIVITY PREFERENCES

This inventory lists a variety of characteristics (such as conditions, benefits, advantages, and opportunities) that can be part of a work situation. Different people prefer different characteristics in their work. Which characteristics do you most prefer?

Task 1: Provide Background Information

Please provide the background information (name, sex, birth date, curricular major code, Social Security number, and class standing) in the appropriate spaces provided on the op-scan answer sheet.

Task 2: Complete the Job Characteristic Preferences Questionnaire

In this exercise, you will be rating how important each of these characteristics is to <u>you</u>, according to the scale shown below:

> **A = Not Important**
> **B = Somewhat Important**
> **C = Moderately Important**
> **D = Important**
> **E = Very Important**

Using the Importance Scale and the attached machine-scoreable sheets, please rate the following items on how important they are to you.

EXAMPLE OF ITEMS

1. I could do something that makes use of my abilities.
2. The job could give me a feeling of accomplishment.
3. I could be busy all the time.
4. The job would provide an opportunity for advancement.
5. I could tell people what to do.
6. The company would administer its policies fairly.
7. My pay would compare well with that of other workers.
8. My co-workers would be easy to make friends with.
9. I could try out some of my own ideas.
10. I could work alone on the job.

Factor Analysis of the 42-item Interest Inventory

Correlation Matrix

	in_1	in_2	in_3	in_4	in_5	in_6	in_7	in_8	in_9	in_10	in_11	in_12	in_13	in_14	in_15	in_16	in_17	in_18	in_19	in_20
in_1	100	-1	-6	-12	-8	15	-11	14	-8	3	44	-8	-7	5	33	15	-13	20	9	3
in_2	-1	100	-12	37	58	3	-6	-23	23	-7	-4	66	-4	13	31	17	-2	-16	7	9
in_3	-6	-12	100	-14	-15	-6	25	15	0	-3	-3	-3	46	-8	-10	2	22	11	4	-3
in_4	-12	37	-14	100	58	2	-13	-15	3	19	-5	41	-9	42	9	11	-5	-12	-2	34
in_5	-8	58	-15	58	100	-7	-9	-27	8	-2	-13	60	-3	16	36	6	4	-21	-2	14
in_6	15	3	-6	2	-7	100	-7	17	19	28	10	-6	-11	35	5	42	-13	11	16	22
in_7	-11	-6	25	-13	-9	-7	100	18	7	0	-1	-8	26	-11	4	-14	45	13	19	-4
in_8	14	-23	15	-15	-27	17	18	100	15	27	21	-22	1	7	-11	6	-1	44	26	14
in_9	-8	23	0	3	8	19	7	15	100	15	-3	19	5	12	2	13	2	11	43	13
in_10	3	-7	-3	19	-2	28	0	27	15	100	9	-2	-3	49	-5	17	2	11	24	69
in_11	44	-4	-3	-5	-13	10	-1	21	-3	9	100	1	-8	5	12	3	-9	29	10	6
in_12	-8	66	-3	41	60	-6	-8	-22	19	-2	1	100	7	17	21	13	8	-15	7	13
in_13	-7	-4	46	-9	-3	-11	26	1	5	-3	-8	7	100	-2	4	5	52	4	8	-2
in_14	5	13	-8	42	16	35	-11	7	12	49	5	17	-2	100	6	42	-5	6	18	57
in_15	33	31	-10	9	36	5	4	-11	2	-5	12	21	4	6	100	16	0	-4	7	3
in_16	15	17	2	11	6	42	-14	6	13	17	3	13	5	42	16	100	-1	4	8	19
in_17	-13	-2	22	-5	4	-13	45	-1	2	2	-9	8	52	-5	0	-1	100	2	9	2
in_18	20	-16	11	-12	-21	11	13	44	11	11	29	-15	4	6	-4	4	2	100	26	3
in_19	9	7	4	-2	-2	16	19	26	43	24	10	7	8	18	7	8	9	26	100	28
in_20	3	9	-3	34	14	22	-4	14	13	69	6	13	-2	57	3	19	2	3	28	100
in_21	39	-16	10	-21	-26	14	2	27	3	9	37	-16	5	8	6	15	-2	36	15	2
in_22	-13	67	0	27	49	6	-1	-19	29	-7	-9	56	11	12	23	22	9	-9	7	8
in_23	-9	7	41	-9	3	-6	29	6	12	3	0	15	57	1	4	7	49	2	12	1
in_24	16	23	-9	33	23	24	-12	-1	15	23	10	24	-3	48	17	42	0	7	21	35
in_25	24	43	-7	21	47	3	-4	-15	8	-4	8	41	6	9	63	15	1	-12	6	9
in_26	19	4	-3	4	-2	70	-7	16	15	25	17	0	-8	38	10	46	-11	14	15	26
in_27	-4	-10	26	-19	-12	-4	43	14	3	-2	6	-6	30	-9	5	-8	46	13	8	-7
in_28	13	-17	24	-19	-21	22	17	42	9	19	19	-11	13	10	-2	15	6	39	21	16
in_29	-9	32	-8	13	19	11	-3	-7	49	7	-2	27	-2	13	4	13	1	2	24	11
in_30	6	-18	9	-1	-21	33	0	37	16	58	10	-15	3	38	-8	19	-6	26	19	49
in_31	44	-17	-2	-17	-22	7	-3	24	-3	5	47	-14	-3	-2	5	3	-6	32	11	-3
in_32	10	64	-6	25	48	9	-3	-17	15	-7	1	49	4	13	48	24	0	-12	10	6
in_33	1	-6	46	-10	-11	-1	25	25	14	6	8	0	49	2	-4	11	31	21	19	5
in_34	-11	33	6	44	47	-8	1	-9	5	2	-7	41	23	19	16	9	25	-4	5	18
in_35	-6	34	8	16	34	11	5	-4	22	-5	0	34	12	17	29	29	10	3	18	10
in_36	10	3	-5	6	-4	71	-5	20	18	42	7	0	-6	39	5	40	-3	12	16	37
in_37	-3	-8	21	-9	-6	1	31	22	23	21	5	-3	30	5	-1	1	34	14	35	14
in_38	16	-20	13	-13	-23	14	11	45	10	24	21	-17	3	11	-5	12	2	35	25	16
in_39	-5	27	-9	4	14	13	11	9	20	10	10	20	0	6	15	7	8	8	17	8
in_40	2	8	-2	33	16	23	-3	16	8	67	9	12	-1	54	0	19	1	7	25	74
in_41	-1	32	13	27	42	-13	2	-12	6	-6	-4	51	19	9	16	-1	14	-13	6	11
in_42	18	17	-2	14	11	45	-8	2	9	22	5	16	-2	46	13	71	0	6	10	30

Correlation Matrix

	in_21	in_22	in_23	in_24	in_25	in_26	in_27	in_28	in_29	in_30	in_31	in_32	in_33	in_34	in_35	in_36	in_37	in_38	in_39	in_40	in_41	in_42
in_1	39	-13	-9	16	24	19	-4	13	-9	6	44	10	1	-11	-6	10	-3	16	-5	2	-1	18
in_2	-16	67	7	23	43	4	-10	-17	32	-18	-17	64	-6	33	34	3	-8	-20	27	8	32	17
in_3	10	0	41	-9	-7	-3	26	24	-8	9	-2	-6	46	6	8	-5	21	13	-9	-2	13	-2
in_4	-21	27	-9	33	21	4	-19	-19	13	-1	-17	25	-10	44	16	6	-9	-13	4	33	27	14
in_5	-26	49	3	23	47	-2	-12	-21	19	-21	-22	48	-11	47	34	-4	-6	-23	14	16	42	11
in_6	14	6	-6	24	3	70	-4	22	11	33	7	9	-1	-8	11	71	1	14	13	23	-13	45
in_7	2	-1	29	-12	-4	-7	43	17	-3	0	-3	-3	25	1	5	-5	31	11	11	-3	2	-8
in_8	27	-19	6	-1	-15	16	14	42	-7	37	24	-17	25	-9	-4	20	22	45	9	16	-12	2
in_9	3	29	12	15	8	15	3	9	49	16	-3	15	14	5	22	18	23	10	20	8	6	9
in_10	9	-7	3	23	-4	25	-2	19	7	58	5	-7	6	2	-5	42	21	24	10	67	-6	22
in_11	37	-9	0	10	8	17	6	19	-2	10	47	1	8	-7	0	7	5	21	10	9	-4	5
in_12	-16	56	15	24	41	0	-6	-11	27	-15	-14	49	0	41	34	0	-3	-17	20	12	51	16
in_13	5	11	57	-3	6	-8	30	13	-2	3	-3	4	49	23	12	-6	30	3	0	-1	19	-2
in_14	8	12	1	48	9	38	-9	10	13	38	-2	13	2	19	17	39	5	11	6	54	9	46
in_15	6	23	4	17	63	10	5	-2	4	-8	5	48	-4	16	29	5	-1	-5	15	0	16	13
in_16	15	22	7	42	15	46	-8	15	13	19	3	24	11	9	29	40	1	12	7	19	-1	71
in_17	-2	9	49	0	1	-11	46	6	1	-6	-6	0	31	25	10	-3	34	2	8	1	14	0
in_18	36	-9	2	7	-12	14	13	39	2	26	32	-12	21	-4	3	12	14	35	8	7	-13	6
in_19	15	7	12	21	6	15	8	21	24	19	11	10	19	5	18	16	35	25	17	25	6	10
in_20	2	8	1	35	9	26	-7	16	11	49	-3	6	5	18	10	37	14	16	8	74	11	30
in_21	100	-15	2	12	-2	21	9	26	0	16	58	-6	17	-19	1	13	17	42	-2	5	-12	14
in_22	-15	100	22	23	39	8	1	-5	34	-12	-18	56	9	30	41	4	2	-17	28	8	28	19
in_23	2	22	100	3	7	-4	38	17	1	2	-5	8	47	22	21	1	32	3	13	5	23	6
in_24	12	23	3	100	27	32	-8	6	20	17	7	22	2	25	25	26	3	11	10	35	13	44
in_25	-2	39	7	27	100	9	0	-7	16	-10	2	54	-2	27	35	6	1	-6	16	5	26	14
in_26	21	8	-4	32	9	100	-2	25	12	32	11	12	6	-2	16	65	-2	16	13	25	-7	49
in_27	9	1	38	-8	0	-2	100	25	0	2	9	-2	29	2	8	-4	32	12	15	-3	5	-2
in_28	26	-5	17	6	-7	25	25	100	-3	49	20	-5	39	2	11	26	17	31	7	14	-3	19
in_29	0	34	1	20	16	12	0	-3	100	7	-2	26	4	9	25	16	13	-1	25	7	9	12
in_30	16	-12	2	17	-10	32	2	49	7	100	11	-11	21	-4	0	46	14	29	1	45	-9	26
in_31	58	-18	-5	7	2	11	9	20	-2	11	100	-9	12	-15	-9	8	11	32	-1	5	-5	5
in_32	-6	56	8	22	54	12	-2	-5	26	-11	-9	100	2	29	44	8	-4	-12	27	6	24	22
in_33	17	9	47	2	-2	6	29	39	4	21	12	2	100	13	21	8	34	26	6	10	9	10
in_34	-19	30	22	25	27	-2	2	2	9	-4	-15	29	13	100	36	1	4	-11	12	20	39	13
in_35	1	41	21	25	35	16	8	11	25	0	-9	44	21	36	100	14	13	-1	18	10	18	29
in_36	13	4	1	26	6	65	-4	26	16	46	8	8	8	1	14	100	9	17	13	36	-8	46
in_37	17	2	32	3	1	-2	32	17	13	14	11	-4	34	4	13	9	100	37	12	17	7	2
in_38	42	-17	3	11	-6	16	12	31	-1	29	32	-12	26	-11	-1	17	37	100	2	20	-9	9
in_39	-2	28	13	10	16	13	15	7	25	1	-1	27	6	12	18	13	12	2	100	13	6	7
in_40	5	8	5	35	5	25	-3	14	7	45	5	6	10	20	10	36	17	20	13	100	11	30
in_41	-12	28	23	13	26	-7	5	-3	9	-9	-5	24	9	39	18	-8	7	-9	6	11	100	4
in_42	14	19	6	44	14	49	-2	19	12	26	5	22	10	13	29	46	2	9	7	30	4	100

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Eigenvalues of the Correlation Matrix: Total = 42  Average = 1

                    Eigenvalue    Difference    Proportion    Cumulative

              1     6.46224173    0.80274765       0.1539        0.1539
              2     5.65949408    1.58584119       0.1347        0.2886
              3     4.07365289    1.32633125       0.0970        0.3856
              4     2.74732163    0.73907512       0.0654        0.4510
              5     2.00824651    0.12006250       0.0478        0.4988
              6     1.88818402    0.54483928       0.0450        0.5438
              7     1.34334474    0.15361231       0.0320        0.5758
              8     1.18973242    0.12776535       0.0283        0.6041
              9     1.06196708    0.05050875       0.0253        0.6294
             10     1.01145833    0.13844854       0.0241        0.6535
             11     0.87300979    0.05301417       0.0208        0.6743
             12     0.81999562    0.06651435       0.0195        0.6938
             13     0.75348127    0.00774225       0.0179        0.7117
             14     0.74573903    0.04774184       0.0178        0.7295
             15     0.69799718    0.02897824       0.0166        0.7461
             16     0.66901895    0.04542846       0.0159        0.7620
             17     0.62359048    0.02341589       0.0148        0.7769
             18     0.60017460    0.05160010       0.0143        0.7912
             19     0.54857450    0.01693507       0.0131        0.8042
             20     0.53163942    0.01940175       0.0127        0.8169
             21     0.51223767    0.00620112       0.0122        0.8291
             22     0.50603654    0.01778690       0.0120        0.8411
             23     0.48824964    0.02320160       0.0116        0.8527
             24     0.46504804    0.01341567       0.0111        0.8638
             25     0.45163237    0.02876212       0.0108        0.8746
             26     0.42287025    0.00549326       0.0101        0.8846
             27     0.41737699    0.01930576       0.0099        0.8946
             28     0.39807123    0.01791352       0.0095        0.9041
             29     0.38015771    0.01295545       0.0091        0.9131
             30     0.36720226    0.02707327       0.0087        0.9219
             31     0.34012899    0.00407623       0.0081        0.9299
             32     0.33605277    0.02707385       0.0080        0.9380
             33     0.30897892    0.00691280       0.0074        0.9453
             34     0.30206612    0.00687832       0.0072        0.9525
             35     0.29518780    0.01005120       0.0070        0.9595
             36     0.28513660    0.01745738       0.0068        0.9663
             37     0.26767922    0.01039774       0.0064        0.9727
             38     0.25728148    0.02115427       0.0061        0.9788
             39     0.23612721    0.00376047       0.0056        0.9844
             40     0.23236674    0.00808956       0.0055        0.9900
             41     0.22427719    0.02730718       0.0053        0.9953
             42     0.19697001                     0.0047        1.0000
```

Rotated Factor Pattern

		Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7
in_12	in_12	76 *	-1	2	0	-8	17	8
in_5	in_5	74 *	-10	-3	9	-18	2	21
in_2	in_2	69 *	-12	9	-8	-13	29	24
in_34	in_34	61 *	20	1	15	-10	-7	0
in_22	in_22	60 *	7	16	-11	-18	34	17
in_4	in_4	59 *	-18	4	35	-12	-7	-10
in_32	in_32	54 *	-3	16	-9	-5	22	47
in_41	in_41	54 *	17	-10	6	-2	-4	5
in_35	in_35	42	18	24	-3	-3	24	21
in_17	in_17	8	71 *	-4	3	-6	-1	-4
in_13	in_13	9	71 *	-2	-2	-5	-4	3
in_23	in_23	17	69 *	4	-2	-4	5	2
in_33	in_33	5	58 *	6	3	15	10	-5
in_27	in_27	-6	58 *	-3	-6	10	3	3
in_7	in_7	-9	53 *	-11	-1	1	9	2
in_3	in_3	-1	52 *	-2	-6	1	-7	-8
in_37	in_37	-8	49 *	-6	21	16	31	0
in_6	in_6	-11	-11	73 *	15	5	11	3
in_26	in_26	-2	-8	73 *	15	15	7	5
in_42	in_42	17	3	71 *	18	9	3	6
in_16	in_16	13	3	70 *	8	7	8	9
in_36	in_36	-7	-3	67 *	32	4	11	4

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in_24	in_24	32	-4	37	30	18	12	6
in_20	in_20	14	-1	16	82 *	0	8	3
in_10	in_10	-9	1	16	79 *	5	10	-2
in_40	in_40	17	2	16	78 *	7	4	-3
in_14	in_14	22	-6	42	58 *	5	4	-5
in_30	in_30	-18	4	26	55 *	10	8	-4
in_31	in_31	-12	-1	2	-1	71 *	-2	2
in_21	in_21	-17	8	14	1	67 *	6	3
in_11	in_11	2	-5	4	3	60 *	-4	8
in_1	in_1	-6	-12	13	0	57 *	-14	34
in_18	in_18	-9	10	5	5	48 *	13	-13
in_38	in_38	-19	15	5	22	46 *	17	-6
in_9	in_9	9	6	10	7	-1	66 *	-2
in_29	in_29	21	-4	12	2	-4	58 *	1
in_19	in_19	1	16	3	26	21	49 *	4
in_15	in_15	26	1	8	-3	13	-1	70
in_25	in_25	43	0	7	0	7	6	63
in_28	in_28	-9	26	20	13	28	3	-3
in_8	in_8	-21	13	4	20	37	13	-12
in_39	in_39	20	8	9	3	3	30	11

Rotated Factor Pattern

		Factor8	Factor9
in_12	in_12	-5	0
in_5	in_5	-14	8
in_2	in_2	-5	6
in_34	in_34	1	-1
in_22	in_22	2	0
in_4	in_4	-16	1
in_32	in_32	2	2
in_41	in_41	-1	-5
in_35	in_35	9	-8
in_17	in_17	-19	15
in_13	in_13	6	-19
in_23	in_23	7	-6
in_33	in_33	33	-19
in_27	in_27	2	26
in_7	in_7	4	28
in_3	in_3	28	-22
in_37	in_37	-2	3
in_6	in_6	14	22
in_26	in_26	13	15
in_42	in_42	-5	-18
in_16	in_16	-4	-29
in_36	in_36	17	20
in_24	in_24	-16	-14
in_20	in_20	4	-1
in_10	in_10	9	7
in_40	in_40	3	3
in_14	in_14	-7	-10
in_30	in_30	43	-4
in_31	in_31	-1	-1
in_21	in_21	2	-11
in_11	in_11	6	10
in_1	in_1	-2	-6
in_18	in_18	30	8
in_38	in_38	18	-5
in_9	in_9	9	1
in_29	in_29	-6	1
in_19	in_19	7	4
in_15	in_15	-6	6
in_25	in_25	-7	0
in_28	in_28	54 *	3
in_8	in_8	41	12
in_39	in_39	4	30

Rotated Factor Pattern

Variance Explained by Each Factor

Factor1	Factor2	Factor3	Factor4	Factor5
4.3065871	3.3202610	3.2600626	3.2310501	2.6374302

```
   Factor6          Factor7          Factor8          Factor9
  1.7439035        1.5213786        1.2008655        0.7232618
```

Factor Analysis of the 10 Interest Inventory Scales

Correlation Matrix

Correlations

	arts1	work_thing2	off_bus3	sci_math4	eng5	an_plant6	lead_ent7	human_dev8	sec9	health10
arts1	100	-13	1	-7	-1	19	1	43	2	9
work_thing2	-13	100	5	50	68	15	-3	-24	37	-1
off_bus3	1	5	100	7	3	0	55	23	9	5
sci_math4	-7	50	7	100	49	28	-2	-7	21	38
eng5	-1	68	3	49	100	15	1	-18	24	1
an_plant6	19	15	0	28	15	100	-6	24	23	42
lead_ent7	1	-3	55	-2	1	-6	100	25	20	5
human_dev8	43	-24	23	-7	-18	24	25	100	19	33
sec9	2	37	9	21	24	23	20	19	100	22
health10	9	-1	5	38	1	42	5	33	22	100

Printed values are multiplied by 100 and rounded to the nearest integer.

The FACTOR Procedure
Initial Factor Method: Principal Components

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 10 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	2.51945279	0.44956634	0.2519	0.2519
2	2.06988644	0.53911922	0.2070	0.4589
3	1.53076723	0.54021516	0.1531	0.6120
4	0.99055207	0.16363988	0.0991	0.7111
5	0.82691220	0.22506913	0.0827	0.7938
6	0.60184306	0.15296806	0.0602	0.8539
7	0.44887500	0.04443040	0.0449	0.8988
8	0.40444461	0.06606188	0.0404	0.9393
9	0.33838272	0.06949885	0.0338	0.9731
10	0.26888388		0.0269	1.0000

3 factors will be retained by the MINEIGEN criterion.

Rotated Factor Pattern

	Factor1	Factor2	Factor3	Factor4	Factor5
work_thing2	79 *	4	0	-15	21
eng5	77 *	4	0	-2	5
sci_math4	56 *	47 *	3	-13	-4
health10	1	68 *	6	12	7
an_plant6	17	49 *	-7	24	12
lead_ent7	-2	-1	68 *	5	11

```
off_bus3             5            3           66 *          4             0
arts1               -5            8            0           56 *           0
human_dev8         -22           30           29           55 *          14
sec9                29           22           16            8            43
```

Printed values are multiplied by 100 and rounded to the nearest integer.
Values greater than 0.45 are flagged by an '*'.

                    Variance Explained by Each Factor

      Factor1   Factor2   Factor3   Factor4   Factor5

    1.6901832   1.0756818   1.0161165   0.7354037   0.2804218

APPENDIX I

Factor Analysis of 3 Interest Questionnaires

Correlation Matrix

	in_a rts1	in_work _thing2	in_of f_bus 3	in_sci _math4	in_ eng 5	in_an_ plant6	in_lea d_ent7	in_hum an_dev 8	in_ sec 9	in_he alth1 0
in_arts1	100	-16	1	-7	-4	20	0	45	2	11
in_work_t hing2	-16	100	3	50	68	15	-6	-26	37	-1
in_off_bu s3	1	3	100	6	1	2	55	25	10	7
in_sci_ma th4	-7	50	6	100	51	29	-3	-8	23	39
in_eng5	-4	68	1	51	100	16	0	-19	23	2
in_an_pla nt6	20	15	2	29	16	100	-7	23	22	40
in_lead_e nt7	0	-6	55	-3	0	-7	100	26	20	7
in_human_ dev8	45	-26	25	-8	-19	23	26	100	18	34
in_sec9	2	37	10	23	23	22	20	18	100	23
in_health 10	11	-1	7	39	2	40	7	34	23	100
sp_artist ic1	72	-3	8	3	11	31	3	36	9	13
sp_caring _an2	16	27	1	34	24	80	-8	14	27	34
sp_cleric al3	-5	16	71	17	15	4	43	15	12	6
sp_cust_s ales4	20	8	49	4	9	29	30	38	24	16
sp_eng5	-11	68	7	65	68	10	3	-23	26	6
sp_health 6	8	-2	16	31	3	45	5	34	23	77
sp_human_ dev7	40	-20	25	0	-11	26	21	77	19	36
sp_leader _enter8	6	0	51	3	8	0	77	25	23	4
sp_protec tion9	3	38	10	27	32	27	17	11	77	20
sp_scient ific10	-1	34	-1	71	38	34	-8	2	23	46
sp_hardwa re11	-18	85	1	50	64	19	-10	-26	38	0
us_art1	57	6	3	12	15	26	-1	25	14	15
us_scient ific2	1	14	7	42	16	31	5	14	21	60
us_plants 3	13	25	1	22	19	61	-3	9	24	21
us_protec tive4	-1	33	9	19	23	21	11	9	53	16
us_mechan ical5	-5	64	6	37	55	20	-7	-14	30	4
us_indust rial6	-1	26	24	12	18	14	7	4	19	6
us_bus_de tail7	2	4	46	2	0	4	20	18	5	7
us_sellin g8	1	10	32	0	10	9	42	15	20	3
us_accomo dating9	4	15	22	6	7	19	9	16	19	9
us_humani tarian10	23	-14	19	1	-9	34	5	50	12	44
us_leadin g_influ11	10	-1	43	2	4	4	49	31	21	12
us_physic	10	37	4	23	33	28	13	0	47	12

	sp_artistic1	sp_caring_an2	sp_clerical3	sp_cust_sales4	sp_eng5	sp_health6	sp_human_dev7	sp_leader_enter8	sp_protection9	sp_scientific10	sp_hardware11
in_arts_1	72	16	-5	20	-11	8	40	6	3	-1	-18
in_work_thing2	-3	27	16	8	68	-2	-20	0	38	34	85
in_off_bus3	8	1	71	49	7	16	25	51	10	-1	1
in_sci_math4	3	34	17	4	65	31	0	3	27	71	50
in_eng5	11	24	15	9	68	3	-11	8	32	38	64
in_an_plant6	31	80	4	29	10	45	26	0	27	34	19
in_lead_ent7	3	-8	43	30	3	5	21	77	17	-8	-10
in_human_dev8	36	14	15	38	-23	34	77	25	11	2	-26
in_sec9	9	27	12	24	26	23	19	23	77	23	38
in_health10	13	34	6	16	6	77	36	4	20	46	0
sp_artistic1	100	43	23	50	13	32	52	24	30	25	8
sp_caring_an2	43	100	20	45	29	53	32	7	46	50	42
sp_clerical3	23	20	100	67	33	29	32	61	28	24	25
sp_cust_sales4	50	45	67	100	16	46	53	45	43	21	21
sp_eng5	13	29	33	16	100	12	-5	19	43	64	77
sp_health6	32	53	29	46	12	100	53	17	36	55	9
sp_human_dev7	52	32	32	53	-5	53	100	37	29	25	-12
sp_leader_enter8	24	7	61	45	19	17	37	100	32	10	2
sp_protection9	30	46	28	43	43	36	29	32	100	40	51
sp_scientific10	25	50	24	21	64	55	25	10	40	100	47
sp_hardware11	8	42	25	21	77	9	-12	2	51	47	100
us_art1	68	33	7	30	17	21	34	10	26	23	13
us_scientific2	14	33	16	19	31	61	25	11	29	60	21
us_plants3	27	67	11	29	19	29	18	3	32	29	33
us_protective4	15	31	22	32	32	23	17	17	64	27	41
us_mechanical5	15	35	21	23	55	11	-4	1	39	34	71
us_industrial6	14	20	33	33	24	15	10	13	26	18	32
us_bus_detail7	12	8	52	41	8	18	22	25	13	8	7
us_selling8	12	11	38	39	11	11	14	43	24	1	10
us_accomodating9	17	23	31	44	11	20	20	12	26	13	20
us_humanitarian10	28	33	16	41	-11	55	55	8	17	14	-9

	us _a rt 1	us_s cien tifi c2	us_ pla nts 3	us_p rote ctiv e4	us_m echa nica l5	us_i ndus tria l6	us_b us_d etai l7	us_ sel lin g8	us_ac comod ating 9	us_hu manit arian 10	us_lea ding_i nflu11	us_p hysi cal1 2
in_art s1	57	1	13	-1	-5	-1	2	1	4	23	10	10
in_wor k_thin g2	6	14	25	33	64	26	4	10	15	-14	-1	37
in_off _bus3	3	7	1	9	6	24	46	32	22	19	43	4
in_sci _math4	12	42	22	19	37	12	2	0	6	1	2	23
in_eng 5	15	16	19	23	55	18	0	10	7	-9	4	33
in_an_ plant6	26	31	61	21	20	14	4	9	19	34	4	28
in_lea d_ent7	-1	5	-3	11	-7	7	20	42	9	5	49	13
in_hum an_dev 8	25	14	9	9	-14	4	18	15	16	50	31	0
in_sec 9	14	21	24	53	30	19	5	20	19	12	21	47
in_hea lth10	15	60	21	16	4	6	7	3	9	44	12	12
sp_art istic1	68	14	27	15	15	14	12	12	17	28	20	30
sp_car ing_an 2	33	33	67	31	35	20	8	11	23	33	8	40
sp_cle rical3	7	16	11	22	21	33	52	38	31	16	45	13
sp_cus t_sale s4	30	19	29	32	23	33	41	39	44	41	39	26
sp_eng 5	17	31	19	32	55	24	8	11	11	-11	14	34
sp_hea lth6	21	61	29	23	11	15	18	11	20	55	20	19
sp_hum an_dev 7	34	25	18	17	-4	10	22	14	20	55	39	8
sp_lea der_en ter8	10	11	3	17	1	13	25	43	12	8	57	18
sp_pro tectio n9	26	29	32	64	39	26	13	24	26	17	27	60
sp_sci entifi c10	23	60	29	27	34	18	8	1	13	14	13	27
sp_har dware1 1	13	21	33	41	71	32	7	10	20	-9	2	44
us_art 1	100	34	48	37	38	26	23	20	32	42	40	53
us_sci entifi c2	34	100	43	43	40	34	32	22	33	47	42	32
us_pla nts3	48	43	100	50	55	49	34	35	50	45	31	52
us_pro tectiv	37	43	50	100	57	50	38	42	52	34	46	61

e4												
us_mec hanica l5	38	40	55	57	100	52	35	30	43	17	31	55
us_ind ustria l6	26	34	49	50	52	100	70	51	70	30	40	30
us_bus _detai l7	23	32	34	38	35	70	100	51	67	41	59	15
us_sel ling8	20	22	35	42	30	51	51	100	51	25	58	30
us_acc omodat ing9	32	33	50	52	43	70	67	51	100	41	44	33
us_hum anitar ian10	42	47	45	34	17	30	41	25	41	100	43	21
us_lea ding_i nflu11	40	42	31	46	31	40	59	58	44	43	100	33
us_phy sical1 2	53	32	52	61	55	30	15	30	33	21	33	100

Initial Factor Method: Principal Components

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 33 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	9.22007227	4.45543044	0.2794	0.2794
2	4.76464184	1.30070775	0.1444	0.4238
3	3.46393408	0.98406433	0.1050	0.5287
4	2.47986975	0.40342111	0.0751	0.6039
5	2.07644863	0.48053801	0.0629	0.6668
6	1.59591063	0.26086252	0.0484	0.7152
7	1.33504811	0.28773713	0.0405	0.7556
8	1.04731098	0.21942648	0.0317	0.7874
9	0.82788451	0.16734839	0.0251	0.8125
10	0.66053612	0.03569860	0.0200	0.8325
11	0.62483751	0.08692987	0.0189	0.8514
12	0.53790765	0.12801469	0.0163	0.8677
13	0.40989295	0.03757977	0.0124	0.8801
14	0.37231318	0.01683775	0.0113	0.8914
15	0.35547543	0.05023744	0.0108	0.9022
16	0.30523800	0.01433618	0.0092	0.9114
17	0.29090182	0.01019528	0.0088	0.9202
18	0.28070654	0.02676348	0.0085	0.9288
19	0.25394306	0.01789331	0.0077	0.9365
20	0.23604975	0.02736974	0.0072	0.9436
21	0.20868001	0.01388057	0.0063	0.9499
22	0.19479944	0.00558222	0.0059	0.9558
23	0.18921722	0.01032391	0.0057	0.9616
24	0.17889330	0.01415750	0.0054	0.9670
25	0.16473580	0.00759617	0.0050	0.9720
26	0.15713964	0.01468882	0.0048	0.9767
27	0.14245081	0.01898081	0.0043	0.9811
28	0.12347000	0.00801311	0.0037	0.9848
29	0.11545688	0.00300065	0.0035	0.9883
30	0.11245624	0.00649352	0.0034	0.9917
31	0.10596271	0.01623088	0.0032	0.9949
32	0.08973184	0.01164854	0.0027	0.9976
33	0.07808330		0.0024	1.0000

8 factors will be retained by the MINEIGEN criterion.

The FACTOR Procedure
Rotation Method: Varimax

Rotated Factor Pattern

	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8
sp_eng5	88 *	5	13	12	2	9	-3	0
sp_hardware11	84 *	16	-6	-6	-7	28	16	15
in_work_thing2	79 *	12	-5	-10	-12	24	10	5
in_eng5	74 *	3	4	-3	5	11	7	-6
in_sci_math4	67 *	-5	2	44	-5	-1	10	-6
us_mechanical5	62 *	52 *	-6	0	7	21	14	-11
us_bus_detail7	0	80 *	28	10	3	-9	-5	15
us_accomodating9	4	78 *	7	7	7	12	12	10
us_industrial6	20	78 *	7	4	1	8	7	7
us_selling8	1	54 *	44	-2	2	14	9	-10
sp_leader_enter8	4	3	86 *	4	13	16	-2	0
in_lead_ent7	-9	2	83 *	0	-2	15	-5	-12
sp_clerical3	25	29	67 *	8	2	-6	4	44
in_off_bus3	1	24	67 *	5	-1	-7	-2	28
us_leading_influ11	-1	53 *	55 *	19	20	14	-9	-19
in_health10	-1	-1	2	82 *	3	10	16	-2
sp_health6	3	9	10	80 *	11	12	27	22
us_scientific2	23	36	4	70 *	5	7	8	-23
sp_scientific10	60 *	0	1	61 *	10	3	13	4
us_humanitarian10	-24	45 *	4	49 *	29	10	18	7
sp_artistic1	10	5	10	7	85 *	5	21	15
in_arts1	-12	-4	-1	2	81 *	-2	6	-1
us_art1	14	32	-1	11	73 *	11	14	-24
sp_human_dev7	-21	8	27	45 *	52 *	18	5	34
in_human_dev8	-37	6	23	36	45 *	17	0	23
in_sec9	20	5	13	14	0	78 *	7	3
sp_protection9	33	11	16	16	12	78 *	15	13
us_protective4	23	53 *	6	13	6	56 *	9	-11
us_physical12	33	29	8	2	23	50 *	25	-26
sp_caring_an2	27	8	-1	28	21	17	79 *	15
in_an_plant6	8	5	-4	31	16	10	78 *	2
us_plants3	17	52 *	-5	14	17	15	61 *	-18
sp_cust_sales4	7	32	44	13	30	16	26	49

Printed values are multiplied by 100 and rounded to the nearest integer. Values greater than
0.45 are flagged by an '*'.

Variance Explained by Each Factor

Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8
4.7224028	4.1304211	3.3460438	3.3076335	2.8375767	2.3114304	2.1068190	1.1733678

APPENDIX J

Monte Carlo Results: 10 Interest Inventory scales matched to 11 CareerOp (Work Activity Preferences) scales resulting in nine matched scales (A).

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : INTER1.DAT

Mean of the heterotrait-heteromethod elements = 0.158054

Sample size for trait contribution test = 752
Mean of the monotrait-heteromethod elements = 0.754330, p = 0.001328

Sample size for method contribution test = 752
Mean of the heterotrait-monomethod elements = 0.227658, p = 0.001328

Correlational patterning analysis
Sample size for the correlational patterning tests = 720

Mthd 1 to 1, mthd 2 to 1 = 2.660906, p = 0.001387, r = 0.934073
Mthd 1 to 1, mthd 1 to 2 = 2.693964, p = 0.001387, r = 0.966490
Mthd 1 to 1, mthd 2 to 2 = 3.578170, p = 0.001387, r = 0.930197
Mthd 2 to 1, mthd 1 to 2 = 2.541740, p = 0.001387, r = 0.873083
Mthd 2 to 1, mthd 2 to 2 = 3.786032, p = 0.001387, r = 0.946886
Mthd 1 to 2, mthd 2 to 2 = 3.571504, p = 0.001387, r = 0.937858

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
100.000000 % of the p-values for patterning <= 0.1
100.000000 % of the p-values for patterning <= 0.05
100.000000 % of the p-values for patterning <= 0.041667 (1/24)
100.000000 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

Monte Carlo Results: 10 Interest Inventory scales matched to 12 US Employment Services scales resulting in eight matched scales (B)

 Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : INTER2.DAT

Mean of the heterotrait-heteromethod elements = 0.135234

Sample size for trait contribution test = 721
Mean of the monotrait-heteromethod elements = 0.515338, p = 0.002770

Sample size for method contribution test = 721
Mean of the heterotrait-monomethod elements = 0.273573, p = 0.001385

Correlational patterning analysis
Sample size for the correlational patterning tests = 721

Mthd 1 to 1, mthd 2 to 1 = 1.777372, p = 0.001385, r = 0.680426
Mthd 1 to 1, mthd 1 to 2 = 1.817138, p = 0.001385, r = 0.714505
Mthd 1 to 1, mthd 2 to 2 = 1.922629, p = 0.004155, r = 0.585168
Mthd 2 to 1, mthd 1 to 2 = 0.745550, p = 0.006925, r = 0.483792
Mthd 2 to 1, mthd 2 to 2 = 1.152881, p = 0.001385, r = 0.911356
Mthd 1 to 2, mthd 2 to 2 = 0.937733, p = 0.001385, r = 0.612714

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
100.000000 % of the p-values for patterning <= 0.1
100.000000 % of the p-values for patterning <= 0.05
100.000000 % of the p-values for patterning <= 0.041667 (1/24)
100.000000 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

Monte Carlo Results: 12 US Employment Services scales matched to 5 Interest Inventory factors resulting in five matched factors (C).

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : INTEREST.DAT

Mean of the heterotrait-heteromethod elements = 0.162455

Sample size for trait contribution test = 120
Mean of the monotrait-heteromethod elements = 0.769860, p = 0.008333

Sample size for method contribution test = 1024
Mean of the heterotrait-monomethod elements = 0.255855, p = 0.000977

Correlational patterning analysis
Sample size for the correlational patterning tests = 120

Mthd 1 to 1, mthd 2 to 1 = 0.385514, p = 0.008333, r = 0.918941
Mthd 1 to 1, mthd 1 to 2 = 0.458918, p = 0.008333, r = 0.894891
Mthd 1 to 1, mthd 2 to 2 = 0.711918, p = 0.008333, r = 0.937096
Mthd 2 to 1, mthd 1 to 2 = 0.397582, p = 0.016667, r = 0.686876
Mthd 2 to 1, mthd 2 to 2 = 0.665057, p = 0.008333, r = 0.919852
Mthd 1 to 2, mthd 2 to 2 = 0.893824, p = 0.008333, r = 0.813096

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
100.000000 % of the p-values for patterning <= 0.1
100.000000 % of the p-values for patterning <= 0.05
100.000000 % of the p-values for patterning <= 0.041667 (1/24)
83.333333 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

Monte Carlo Results: 12 US Employment Services scales matched to 5 Interest Inventory factors resulting in five matched factors (D).

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : INTER4.DAT

Mean of the heterotrait-heteromethod elements = 0.156655

Sample size for trait contribution test = 120
Mean of the monotrait-heteromethod elements = 0.550000, p = 0.008333

Sample size for method contribution test = 1024
Mean of the heterotrait-monomethod elements = 0.328095, p = 0.000977

Correlational patterning analysis
Sample size for the correlational patterning tests = 120

Mthd 1 to 1, mthd 2 to 1 = 0.335601, p = 0.008333, r = 0.901850
Mthd 1 to 1, mthd 1 to 2 = 0.438458, p = 0.008333, r = 0.817405
Mthd 1 to 1, mthd 2 to 2 = 0.848998, p = 0.008333, r = 0.926480
Mthd 2 to 1, mthd 1 to 2 = 0.322529, p = 0.066667, r = 0.557368
Mthd 2 to 1, mthd 2 to 2 = 0.712353, p = 0.025000, r = 0.771680
Mthd 1 to 2, mthd 2 to 2 = 1.068145, p = 0.008333, r = 0.876040

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
100.000000 % of the p-values for patterning <= 0.1
83.333333 % of the p-values for patterning <= 0.05
83.333333 % of the p-values for patterning <= 0.041667 (1/24)
66.666667 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

<u>Monte Carlo Results: 11 CareerOp (Work Activity Preferences) Scales matched to 12 US Employment Service Scales resulting in nine matched scales (E).</u>

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : INTER5.DAT

Mean of the heterotrait-heteromethod elements = 0.227519

Sample size for trait contribution test = 718
Mean of the monotrait-heteromethod elements = 0.601111, p = 0.001391

Sample size for method contribution test = 718
Mean of the heterotrait-monomethod elements = 0.380400, p = 0.001391

Correlational patterning analysis
Sample size for the correlational patterning tests = 718

Mthd 1 to 1, mthd 2 to 1 = 2.974104, p = 0.001391, r = 0.775654
Mthd 1 to 1, mthd 1 to 2 = 3.601437, p = 0.001391, r = 0.834822
Mthd 1 to 1, mthd 2 to 2 = 5.543666, p = 0.001391, r = 0.654428
Mthd 2 to 1, mthd 1 to 2 = 2.125382, p = 0.001391, r = 0.558889
Mthd 2 to 1, mthd 2 to 2 = 3.490290, p = 0.001391, r = 0.771960
Mthd 1 to 2, mthd 2 to 2 = 4.163539, p = 0.001391, r = 0.655600

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
100.000000 % of the p-values for patterning <= 0.1
100.000000 % of the p-values for patterning <= 0.05
100.000000 % of the p-values for patterning <= 0.041667 (1/24)
100.000000 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

APPENDIX K

Factor Analysis of the 22 I-WRN Scales

Correlation Matrix

	achieve1	act2	adv3	alt4	aut5	compart6	comp7	creat8	culture9	growth10	lead11
achieve1	100	18	59	61	50	47	46	65	37	82	57
act2	18	100	23	37	37	13	12	29	43	19	40
adv3	59	23	100	28	53	41	75	46	24	56	67
alt4	61	37	28	100	41	35	15	45	61	56	52
aut5	50	37	53	41	100	47	47	60	44	48	67
compart6	47	13	41	35	47	100	49	39	24	42	29
comp7	46	12	75	15	47	49	100	33	10	40	51
creat8	65	29	46	45	60	39	33	100	54	73	54
culture9	37	43	24	61	44	24	10	54	100	45	45
growth10	82	19	56	56	48	42	40	73	45	100	52
lead11	57	40	67	52	67	29	51	54	45	52	100
part12	80	22	63	54	58	48	50	67	43	75	72
prestige13	64	31	77	48	59	39	66	52	41	56	79
qom14	74	16	53	53	39	63	46	50	32	68	46
recog15	66	25	70	36	51	48	66	50	30	56	62
resp16	67	37	70	55	62	31	52	59	46	61	89
security17	53	-1	54	26	29	58	65	28	1	44	28
soc_int18	58	29	38	57	38	55	33	43	35	54	40
structure19	42	35	54	44	55	61	53	37	40	39	56
team20	55	41	45	60	37	34	31	49	45	56	60
var21	62	53	48	51	62	44	38	66	52	64	56
wcond22	54	23	55	46	52	63	54	44	37	52	50

	part12	prestige13	qom14	recog15	resp16	security17	soc_int18	structure19	team20	var21	wcond22
achieve1	80	64	74	66	67	53	58	42	55	62	54
act2	22	31	16	25	37	-1	29	35	41	53	23
adv3	63	77	53	70	70	54	38	54	45	48	55
alt4	54	48	53	36	55	26	57	44	60	51	46
aut5	58	59	39	51	62	29	38	55	37	62	52
compart6	48	39	63	48	31	58	55	61	34	44	63
comp7	50	66	46	66	52	65	33	53	31	38	54
creat8	67	52	50	50	59	28	43	37	49	66	44
culture9	43	41	32	30	46	1	35	40	45	52	37
growth10	75	56	68	56	61	44	54	39	56	64	52
lead11	72	79	46	62	89	28	40	56	60	56	50
part12	100	67	71	66	79	49	56	49	63	63	58
prestige13	67	100	52	81	76	43	42	56	51	53	56
qom14	71	52	100	64	52	63	76	55	59	54	70
recog15	66	81	64	100	64	50	48	56	49	51	59
resp16	79	76	52	64	100	34	44	55	63	58	51
security17	49	43	63	50	34	100	47	48	30	29	57
soc_int18	56	42	76	48	44	47	100	52	69	53	70
structure19	49	56	55	56	55	48	52	100	53	47	72
team20	63	51	59	49	63	30	69	53	100	56	55
var21	63	53	54	51	58	29	53	47	56	100	55

```
wcond22    58    56    70    59    51    57    70    72    55    55    100
```

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 22 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	11.6975607	9.6491647	0.5317	0.5317
2	2.0483960	0.4835029	0.0931	0.6248
3	1.5648931	0.3570737	0.0711	0.6959
4	1.2078195	0.3403161	0.0549	0.7508
5	0.8675034	0.2096856	0.0394	0.7903
6	0.6578178	0.1444178	0.0299	0.8202
7	0.5134000	0.0556740	0.0233	0.8435
8	0.4577260	0.0550124	0.0208	0.8643
9	0.4027136	0.0547239	0.0183	0.8826
10	0.3479897	0.0480946	0.0158	0.8984
11	0.2998951	0.0237734	0.0136	0.9121
12	0.2761217	0.0114560	0.0126	0.9246
13	0.2646658	0.0238849	0.0120	0.9367
14	0.2407808	0.0358023	0.0109	0.9476
15	0.2049786	0.0219107	0.0093	0.9569
16	0.1830679	0.0197653	0.0083	0.9652
17	0.1633026	0.0208315	0.0074	0.9727
18	0.1424711	0.0046309	0.0065	0.9791
19	0.1378402	0.0125754	0.0063	0.9854
20	0.1252648	0.0103417	0.0057	0.9911
21	0.1149231	0.0340545	0.0052	0.9963
22	0.0808686		0.0037	1.0000

4 factors will be retained by the MINEIGEN criterion.

Rotated Factor Pattern

	Factor1	Factor2	Factor3	Factor4	Factor5
prestige13	77 *	24	25	27	16
adv3	75 *	35	24	10	5
lead11	73 *	7	22	45	25
resp16	71 *	7	34	37	31
comp7	68 *	52 *	10	-1	-10
recog15	65 *	41	28	14	15
compart6	14	74 *	22	17	4
wcond22	30	69 *	18	28	25
security17	34	68 *	22	-19	11
qom14	24	62 *	44	6	44
structure19	38	59 *	0	43	17
soc_int18	8	57 *	26	25	54 *
growth10	29	27	75 *	18	24
achieve1	39	32	69 *	9	32
creat8	26	18	67 *	40	4
part12	50 *	28	59 *	20	30
culture9	9	5	32	64 *	21
act2	15	3	1	63 *	14
var21	25	29	47 *	56 *	11
aut5	42	29	32	53 *	-11
team20	29	25	24	38	58 *
alt4	12	17	36	45	52 *

Printed values are multiplied by 100 and rounded to the nearest integer.
Values greater than 0.45 are flagged by an '*'.

Principle Axis Analysis IW using SMC. Rotate

The FACTOR Procedure

Rotation Method: Varimax

Variance Explained by Each Factor

Factor1	Factor2	Factor3	Factor4	Factor5
4.4312770	3.7138640	3.2139991	2.8270616	1.7589247

APPENDIX L

Factor Analysis of 3 Work-Related Need Questionnaires

Correlation Matrix

	iw_a chie ve1	iw_a ct2	iw_a dv3	iw_a lt4	iw_a ut5	iw_c ompa rt6	iw_comp7	iw_cre at8	iw_c ultu re9	iw_g rowt h10	iw_ lea d11
iw_achie ve1	100	17	56	61	48	46	45	64	38	82	56
iw_act2	17	100	22	36	35	11	11	27	43	18	38
iw_adv3	56	22	100	27	51	41	75	46	25	55	68
iw_alt4	61	36	27	100	41	37	17	43	62	55	49
iw_aut5	48	35	51	41	100	47	47	59	45	46	66
iw_compa rt6	46	11	41	37	47	100	51	39	23	43	30
iw_comp7	45	11	75	17	47	51	100	33	10	39	53
iw_creat 8	64	27	46	43	59	39	33	100	54	73	53
iw_cultu re9	38	43	25	62	45	23	10	54	100	46	44
iw_growt h10	82	18	55	55	46	43	39	73	46	100	51
iw_lead1 1	56	38	68	49	66	30	53	53	44	51	100
iw_part1 2	79	20	62	53	55	49	51	67	42	74	70
iw_prest ige13	63	30	77	47	59	40	68	52	41	55	77
iw_qom14	73	15	51	54	37	63	45	48	32	68	44
iw_recog 15	66	24	70	37	49	48	68	52	29	58	62
iw_resp1 6	65	35	69	53	60	31	52	58	46	60	89
iw_secur ity17	51	-2	52	27	29	59	65	27	0	42	27
iw_soc_i nt18	57	28	36	56	36	54	33	42	34	52	38
iw_struc ture19	41	35	53	47	55	60	52	38	41	39	57
iw_team2 0	55	38	44	59	35	34	31	49	45	56	59
iw_var21	61	52	47	50	61	45	38	66	53	63	54
iw_wcond 22	54	21	55	47	52	62	55	44	37	51	50
ca_aut1	23	23	28	24	69	24	23	39	31	28	43
ca_comfo rt2	23	3	21	24	26	60	31	19	16	22	14
ca_feed3	46	15	46	29	27	33	40	33	20	40	41
ca_inter _rel4	55	11	35	44	32	45	33	36	24	47	39
ca_lead_ resp5	44	18	51	33	35	14	34	35	26	42	63
ca_pay_f ut6	34	-1	51	12	22	35	58	15	-1	26	29
ca_self_ act7	62	11	30	43	29	26	19	55	35	65	32
ca_statu s8	35	17	52	27	36	23	45	27	26	30	52
ca_var9	22	66	19	32	31	14	7	32	39	24	28
ca_alt10	30	15	5	64	16	16	-2	15	38	27	24
mi_auto1	25	19	27	15	49	15	21	46	28	28	37

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mi_achievemt2	40	7	18	25	15	16	10	33	16	39	17
mi_activity3	24	26	16	22	23	7	8	27	22	25	23
mi_altruism4	34	10	8	51	11	26	-3	19	28	27	13
mi_pay5	28	3	46	14	18	30	47	14	3	23	30
mi_qualityom6	33	7	25	29	11	27	17	15	15	29	20
mi_recognition_status7	26	20	44	25	34	18	39	23	21	20	51
mi_interpers_rel8	20	18	13	24	19	27	12	19	14	14	18

	iw_part12	iw_prestige13	iw_qom14	iw_recog15	iw_resp16	iw_security17	iw_soc_int18	iw_structure19	iw_team20	iw_var21	iw_wcond22
iw_achieve1	79	63	73	66	65	51	57	41	55	61	54
iw_act2	20	30	15	24	35	-2	28	35	38	52	21
iw_adv3	62	77	51	70	69	52	36	53	44	47	55
iw_alt4	53	47	54	37	53	27	56	47	59	50	47
iw_aut5	55	59	37	49	60	29	36	55	35	61	52
iw_compart6	49	40	63	48	31	59	54	60	34	45	62
iw_comp7	51	68	45	68	52	65	33	52	31	38	55
iw_creat8	67	52	48	52	58	27	42	38	49	66	44
iw_culture9	42	41	32	29	46	0	34	41	45	53	37
iw_growth10	74	55	68	58	60	42	52	39	56	63	51
iw_lead11	70	77	44	62	89	27	38	57	59	54	50
iw_part12	100	66	69	66	78	48	54	49	61	61	57
iw_prestige13	66	100	51	81	75	42	41	57	50	52	57
iw_qom14	69	51	100	64	49	63	76	54	59	53	69
iw_recog15	66	81	64	100	64	51	46	55	49	51	58
iw_resp16	78	75	49	64	100	32	42	55	63	56	51
iw_security17	48	42	63	51	32	100	47	48	30	29	58
iw_soc_int18	54	41	76	46	42	47	100	51	69	52	69
iw_structure19	49	57	54	55	55	48	51	100	54	47	71
iw_team20	61	50	59	49	63	30	69	54	100	56	55
iw_var21	61	52	53	51	56	29	52	47	56	100	54
iw_wcond22	57	57	69	58	51	58	69	71	55	54	100
ca_aut1	30	33	12	24	36	8	13	26	16	35	24
ca_comfort2	25	23	40	28	12	40	36	44	22	23	51
ca_feed3	47	52	47	63	42	34	35	36	40	31	40
ca_inter_rel4	60	39	62	44	42	42	57	36	46	38	49
ca_lead_resp5	52	52	32	42	63	20	21	27	41	33	26

ca_pay_fut6	35	39	36	42	29	57	25	33	22	19	38
ca_self_act7	51	36	45	37	40	25	34	21	37	42	31
ca_status8	37	65	28	50	47	23	21	35	26	27	36
ca_var9	22	22	17	20	27	-1	23	22	29	57	17
ca_alt10	24	19	29	10	24	9	33	18	31	24	22
mi_auto1	33	34	15	29	35	5	13	21	15	37	20
mi_achievemt2	30	22	32	27	21	18	25	14	23	23	19
mi_activity3	23	19	15	15	25	8	17	15	26	41	18
mi_altruism4	29	14	37	14	20	16	40	19	30	23	27
mi_pay5	35	39	34	41	30	42	24	38	26	22	38
mi_qualityom6	34	22	45	28	23	26	33	25	32	26	34
mi_recognition_status7	32	60	21	49	44	16	20	36	28	26	33
mi_interpers_rel8	22	22	32	22	18	17	50	25	34	24	36

	ca_aut1	ca_comfort2	ca_feed3	ca_inter_rel4	ca_lead_resp5	ca_pay_fut6	ca_self_act7	ca_status8	ca_var9	ca_alt10
iw_achieve1	23	23	46	55	44	34	62	35	22	30
iw_act2	23	3	15	11	18	-1	11	17	66	15
iw_adv3	28	21	46	35	51	51	30	52	19	5
iw_alt4	24	24	29	44	33	12	43	27	32	64
iw_aut5	69	26	27	32	35	22	29	36	31	16
iw_compart6	24	60	33	45	14	35	26	23	14	16
iw_comp7	23	31	40	33	34	58	19	45	7	-2
iw_creat8	39	19	33	36	35	15	55	27	32	15
iw_culture9	31	16	20	24	26	-1	35	26	39	38
iw_growth10	28	22	40	47	42	26	65	30	24	27
iw_lead11	43	14	41	39	63	29	32	52	28	24
iw_part12	30	25	47	60	52	35	51	37	22	24
iw_prestige13	33	23	52	39	52	39	36	65	22	19
iw_qom14	12	40	47	62	32	36	45	28	17	29
iw_recog15	24	28	63	44	42	42	37	50	20	10
iw_resp16	36	12	42	42	63	29	40	47	27	24
iw_security17	8	40	34	42	20	57	25	23	-1	9
iw_soc_int18	13	36	35	57	21	25	34	21	23	33
iw_structure19	26	44	36	36	27	33	21	35	22	18
iw_team20	16	22	40	46	41	22	37	26	29	31
iw_var21	35	23	31	38	33	19	42	27	57	24
iw_wcond22	24	51	40	49	26	38	31	36	17	22

ca_aut1	100	28	25	28	38	23	34	35	34	19
ca_comfort2	28	100	42	52	21	53	34	31	14	24
ca_feed3	25	42	100	57	49	52	53	51	25	23
ca_inter_rel4	28	52	57	100	51	58	61	36	25	41
ca_lead_resp5	38	21	49	51	100	41	52	52	27	33
ca_pay_fut6	23	53	52	58	41	100	42	44	8	13
ca_self_act7	34	34	53	61	52	42	100	36	32	38
ca_status8	35	31	51	36	52	44	36	100	24	20
ca_var9	34	14	25	25	27	8	32	24	100	28
ca_alt10	19	24	23	41	33	13	38	20	28	100
mi_auto1	41	7	18	13	23	3	22	23	26	0
mi_achievemt2	10	11	24	23	18	6	35	8	14	21
mi_activity3	14	-1	10	11	18	-1	19	11	32	10
mi_altruism4	3	17	12	29	12	1	25	4	14	42
mi_pay5	3	25	28	25	21	36	8	28	0	1
mi_qualityom6	3	23	25	36	19	20	19	13	11	15
mi_recognition_status7	22	14	32	19	33	20	12	50	14	8
mi_interpers_rel8	6	19	14	24	3	6	10	12	19	14

	mi_auto1	**mi_achievemt2**	**mi_activity3**	**mi_altruism4**	**mi_pay5**	**mi_qualityom6**	**mi_recognition_status7**	**mi_interpers_rel8**
iw_achieve1	25	40	24	34	28	33	26	20
iw_act2	19	7	26	10	3	7	20	18
iw_adv3	27	18	16	8	46	25	44	13
iw_alt4	15	25	22	51	14	29	25	24
iw_aut5	49	15	23	11	18	11	34	19
iw_compart6	15	16	7	26	30	27	18	27
iw_comp7	21	10	8	-3	47	17	39	12
iw_creat8	46	33	27	19	14	15	23	19
iw_culture9	28	16	22	28	3	15	21	14
iw_growth10	28	39	25	27	23	29	20	14
iw_lead11	37	17	23	13	30	20	51	18
iw_part12	33	30	23	29	35	34	32	22
iw_prestige13	34	22	19	14	39	22	60	22
iw_qom14	15	32	15	37	34	45	21	32
iw_recog15	29	27	15	14	41	28	49	22
iw_resp16	35	21	25	20	30	23	44	18
iw_security17	5	18	8	16	42	26	16	17

iw_soc_i nt18	13	25	17	40	24	33	20	50
iw_struc ture19	21	14	15	19	38	25	36	25
iw_team2 0	15	23	26	30	26	32	28	34
iw_var21	37	23	41	23	22	26	26	24
iw_wcond 22	20	19	18	27	38	34	33	36
ca_aut1	41	10	14	3	3	3	22	6
ca_comfo rt2	7	11	-1	17	25	23	14	19
ca_feed3	18	24	10	12	28	25	32	14
ca_inter _rel4	13	23	11	29	25	36	19	24
ca_lead_ resp5	23	18	18	12	21	19	33	3
ca_pay_f ut6	3	6	-1	1	36	20	20	6
ca_self_ act7	22	35	19	25	8	19	12	10
ca_statu s8	23	8	11	4	28	13	50	12
ca_var9	26	14	32	14	0	11	14	19
ca_alt10	0	21	10	42	1	15	8	14
mi_auto1	100	25	32	15	24	14	41	24
mi_achie vemt2	25	100	19	38	26	30	18	28
mi_activ ity3	32	19	100	14	18	19	23	21
mi_altru ism4	15	38	14	100	20	36	10	37
mi_pay5	24	26	18	20	100	50	45	32
mi_quali tyom6	14	30	19	36	50	100	28	35
mi_recog nition_s tatus7	41	18	23	10	45	28	100	29
mi_inter pers_rel 8	24	28	21	37	32	35	29	100

The FACTOR Procedure
Initial Factor Method: Principal Components

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 40 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	15.1552863	12.0014661	0.3789	0.3789
2	3.1538202	0.3236152	0.0788	0.4577
3	2.8302050	0.7674226	0.0708	0.5285
4	2.0627824	0.3077534	0.0516	0.5801
5	1.7550290	0.0514425	0.0439	0.6239
6	1.7035865	0.2463201	0.0426	0.6665
7	1.4572664	0.2746240	0.0364	0.7029
8	1.1826424	0.3189276	0.0296	0.7325
9	0.8637148	0.0385036	0.0216	0.7541
10	0.8252112	0.0896781	0.0206	0.7747
11	0.7355331	0.0208769	0.0184	0.7931
12	0.7146563	0.1167173	0.0179	0.8110

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13      0.5979390     0.0707278        0.0149       0.8259
14      0.5272112     0.0183184        0.0132       0.8391
15      0.5088928     0.0428618        0.0127       0.8518
16      0.4660311     0.0475676        0.0117       0.8635
17      0.4184634     0.0266206        0.0105       0.8740
18      0.3918429     0.0169317        0.0098       0.8838
19      0.3749112     0.0101419        0.0094       0.8931
20      0.3647692     0.0287974        0.0091       0.9022
21      0.3359718     0.0094760        0.0084       0.9106
22      0.3264958     0.0253624        0.0082       0.9188
23      0.3011334     0.0116155        0.0075       0.9263
24      0.2895178     0.0355476        0.0072       0.9336
25      0.2539702     0.0036514        0.0063       0.9399
26      0.2503188     0.0152764        0.0063       0.9462
27      0.2350424     0.0122688        0.0059       0.9521
28      0.2227735     0.0060917        0.0056       0.9576
29      0.2166818     0.0191206        0.0054       0.9630
30      0.1975613     0.0200935        0.0049       0.9680
31      0.1774677     0.0235766        0.0044       0.9724
32      0.1538911     0.0026751        0.0038       0.9763
33      0.1512161     0.0110381        0.0038       0.9800
34      0.1401780     0.0114169        0.0035       0.9836
35      0.1287611     0.0024216        0.0032       0.9868
36      0.1263394     0.0066709        0.0032       0.9899
37      0.1196685     0.0138968        0.0030       0.9929
38      0.1057717     0.0073617        0.0026       0.9956
39      0.0984100     0.0193749        0.0025       0.9980
40      0.0790352                      0.0020       1.0000
```

 8 factors will be retained by the MINEIGEN criterion.

```
Rotated Factor Pattern

                    Factor1   Factor2   Factor3   Factor4   Factor5   Factor6   Factor7 Factor8

   iw_prestige13      79 *       25        24        14        10        13        13      16
   iw_lead11          79 *       14        24         5        25        21         2      22
   iw_resp16          74 *       14        39         5        26        19         5      14
   iw_adv3            71 *       33        29        19       -12         9         9       6
   iw_recog15         62 *       37        36        20        -5        12        18       3
   iw_comp7           60 *       51 *      14        20       -24        -1         4       7
   mi_recog_status7   59 *        3        -9         7         1         9        41      20
   ca_status8         57 *        8        -2        42         9         9         6      18
   ca_lead_resp5      52 *       -9        23        47 *      23        10         1      12
   iw_compart6         9         75 *      18        14         9         3        14      20
   iw_wcond22         32         70 *      19        10        20        13        21      10
   iw_security17      24         66 *      25        24       -10       -13        14     -10
   iw_structure19     43         62 *       4         2        20        22        10      14
   iw_qom14           21         58 *      49 *      19        24         7        27     -12
   iw_soc_int18       12         58 *      30         7        37        25        29     -11
   ca_comfort2        -3         56 *      -8        50 *      15        -1        11      21
   iw_growth10        26         24        77 *      15        19        12        12      11
   iw_achieve1        34         28        72 *      19        22         6        18       4
   iw_creat8          23         18        65 *       4        10        25         8      37
   iw_part12          47 *       30        61 *      15        20         8        16      11
   ca_pay_fut6        30         37         3        69 *     -11        -7         1      -1
   ca_inter_rel4      14         32        28        61 *      31         6        17       2
   ca_feed3           36         18        19        58 *       7        11        14       1
   ca_self_act7        6          1        55 *      58 *      25        12         7      17
   iw_alt4            22         23        29         4        72 *      22        15       6
   ca_alt10            2          3         8        27        68 *      10         9       4
   mi_altruism4       -7         13        18         2        47 *       1        46 *     1
   iw_culture9        20         10        26        -6        47 *      38         1      28
   iw_team20          36         30        34         5        38        35        19     -14
   iw_act2            20          7         0        -5        14        76 *      1       7
   ca_var9             3         -1         9        22        12        75 *      7      18
   iw_var21           23         31        46 *       4        11        57 *     14      22
   mi_activity3       11         -5        19        -2         1        33        29      14
   mi_qualityom6      11         18        13        13        12         3        57 *    -8
   mi_interpers_rel8   4         23        -1        -3        14        18        57 *     4
   mi_pay5            37         26         0        13       -13        -7        55 *    -2
   mi_achievemt2       2          0        34        10        12         1        45       9
   ca_aut1            20          8         8        24        11        18        -9      67 *
   iw_aut5            40         35        24        -1        11        23        -1      64 *
   mi_auto1           23         -4        19        -2        -8        17        33      53 *


                         Variance Explained by Each Factor

     Factor1    Factor2     Factor3    Factor4      Factor5     Factor6    Factor7      Factor8

   5.8254872  4.5921017  4.1432916  2.7649287  2.5989766  2.4758972  2.2828342   1.8903873
```

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APPENDIX M

Monte Carlo Results: 22 I-WRN Scales collapsed into nine higher-order factors and matched to 10 CareerOp-Benefits & Opportunities Scales that were also collapsed into the nine higher-order factors resulting in eight matched scales (A).

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : NEEDS1.DAT

Mean of the heterotrait-heteromethod elements = 0.346777

Sample size for trait contribution test = 808
Mean of the monotrait-heteromethod elements = 0.649787, p = 0.002472

Sample size for method contribution test = 808
Mean of the heterotrait-monomethod elements = 0.469571, p = 0.001236

Correlational patterning analysis
Sample size for the correlational patterning tests = 720

Mthd 1 to 1, mthd 2 to 1 = 5.527486, p = 0.001387, r = 0.736944
Mthd 1 to 1, mthd 1 to 2 = 5.941510, p = 0.040222, r = 0.304020
Mthd 1 to 1, mthd 2 to 2 = 6.255160, p = 0.001387, r = 0.806053
Mthd 2 to 1, mthd 1 to 2 = 3.407750, p = 0.241331, r = 0.119081
Mthd 2 to 1, mthd 2 to 2 = 3.738561, p = 0.001387, r = 0.856002
Mthd 1 to 2, mthd 2 to 2 = 3.941840, p = 0.011096, r = 0.356418

83.333333 % of the p-values for patterning <= 0.166667 (1/6)
83.333333 % of the p-values for patterning <= 0.1
83.333333 % of the p-values for patterning <= 0.05
83.333333 % of the p-values for patterning <= 0.041667 (1/24)
50.000000 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

Monte Carlo Results: 22 I-WRN Scales collapsed into nine higher-order factors and matched to 10 Minnesota Importance Scales that were also collapsed into the nine higher-order factors resulting in seven matched scales (B).

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : NEEDS2.DAT

Mean of the heterotrait-heteromethod elements = 0.244700

Sample size for trait contribution test = 722
Mean of the monotrait-heteromethod elements = 0.461600, p = 0.001383

Sample size for method contribution test = 722
Mean of the heterotrait-monomethod elements = 0.409664, p = 0.001383

Correlational patterning analysis
Sample size for the correlational patterning tests = 720

Mthd 1 to 1, mthd 2 to 1 = 3.128899, p = 0.001387, r = 0.721177
Mthd 1 to 1, mthd 1 to 2 = 2.754488, p = 0.001387, r = 0.701607
Mthd 1 to 1, mthd 2 to 2 = 3.307860, p = 0.004161, r = 0.582067
Mthd 2 to 1, mthd 1 to 2 = 1.311624, p = 0.020804, r = 0.431544
Mthd 2 to 1, mthd 2 to 2 = 1.654323, p = 0.001387, r = 0.734825
Mthd 1 to 2, mthd 2 to 2 = 1.436718, p = 0.002774, r = 0.653831

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
100.000000 % of the p-values for patterning <= 0.1
100.000000 % of the p-values for patterning <= 0.05
100.000000 % of the p-values for patterning <= 0.041667 (1/24)
83.333333 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

Monte Carlo Results: 10 CareerOp-Benefits & Opportunities scales matched to 5 I-WRN factors resulting in five matched factors (C).

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : NEEDS3.DAT

Mean of the heterotrait-heteromethod elements = 0.359300

Sample size for trait contribution test = 120
Mean of the monotrait-heteromethod elements = 0.633420, p = 0.008333

Sample size for method contribution test = 1024
Mean of the heterotrait-monomethod elements = 0.502205, p = 0.000977

Correlational patterning analysis
Sample size for the correlational patterning tests = 120

Mthd 1 to 1, mthd 2 to 1 = 2.531312, p = 0.016667, r = 0.835902
Mthd 1 to 1, mthd 1 to 2 = 2.082388, p = 0.041667, r = 0.615784
Mthd 1 to 1, mthd 2 to 2 = 2.461005, p = 0.016667, r = 0.641363
Mthd 2 to 1, mthd 1 to 2 = 1.326278, p = 0.116667, r = 0.443010
Mthd 2 to 1, mthd 2 to 2 = 1.592756, p = 0.016667, r = 0.653162
Mthd 1 to 2, mthd 2 to 2 = 1.386845, p = 0.025000, r = 0.899829

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
83.333333 % of the p-values for patterning <= 0.1
83.333333 % of the p-values for patterning <= 0.05
83.333333 % of the p-values for patterning <= 0.041667 (1/24)
0.000000 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

<u>Monte Carlo Results: 10 Minnesota Importance Questionnaire scales matched to 5 I-WRN factors resulting in five matched factors (D).</u>

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : NEEDS4.DAT

Mean of the heterotrait-heteromethod elements = 0.274190

Sample size for trait contribution test = 120
Mean of the monotrait-heteromethod elements = 0.454240, p = 0.008333

Sample size for method contribution test = 1024
Mean of the heterotrait-monomethod elements = 0.451735, p = 0.000977

Correlational patterning analysis
Sample size for the correlational patterning tests = 120

Mthd 1 to 1, mthd 2 to 1 = 1.812340, p = 0.041667, r = 0.636759
Mthd 1 to 1, mthd 1 to 2 = 1.634305, p = 0.141667, r = 0.408575
Mthd 1 to 1, mthd 2 to 2 = 1.814835, p = 0.125000, r = 0.396532
Mthd 2 to 1, mthd 1 to 2 = 0.752461, p = 0.433333, r = 0.038408
Mthd 2 to 1, mthd 2 to 2 = 0.868332, p = 0.083333, r = 0.446211
Mthd 1 to 2, mthd 2 to 2 = 0.807468, p = 0.008333, r = 0.752934

83.333333 % of the p-values for patterning <= 0.166667   (1/6)
50.000000 % of the p-values for patterning <= 0.1
33.333333 % of the p-values for patterning <= 0.05
33.333333 % of the p-values for patterning <= 0.041667 (1/24)
16.666667 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

Monte Carlo Results: 10 CareerOp-Benefits & Opportunities scales matched to 10
Minnesota Importance Questionnaire scales resulting in eight matched factors (E).

Monte Carlo Multitrait-Multimethod Analysis Package 5.0

Data file : NEEDS5.DAT

Mean of the heterotrait-heteromethod elements = 0.143141

Sample size for trait contribution test = 720
Mean of the monotrait-heteromethod elements = 0.348900, p = 0.002774

Sample size for method contribution test = 720
Mean of the heterotrait-monomethod elements = 0.313421, p = 0.001387

Correlational patterning analysis
Sample size for the correlational patterning tests = 720

Mthd 1 to 1, mthd 2 to 1 = 1.824273, p = 0.001387, r = 0.658240
Mthd 1 to 1, mthd 1 to 2 = 1.503561, p = 0.002774, r = 0.574500
Mthd 1 to 1, mthd 2 to 2 = 2.893858, p = 0.013870, r = 0.487412
Mthd 2 to 1, mthd 1 to 2 = 0.669943, p = 0.011096, r = 0.489326
Mthd 2 to 1, mthd 2 to 2 = 1.361120, p = 0.001387, r = 0.747728
Mthd 1 to 2, mthd 2 to 2 = 1.090349, p = 0.008322, r = 0.491649

100.000000 % of the p-values for patterning <= 0.166667   (1/6)
100.000000 % of the p-values for patterning <= 0.1
100.000000 % of the p-values for patterning <= 0.05
100.000000 % of the p-values for patterning <= 0.041667 (1/24)
66.666667 % of the p-values for patterning <= 0.01
0.000000 % of the p-values for patterning <= 0.001

Factor Analysis of 6 Questionnaires: 3 Work-Related Interest and 3 Need Questionnaires

Correlation Matrix

	in_arts1	in_work_thing2	in_off_bus3	in_sci_math4	in_eng5	in_an_plant6	in_lead_ent7	in_human_dev8	in_sec9	in_health10
in_arts1	100	-16	1	-7	-4	20	0	45	2	12
in_work_thing2	-16	100	2	50	68	15	-6	-25	37	-1
in_off_bus3	1	2	100	5	1	1	55	26	10	7
in_sci_math4	-7	50	5	100	50	29	-4	-7	23	39
in_eng5	-4	68	1	50	100	15	0	-19	23	2
in_an_plant6	20	15	1	29	15	100	-7	24	22	40
in_lead_ent7	0	-6	55	-4	0	-7	100	26	20	7
in_human_dev8	45	-25	26	-7	-19	24	26	100	18	34
in_sec9	2	37	10	23	23	22	20	18	100	23
in_health10	12	-1	7	39	2	40	7	34	23	100
sp_artistic1	72	-3	7	3	11	30	2	36	9	13
sp_caring_an2	16	27	1	34	24	80	-8	15	27	34
sp_clerical3	-5	16	71	17	14	4	43	15	12	6
sp_cust_sales4	19	8	49	4	8	28	29	39	24	16
sp_eng5	-11	67	6	65	67	9	3	-22	26	6
sp_health6	8	-3	15	31	2	45	5	35	22	77
sp_human_dev7	40	-20	25	1	-11	27	21	77	19	36
sp_leader_enter8	6	0	51	3	7	-1	77	25	23	4
sp_protection9	3	37	10	27	31	27	17	12	77	21
sp_scientific10	-1	34	-2	71	37	34	-8	3	23	46
sp_hardware11	-18	84	1	50	64	19	-10	-25	37	-1
us_art1	57	6	2	12	15	26	-1	25	14	15
us_scientific2	1	14	7	42	16	31	5	14	20	60
us_plants3	13	25	1	22	19	61	-3	10	23	21
us_protective4	-1	33	9	19	23	21	11	9	53	16
us_mechanical5	-5	64	6	38	55	20	-7	-14	29	4
us_industrial6	-1	27	24	12	18	14	7	4	20	6
us_bus_detail7	2	4	46	2	0	3	20	18	5	7
us_selling8	1	10	32	0	10	9	42	15	20	3
us_accomodating9	4	15	22	6	7	19	9	16	19	9

Label										
us_humanitarian10	23	-13	19	2	-9	34	5	50	12	44
us_leading_influ11	10	0	43	3	4	3	49	31	21	12
us_physical12	10	37	4	23	33	27	13	1	47	12
iw_achieve1	14	-13	-6	-7	-3	2	5	8	-9	4
iw_act2	-4	31	1	13	20	28	0	-7	30	4
iw_adv3	-2	0	9	-3	3	-10	26	-5	5	-7
iw_alt4	22	-13	6	-7	-9	21	3	38	5	26
iw_aut5	8	3	3	-2	-1	3	14	0	2	-2
iw_compart6	15	-7	3	-5	0	2	-2	8	-4	-1
iw_comp7	-5	-1	9	-2	1	-15	24	-8	-1	-6
iw_creat8	26	11	-11	8	17	6	-4	-3	-5	-4
iw_culture9	39	-6	8	-4	-2	16	7	23	1	8
iw_growth10	16	-1	-6	5	4	3	1	5	-6	4
iw_lead11	-3	1	16	-6	2	-3	33	4	9	1
iw_part12	11	-6	3	-6	1	1	17	8	-2	2
iw_prestige13	6	-7	7	-9	-4	-5	21	1	1	-2
iw_qom14	15	-15	4	-11	-5	4	4	13	-7	2
iw_recog15	5	-4	5	-3	0	-5	13	-5	-6	-4
iw_resp16	-2	2	11	-4	5	-3	28	3	7	3
iw_security17	2	-10	5	-5	-3	-7	4	-1	-8	-1
iw_soc_int18	13	-7	5	-1	-3	15	0	12	-2	8
iw_structure19	-1	0	20	-5	1	-4	13	5	4	0
iw_team20	2	5	12	3	4	7	11	3	4	8
iw_var21	12	7	-1	-1	6	12	3	0	5	0
iw_wcond22	10	-12	17	-4	-6	2	10	6	-7	0
ca_aut1	8	5	-5	-3	2	4	9	-2	1	-3
ca_comfort2	5	-14	4	-10	-6	-2	-3	3	-14	-3
ca_feed3	-1	-1	-1	-5	3	-5	3	-6	-6	-1
ca_inter_rel4	10	-14	-3	-9	-3	2	8	13	-7	6
ca_lead_resp5	-4	-1	6	-5	1	-7	25	2	4	2
ca_pay_fut6	-11	-10	5	-9	-2	-14	15	-6	-7	-5
ca_self_act7	13	-6	-12	2	4	3	-7	4	-10	4
ca_status8	3	-11	10	-10	-7	-11	21	-2	0	-2
ca_var9	7	25	-6	5	19	25	-3	-4	25	2
ca_alt10	18	-18	5	-8	-14	21	1	42	6	27
mi_auto1	7	6	-6	3	6	2	0	-11	-3	-11
mi_achievemt2	14	-4	-9	0	1	0	-9	9	-3	4
mi_activity3	3	6	0	6	3	10	-1	2	0	6
mi_altruism4	22	-15	1	-8	-9	23	-5	32	1	21
mi_pay5	-6	-2	11	-4	-3	-13	17	-4	0	-1

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mi_quali tyom6	8	-8	5	-6	-3	2	8	12	1	7
mi_recog nition_s tatus7	0	-4	12	-7	-5	-7	20	-1	1	-4
mi_inter pers_rel 8	6	2	6	2	5	13	0	3	1	3

	sp_a rt is ti c1	sp_ca ring_ an2	sp_cl erica l3	sp_cu st_sa les4	sp_en g5	sp_he alth6	sp_hu man_d ev7	sp_le ader_ enter 8	sp_pr otect ion9	sp_sc ienti fic10	sp_hardware 11
in_arts1	72	16	-5	19	-11	8	40	6	3	-1	-18
in_work_ thing2	-3	27	16	8	67	-3	-20	0	37	34	84
in_off_b us3	7	1	71	49	6	15	25	51	10	-2	1
in_sci_m ath4	3	34	17	4	65	31	1	3	27	71	50
in_eng5	11	24	14	8	67	2	-11	7	31	37	64
in_an_pl ant6	30	80	4	28	9	45	27	-1	27	34	19
in_lead_ ent7	2	-8	43	29	3	5	21	77	17	-8	-10
in_human _dev8	36	15	15	39	-22	35	77	25	12	3	-25
in_sec9	9	27	12	24	26	22	19	23	77	23	37
in_healt h10	13	34	6	16	6	77	36	4	21	46	-1
sp_artis tic1	100	43	22	50	12	31	52	23	30	25	8
sp_carin g_an2	43	100	20	45	28	53	32	7	46	50	41
sp_cleri cal3	22	20	100	67	32	29	32	61	27	24	25
sp_cust_ sales4	50	45	67	100	15	46	53	45	43	21	21
sp_eng5	12	28	32	15	100	12	-4	19	42	64	77
sp_healt h6	31	53	29	46	12	100	53	17	35	55	9
sp_human _dev7	52	32	32	53	-4	53	100	37	30	25	-12
sp_leade r_enter8	23	7	61	45	19	17	37	100	31	10	2
sp_prote ction9	30	46	27	43	42	35	30	31	100	40	51
sp_scien tific10	25	50	24	21	64	55	25	10	40	100	47
sp_hardw are11	8	41	25	21	77	9	-12	2	51	47	100
us_art1	68	33	7	30	17	20	34	10	25	23	13
us_scien tific2	14	33	16	19	31	61	25	11	28	60	21
us_plant s3	27	67	11	29	19	29	18	2	31	29	33
us_prote ctive4	15	31	22	32	32	23	17	17	64	27	41
us_mecha nical5	15	34	21	23	55	11	-4	1	39	34	71
us_indus trial6	14	19	33	32	24	14	10	13	26	18	32
us_bus_d etail7	12	8	52	41	8	18	21	25	13	8	7
us_selli ng8	11	11	38	39	11	11	14	43	23	1	10

us_accom odating9	17	23	31	45	11	20	20	12	26	13	20
us_human itarian1 0	28	33	16	42	-11	55	55	8	17	14	-9
us_leadi ng_influ 11	20	8	46	39	14	20	38	57	27	12	2
us_physi cal12	30	40	13	26	34	18	8	17	60	27	44
iw_achie ve1	6	-2	-13	-7	-8	3	10	5	-9	-3	-14
iw_act2	4	32	5	13	12	10	-6	1	33	11	33
iw_adv3	-4	-11	7	-1	7	-8	-4	32	5	-7	-2
iw_alt4	19	16	-4	18	-17	30	38	2	6	-1	-12
iw_aut5	3	1	-2	-3	-3	-3	-2	12	-1	-5	-2
iw_compa rt6	10	-1	-2	2	-4	-3	6	-4	-7	-8	-6
iw_comp7	-10	-18	5	-5	6	-10	-12	24	-3	-7	-3
iw_creat 8	22	5	-11	-6	15	-5	1	4	-2	8	8
iw_cultu re9	37	15	3	14	-8	12	25	10	5	3	-5
iw_growt h10	13	1	-8	-5	8	4	11	7	-4	8	-2
iw_lead1 1	-6	-6	10	5	-2	1	3	35	7	-8	-2
iw_part1 2	6	-5	-5	-2	-4	-1	9	19	-5	-5	-11
iw_prest ige13	1	-11	2	1	-5	-4	0	25	0	-11	-10
iw_qom14	12	0	-4	7	-9	3	13	4	-8	-7	-13
iw_recog 15	0	-9	1	-3	0	-6	-6	16	-5	-6	-6
iw_resp1 6	-4	-6	5	1	1	3	4	30	7	-5	-1
iw_secur ity17	-3	-10	-4	-3	-5	-3	-2	1	-11	-9	-11
iw_soc_i nt18	13	13	-1	12	-4	12	13	-1	-2	0	-4
iw_struc ture19	-3	-5	14	12	-2	0	0	12	1	-9	-1
iw_team2 0	3	5	8	12	7	12	8	13	6	4	6
iw_var21	12	12	-4	4	2	2	2	5	7	0	7
iw_wcond 22	9	1	11	12	-3	3	5	13	-7	-6	-9
ca_aut1	7	5	-2	-3	1	-2	1	12	0	-2	6
ca_comfo rt2	9	-1	6	12	-5	0	7	0	-11	-7	-8
ca_feed3	1	-4	2	1	2	-1	-2	9	-2	-2	0
ca_inter _rel4	5	-2	-6	3	-10	5	13	6	-10	-5	-13
ca_lead_ resp5	-6	-8	6	0	-1	1	5	31	2	-3	-4
ca_pay_f ut6	-7	-14	7	2	0	-6	-5	15	-4	-9	-8
ca_self_ act7	13	2	-10	-6	3	4	13	-1	-8	8	-4
ca_statu s8	1	-13	10	3	-4	-1	1	26	2	-7	-10
ca_var9	12	29	-1	8	8	8	0	1	29	7	26
ca_alt10	14	14	-2	15	-19	30	41	1	4	-2	-13
mi_auto1	5	2	-7	-10	4	-11	-10	5	-2	-1	2
mi_achie vemt2	6	-2	-14	-10	1	-3	7	-4	-7	0	-4
mi_activ ity3	5	11	-1	0	4	7	2	2	4	6	7
mi_altru	13	13	-8	8	-18	20	31	-7	-3	-2	-14

ism4										
mi_pay5	-11	-17	5	-1	3	-6	-3	20	-5	-6	-6
mi_quali tyom6	0	-6	-2	3	-6	5	10	8	-7	-4	-11
mi_recog nition_s tatus7	-4	-9	7	5	-2	0	-2	25	1	-5	-5
mi_inter pers_rel 8	3	7	-2	1	2	3	4	-1	-3	-1	2

	us _a rt 1	**us_sc ienti fic2**	**us_pl ants3**	**us_pr otect ive4**	**us_me chani cal5**	**us_in dustr ial6**	**us_bu s_det ail7**	**us_se lling 8**	**us_ac comod ating 9**	**us_hu manit arian 10**	**us_le ading _infl u11**	**us_ph ysica l12**
in_arts1	57	1	13	-1	-5	-1	2	1	4	23	10	10
in_work_ thing2	6	14	25	33	64	27	4	10	15	-13	0	37
in_off_b us3	2	7	1	9	6	24	46	32	22	19	43	4
in_sci_m ath4	12	42	22	19	38	12	2	0	6	2	3	23
in_eng5	15	16	19	23	55	18	0	10	7	-9	4	33
in_an_pl ant6	26	31	61	21	20	14	3	9	19	34	3	27
in_lead_ ent7	-1	5	-3	11	-7	7	20	42	9	5	49	13
in_human _dev8	25	14	10	9	-14	4	18	15	16	50	31	1
in_sec9	14	20	23	53	29	20	5	20	19	12	21	47
in_healt h10	15	60	21	16	4	6	7	3	9	44	12	12
sp_artis tic1	68	14	27	15	15	14	12	11	17	28	20	30
sp_carin g_an2	33	33	67	31	34	19	8	11	23	33	8	40
sp_cleri cal3	7	16	11	22	21	33	52	38	31	16	46	13
sp_cust_ sales4	30	19	29	32	23	32	41	39	45	42	39	26
sp_eng5	17	31	19	32	55	24	8	11	11	-11	14	34
sp_healt h6	20	61	29	23	11	14	18	11	20	55	20	18
sp_human _dev7	34	25	18	17	-4	10	21	14	20	55	38	8
sp_leade r_enter8	10	11	2	17	1	13	25	43	12	8	57	17
sp_prote ction9	25	28	31	64	39	26	13	23	26	17	27	60
sp_scien tific10	23	60	29	27	34	18	8	1	13	14	12	27
sp_hardw are11	13	21	33	41	71	32	7	10	20	-9	2	44
us_art1	100	34	47	37	38	26	23	20	32	42	40	53
us_scien tific2	34	100	43	43	40	34	32	22	33	47	42	32
us_plant s3	47	43	100	50	55	49	34	35	51	44	30	52
us_prote ctive4	37	43	50	100	57	51	38	42	52	34	46	61
us_mecha nical5	38	40	55	57	100	52	35	30	43	17	31	54
us_indus trial6	26	34	49	51	52	100	70	51	70	30	40	30
us_bus_d etail7	23	32	34	38	35	70	100	51	67	41	59	15
us_selli ng8	20	22	35	42	30	51	51	100	51	26	58	30

us_accom odating9	32	33	51	52	43	70	67	51	100	41	44	33
us_human itarian1 0	42	47	44	34	17	30	41	26	41	100	42	21
us_leadi ng_influ 11	40	42	30	46	31	40	59	58	44	42	100	33
us_physi cal12	53	32	52	61	54	30	15	30	33	21	33	100
iw_achie ve1	2	2	-7	-11	-14	-22	-15	-11	-19	4	-4	-8
iw_act2	3	0	26	25	21	17	-1	16	11	0	-4	34
iw_adv3	-8	-7	-17	-4	-9	-14	-7	6	-16	-15	10	3
iw_alt4	12	12	10	4	-11	-1	3	3	1	39	7	-1
iw_aut5	1	-5	-3	-1	-6	-8	-7	5	-8	-8	3	0
iw_compa rt6	10	-7	-3	-6	-9	-15	-7	-10	-13	3	-5	-4
iw_comp7	-8	-5	-19	-9	-11	-17	-8	1	-21	-18	5	-4
iw_creat 8	18	0	0	-4	3	-9	-16	-6	-14	-7	-5	4
iw_cultu re9	26	4	11	3	-5	10	8	9	6	18	9	4
iw_growt h10	6	5	-5	-7	-7	-17	-12	-12	-17	2	0	-4
iw_lead1 1	-9	-1	-10	2	-9	-2	-1	15	-7	-5	17	3
iw_part1 2	2	-2	-9	-9	-13	-16	-10	-3	-16	-1	4	-6
iw_prest ige13	-5	-6	-15	-5	-16	-9	-6	9	-14	-6	9	-2
iw_qom14	5	-5	-6	-9	-17	-16	-6	-8	-13	8	-2	-8
iw_recog 15	-4	-5	-13	-8	-12	-12	-6	1	-17	-12	1	-5
iw_resp1 6	-8	0	-12	1	-8	-6	-6	11	-11	-4	11	2
iw_secur ity17	-3	-5	-16	-13	-15	-24	-10	-14	-20	-2	-5	-13
iw_soc_i nt18	9	0	4	-3	-8	-7	-5	-3	-5	14	-5	-1
iw_struc ture19	-8	-8	-9	-1	-9	2	8	11	-3	-1	3	-8
iw_team2 0	-1	5	0	2	-2	2	2	6	-2	9	3	3
iw_var21	8	-4	7	4	1	-1	-6	2	-4	0	-4	10
iw_wcond 22	2	-7	-7	-10	-14	-6	3	2	-7	2	2	-9
ca_aut1	3	-4	5	4	3	-2	-2	8	-1	-3	4	3
ca_comfo rt2	8	-7	-4	-12	-8	-6	4	-5	-8	3	-2	-9
ca_feed3	-1	-3	-6	-2	-3	-3	0	-1	-8	-4	-1	-1
ca_inter _rel4	6	2	-3	-5	-11	-14	-4	-3	-11	10	4	-6
ca_lead_ resp5	-8	3	-6	3	-4	-4	2	10	-5	-1	18	0
ca_pay_f ut6	-8	-6	-16	-8	-9	-17	-2	-4	-16	-11	4	-6
ca_self_ act7	10	6	0	-5	-1	-13	-7	-14	-13	7	0	-4
ca_statu s8	-5	-6	-15	-2	-14	-5	3	11	-7	-5	11	-1
ca_var9	13	3	29	24	23	17	1	13	10	7	0	33
ca_alt10	16	16	14	9	-7	3	11	4	11	44	13	0
mi_auto1	0	-7	-2	-1	-2	-2	-7	-1	-8	-14	-5	-1
mi_achie vemt2	0	-1	-6	-10	-6	-8	-5	-10	-10	0	-7	-8
mi_activ ity3	2	1	4	1	3	3	-2	2	2	-2	0	3
mi_altru	7	6	9	-3	-11	-1	1	-10	4	31	-3	-7

ism4											
mi_pay5	-11	-3	-18	-9	-13	-7	3	3	-9	-9	4	-11
mi_quali tyom6	-1	1	-5	-5	-11	-7	-1	-1	-6	5	1	-8
mi_recog nition_s tatus7	-12	-5	-14	-6	-12	-1	4	10	-6	-10	9	-4
mi_inter pers_rel 8	3	-2	3	-3	-3	0	-5	3	-3	3	-5	3

	iw _a ch ie ve 1	**iw_ac t2**	**iw_ad v3**	**iw_al t4**	**iw_au t5**	**iw_co mpart 6**	**iw_co mp7**	**iw_cr eat8**	**iw_cu lture 9**	**iw_gr owth1 0**	**iw_le ad11**	**iw_pa rt12**
in_arts1	14	-4	-2	22	8	15	-5	26	39	16	-3	11
in_work_ thing2	-13	31	0	-13	3	-7	-1	11	-6	-1	1	-6
in_off_b us3	-6	1	9	6	3	3	9	-11	8	-6	16	3
in_sci_m ath4	-7	13	-3	-7	-2	-5	-2	8	-4	5	-6	-6
in_eng5	-3	20	3	-9	-1	0	1	17	-2	4	2	1
in_an_pl ant6	2	28	-10	21	3	2	-15	6	16	3	-3	1
in_lead_ ent7	5	0	26	3	14	-2	24	-4	7	1	33	17
in_human _dev8	8	-7	-5	38	0	8	-8	-3	23	5	4	8
in_sec9	-9	30	5	5	2	-4	-1	-5	1	-6	9	-2
in_healt h10	4	4	-7	26	-2	-1	-6	-4	8	4	1	2
sp_artis tic1	6	4	-4	19	3	10	-10	22	37	13	-6	6
sp_carin g_an2	-2	32	-11	16	1	-1	-18	5	15	1	-6	-5
sp_cleri cal3	-13	5	7	-4	-2	-2	5	-11	3	-8	10	-5
sp_cust_ sales4	-7	13	-1	18	-3	2	-5	-6	14	-5	5	-2
sp_eng5	-8	12	7	-17	-3	-4	6	15	-8	8	-2	-4
sp_healt h6	3	10	-8	30	-3	-3	-10	-5	12	4	1	-1
sp_human _dev7	10	-6	-4	38	-2	6	-12	1	25	11	3	9
sp_leade r_enter8	5	1	32	2	12	-4	24	4	10	7	35	19
sp_prote ction9	-9	33	5	6	-1	-7	-3	-2	5	-4	7	-5
sp_scien tific10	-3	11	-7	-1	-5	-8	-7	8	3	8	-8	-5
sp_hardw are11	-14	33	-2	-12	-2	-6	-3	8	-5	-2	-2	-11
us_art1	2	3	-8	12	1	10	-8	18	26	6	-9	2
us_scien tific2	2	0	-7	12	-5	-7	-5	0	4	5	-1	-2
us_plant s3	-7	26	-17	10	-3	-3	-19	0	11	-5	-10	-9
us_prote ctive4	-11	25	-4	4	-1	-6	-9	-4	3	-7	2	-9
us_mecha nical5	-14	21	-9	-11	-6	-9	-11	3	-5	-7	-9	-13
us_indus trial6	-22	17	-14	-1	-8	-15	-17	-9	10	-17	-2	-16
us_bus_d etail7	-15	-1	-7	3	-7	-7	-8	-16	8	-12	-1	-10
us_selli	-	16	6	3	5	-10	1	-6	9	-12	15	-3

ng8	11											
us_accom odating9	-19	11	-16	1	-8	-13	-21	-14	6	-17	-7	-16
us_human itarian10	4	0	-15	39	-8	3	-18	-7	18	2	-5	-1
us_leadi ng_influ11	-4	-4	10	7	3	-5	5	-5	9	0	17	4
us_physi cal12	-8	34	3	-1	0	-4	-4	4	4	-4	3	-6
iw_achie ve1	100	17	57	61	48	46	46	64	38	82	56	79
iw_act2	17	100	22	35	35	11	11	27	43	18	38	20
iw_adv3	57	22	100	28	51	41	75	46	25	55	68	62
iw_alt4	61	35	28	100	41	37	17	43	62	55	49	52
iw_aut5	48	35	51	41	100	47	47	59	45	47	66	56
iw_compa rt6	46	11	41	37	47	100	51	39	23	43	30	49
iw_comp7	46	11	75	17	47	51	100	33	10	39	53	51
iw_creat 8	64	27	46	43	59	39	33	100	54	73	53	67
iw_cultu re9	38	43	25	62	45	23	10	54	100	46	44	41
iw_growt h10	82	18	55	55	47	43	39	73	46	100	51	74
iw_lead1 1	56	38	68	49	66	30	53	53	44	51	100	70
iw_part1 2	79	20	62	52	56	49	51	67	41	74	70	100
iw_prest ige13	63	30	77	47	59	40	68	52	41	56	78	66
iw_qom14	73	15	51	54	37	63	46	48	32	68	44	69
iw_recog 15	67	24	70	37	49	48	68	52	30	58	62	67
iw_resp1 6	65	35	70	53	60	31	52	58	46	60	89	78
iw_secur ity17	51	-2	52	26	28	60	65	27	0	42	27	48
iw_soc_i nt18	57	28	36	56	36	54	33	42	34	52	38	54
iw_struc ture19	41	35	53	47	54	60	52	38	41	40	57	49
iw_team2 0	55	39	45	58	35	34	32	49	45	56	59	61
iw_var21	61	52	48	49	61	45	38	66	53	63	54	61
iw_wcond 22	54	21	55	47	51	62	55	44	37	52	50	57
ca_aut1	24	23	28	24	69	24	23	39	31	28	43	30
ca_comfo rt2	23	2	21	24	26	60	31	19	16	22	13	25
ca_feed3	46	15	46	29	27	33	40	33	20	41	40	47
ca_inter _rel4	55	11	35	44	32	45	33	36	24	47	39	61
ca_lead_ resp5	44	18	51	33	36	14	34	35	26	42	64	52
ca_pay_f ut6	34	-1	51	12	22	35	58	15	-1	26	29	35
ca_self_ act7	62	11	30	42	29	26	19	55	35	65	32	51
ca_statu s8	35	17	52	27	36	23	45	27	26	30	52	37
ca_var9	22	66	19	32	31	14	6	33	39	24	27	22
ca_alt10	30	15	6	64	16	16	-1	15	37	27	24	24
mi_auto1	25	19	27	15	49	15	20	46	28	28	37	34
mi_achie vemt2	40	7	18	25	15	16	10	33	16	39	17	30
mi_activ ity3	24	26	16	22	23	7	8	27	22	25	23	23

mi_altru ism4	34	10	8	51	11	26	-3	19	28	27	13	28
mi_pay5	28	3	45	14	18	30	47	14	3	23	30	35
mi_quali tyom6	33	7	25	29	11	27	17	15	14	29	20	34
mi_recog nition_s tatus7	26	20	44	25	34	18	39	23	22	21	51	32
mi_inter pers_rel 8	20	18	13	24	19	27	12	20	15	15	18	22

	iw _p re st ig e1 3	**iw_qo m14**	**iw_re cog15**	**iw_re sp16**	**iw_se curit y17**	**iw_so c_int 18**	**iw_st ructu re19**	**iw_te am20**	**iw_va r21**	**iw_wc ond22**
in_arts1	6	15	5	-2	2	13	-1	2	12	10
in_work_ thing2	-7	-15	-4	2	-10	-7	0	5	7	-12
in_off_b us3	7	4	5	11	5	5	20	12	-1	17
in_sci_m ath4	-9	-11	-3	-4	-5	-1	-5	3	-1	-4
in_eng5	-4	-5	0	5	-3	-3	1	4	6	-6
in_an_pl ant6	-5	4	-5	-3	-7	15	-4	7	12	2
in_lead_ ent7	21	4	13	28	4	0	13	11	3	10
in_human _dev8	1	13	-5	3	-1	12	5	3	0	6
in_sec9	1	-7	-6	7	-8	-2	4	4	5	-7
in_healt h10	-2	2	-4	3	-1	8	0	8	0	0
sp_artis tic1	1	12	0	-4	-3	13	-3	3	12	9
sp_carin g_an2	-11	0	-9	-6	-10	13	-5	5	12	1
sp_cleri cal3	2	-4	1	5	-4	-1	14	8	-4	11
sp_cust_ sales4	1	7	-3	1	-3	12	12	12	4	12
sp_eng5	-5	-9	0	1	-5	-4	-2	7	2	-3
sp_healt h6	-4	3	-6	3	-3	12	0	12	2	3
sp_human _dev7	0	13	-6	4	-2	13	0	8	2	5
sp_leade r_enter8	25	4	16	30	1	-1	12	13	5	13
sp_prote ction9	0	-8	-5	7	-11	-2	1	6	7	-7
sp_scien tific10	-11	-7	-6	-5	-9	0	-9	4	0	-6
sp_hardw are11	-10	-13	-6	-1	-11	-4	-1	6	7	-9
us_art1	-5	5	-4	-8	-3	9	-8	-1	8	2
us_scien tific2	-6	-5	-5	0	-5	0	-8	5	-4	-7
us_plant s3	-15	-6	-13	-12	-16	4	-9	0	7	-7
us_prote ctive4	-5	-9	-8	1	-13	-3	-1	2	4	-10
us_mecha nical5	-16	-17	-12	-8	-15	-8	-9	-2	1	-14
us_indus trial6	-9	-16	-12	-6	-24	-7	2	2	-1	-6
us_bus_d etail7	-6	-6	-6	-6	-10	-5	8	2	-6	3

us_selling8	9	-8	1	11	-14	-3	11	6	2	2
us_accomodating9	-14	-13	-17	-11	-20	-5	-3	-2	-4	-7
us_humanitarian10	-6	8	-12	-4	-2	14	-1	9	0	2
us_leading_influ11	9	-2	1	11	-5	-5	3	3	-4	2
us_physical12	-2	-8	-5	2	-13	-1	-8	3	10	-9
iw_achieve1	63	73	67	65	51	57	41	55	61	54
iw_act2	30	15	24	35	-2	28	35	39	52	21
iw_adv3	77	51	70	70	52	36	53	45	48	55
iw_alt4	47	54	37	53	26	56	47	58	49	47
iw_aut5	59	37	49	60	28	36	54	35	61	51
iw_compart6	40	63	48	31	60	54	60	34	45	62
iw_comp7	68	46	68	52	65	33	52	32	38	55
iw_creat8	52	48	52	58	27	42	38	49	66	44
iw_culture9	41	32	30	46	0	34	41	45	53	37
iw_growth10	56	68	58	60	42	52	40	56	63	52
iw_lead11	78	44	62	89	27	38	57	59	54	50
iw_part12	66	69	67	78	48	54	49	61	61	57
iw_prestige13	100	52	81	75	42	41	57	50	52	57
iw_qom14	52	100	64	49	63	76	54	59	53	70
iw_recog15	81	64	100	64	51	47	55	49	51	58
iw_resp16	75	49	64	100	32	42	55	63	56	51
iw_security17	42	63	51	32	100	47	48	30	29	58
iw_soc_int18	41	76	47	42	47	100	52	69	53	69
iw_structure19	57	54	55	55	48	52	100	54	47	71
iw_team20	50	59	49	63	30	69	54	100	56	55
iw_var21	52	53	51	56	29	53	47	56	100	54
iw_wcond22	57	70	58	51	58	69	71	55	54	100
ca_aut1	33	13	24	36	8	13	26	16	35	24
ca_comfort2	23	40	28	12	40	36	44	22	23	51
ca_feed3	52	47	63	42	34	36	36	40	31	40
ca_inter_rel4	39	62	44	42	42	57	36	47	38	49
ca_lead_resp5	52	32	42	63	20	22	27	41	33	27
ca_pay_fut6	39	36	42	29	57	25	33	22	19	38
ca_self_act7	36	45	38	40	25	34	21	37	42	32
ca_status8	66	28	50	47	23	22	35	26	27	36
ca_var9	22	17	20	27	-1	23	22	29	58	17
ca_alt10	19	29	10	24	9	33	18	30	24	22
mi_auto1	34	15	29	35	5	13	21	15	37	20
mi_achievemt2	22	32	27	21	18	25	13	23	23	19
mi_activ	19	14	15	25	8	17	15	26	41	18

ity3									
mi_altru ism4	14	37	14	20	16	40	19	30	23	27
mi_pay5	39	34	41	30	42	25	37	26	22	38
mi_quali tyom6	22	45	28	23	26	33	24	32	26	34
mi_recog nition_s tatus7	60	22	49	44	16	20	36	29	26	33
mi_inter pers_rel 8	22	32	22	18	17	50	25	35	25	36

	ca _a ut 1	ca_co mfort 2	ca_fe ed3	ca_in ter_r el4	ca_le ad_re sp5	ca_pa y_fut 6	ca_se lf_ac t7	ca_st atus8	ca_va r9	ca_al t10
in_arts1	8	5	-1	10	-4	-11	13	3	7	18
in_work_ thing2	5	-14	-1	-14	-1	-10	-6	-11	25	-18
in_off_b us3	-5	4	-1	-3	6	5	-12	10	-6	5
in_sci_m ath4	-3	-10	-5	-9	-5	-9	2	-10	5	-8
in_eng5	2	-6	3	-3	1	-2	4	-7	19	-14
in_an_pl ant6	4	-2	-5	2	-7	-14	3	-11	25	21
in_lead_ ent7	9	-3	3	8	25	15	-7	21	-3	1
in_human _dev8	-2	3	-6	13	2	-6	4	-2	-4	42
in_sec9	1	-14	-6	-7	4	-7	-10	0	25	6
in_healt h10	-3	-3	-1	6	2	-5	4	-2	2	27
sp_artis tic1	7	9	1	5	-6	-7	13	1	12	14
sp_carin g_an2	5	-1	-4	-2	-8	-14	2	-13	29	14
sp_cleri cal3	-2	6	2	-6	6	7	-10	10	-1	-2
sp_cust_ sales4	-3	12	1	3	0	2	-6	3	8	15
sp_eng5	1	-5	2	-10	-1	0	3	-4	8	-19
sp_healt h6	-2	0	-1	5	1	-6	4	-1	8	30
sp_human _dev7	1	7	-2	13	5	-5	13	1	0	41
sp_leade r_enter8	12	0	9	6	31	15	-1	26	1	1
sp_prote ction9	0	-11	-2	-10	2	-4	-8	2	29	4
sp_scien tific10	-2	-7	-2	-5	-3	-9	8	-7	7	-2
sp_hardw are11	6	-8	0	-13	-4	-8	-4	-10	26	-13
us_art1	3	8	-1	6	-8	-8	10	-5	13	16
us_scien tific2	-4	-7	-3	2	3	-6	6	-6	3	16
us_plant s3	5	-4	-6	-3	-6	-16	0	-15	29	14
us_prote ctive4	4	-12	-2	-5	3	-8	-5	-2	24	9
us_mecha nical5	3	-8	-3	-11	-4	-9	-1	-14	23	-7
us_indus trial6	-2	-6	-3	-14	-4	-17	-13	-5	17	3
us_bus_d etail7	-2	4	0	-4	2	-2	-7	3	1	11
us_selli ng8	8	-5	-1	-3	10	-4	-14	11	13	4

us_accom odating9	-1	-8	-8	-11	-5	-16	-13	-7	10	11
us_human itarian10	-3	3	-4	10	-1	-11	7	-5	7	44
us_leadi ng_influ 11	4	-2	-1	4	18	4	0	11	0	13
us_physi cal12	3	-9	-1	-6	0	-6	-4	-1	33	0
iw_achie ve1	24	23	46	55	44	34	62	35	22	30
iw_act2	23	2	15	11	18	-1	11	17	66	15
iw_adv3	28	21	46	35	51	51	30	52	19	6
iw_alt4	24	24	29	44	33	12	42	27	32	64
iw_aut5	69	26	27	32	36	22	29	36	31	16
iw_compa rt6	24	60	33	45	14	35	26	23	14	16
iw_comp7	23	31	40	33	34	58	19	45	6	-1
iw_creat 8	39	19	33	36	35	15	55	27	33	15
iw_cultu re9	31	16	20	24	26	-1	35	26	39	37
iw_growt h10	28	22	41	47	42	26	65	30	24	27
iw_lead1 1	43	13	40	39	64	29	32	52	27	24
iw_part1 2	30	25	47	61	52	35	51	37	22	24
iw_prest ige13	33	23	52	39	52	39	36	66	22	19
iw_qom14	13	40	47	62	32	36	45	28	17	29
iw_recog 15	24	28	63	44	42	42	38	50	20	10
iw_resp1 6	36	12	42	42	63	29	40	47	27	24
iw_secur ity17	8	40	34	42	20	57	25	23	-1	9
iw_soc_i nt18	13	36	36	57	22	25	34	22	23	33
iw_struc ture19	26	44	36	36	27	33	21	35	22	18
iw_team2 0	16	22	40	47	41	22	37	26	29	30
iw_var21	35	23	31	38	33	19	42	27	58	24
iw_wcond 22	24	51	40	49	27	38	32	36	17	22
ca_aut1	100	28	25	28	38	23	34	35	34	19
ca_comfo rt2	28	100	42	52	21	53	34	31	14	24
ca_feed3	25	42	100	57	49	52	53	51	25	23
ca_inter _rel4	28	52	57	100	51	58	61	36	25	41
ca_lead_ resp5	38	21	49	51	100	41	52	52	27	33
ca_pay_f ut6	23	53	52	58	41	100	42	44	8	13
ca_self_ act7	34	34	53	61	52	42	100	36	32	38
ca_statu s8	35	31	51	36	52	44	36	100	24	20
ca_var9	34	14	25	25	27	8	32	24	100	28
ca_alt10	19	24	23	41	33	13	38	20	28	100
mi_auto1	41	7	18	14	23	3	22	22	26	0
mi_achie vemt2	10	11	24	23	18	6	35	8	13	21
mi_activ ity3	13	-1	10	12	18	-1	19	11	32	10

	mi_auto1	mi_achievemt2	mi_activity3	mi_altruism4	mi_pay5	mi_qualityom6	mi_recognition_status7	mi_interpers_rel8
mi_altruism4	3	18	12	29	12	1	25	4	14	42
mi_pay5	3	26	27	25	21	36	8	27	0	1
mi_qualityom6	2	23	25	36	18	20	19	12	11	15
mi_recognition_status7	22	14	32	19	34	21	12	50	14	9
mi_interpers_rel8	6	19	15	24	4	6	11	12	19	14

	mi_auto1	mi_achievemt2	mi_activity3	mi_altruism4	mi_pay5	mi_qualityom6	mi_recognition_status7	mi_interpers_rel8
in_arts1	7	14	3	22	-6	8	0	6
in_work_thing2	6	-4	6	-15	-2	-8	-4	2
in_off_bus3	-6	-9	0	1	11	5	12	6
in_sci_math4	3	0	6	-8	-4	-6	-7	2
in_eng5	6	1	3	-9	-3	-3	-5	5
in_an_plant6	2	0	10	23	-13	2	-7	13
in_lead_ent7	0	-9	-1	-5	17	8	20	0
in_human_dev8	-11	9	2	32	-4	12	-1	3
in_sec9	-3	-3	0	1	0	1	1	1
in_health10	-11	4	6	21	-1	7	-4	3
sp_artistic1	5	6	5	13	-11	0	-4	3
sp_caring_an2	2	-2	11	13	-17	-6	-9	7
sp_clerical3	-7	-14	-1	-8	5	-2	7	-2
sp_cust_sales4	-10	-10	0	8	-1	3	5	1
sp_eng5	4	1	4	-18	3	-6	-2	2
sp_health6	-11	-3	7	20	-6	5	0	3
sp_human_dev7	-10	7	2	31	-3	10	-2	4
sp_leader_enter8	5	-4	2	-7	20	8	25	-1
sp_protection9	-2	-7	4	-3	-5	-7	1	-3
sp_scientific10	-1	0	6	-2	-6	-4	-5	-1
sp_hardware11	2	-4	7	-14	-6	-11	-5	2
us_art1	0	0	2	7	-11	-1	-12	3
us_scientific2	-7	-1	1	6	-3	1	-5	-2
us_plants3	-2	-6	4	9	-18	-5	-14	3
us_protective4	-1	-10	1	-3	-9	-5	-6	-3
us_mechanical5	-2	-6	3	-11	-13	-11	-12	-3
us_industrial6	-2	-8	3	-1	-7	-7	-1	0
us_bus_detail7	-7	-5	-2	1	3	-1	4	-5
us_selling8	-1	-10	2	-10	3	-1	10	3

us_accomodating9	-8	-10	2	4	-9	-6	-6	-3
us_humanitarian10	-14	0	-2	31	-9	5	-10	3
us_leading_influ11	-5	-7	0	-3	4	1	9	-5
us_physical12	-1	-8	3	-7	-11	-8	-4	3
iw_achieve1	25	40	24	34	28	33	26	20
iw_act2	19	7	26	10	3	7	20	18
iw_adv3	27	18	16	8	45	25	44	13
iw_alt4	15	25	22	51	14	29	25	24
iw_aut5	49	15	23	11	18	11	34	19
iw_compart6	15	16	7	26	30	27	18	27
iw_comp7	20	10	8	-3	47	17	39	12
iw_creat8	46	33	27	19	14	15	23	20
iw_culture9	28	16	22	28	3	14	22	15
iw_growth10	28	39	25	27	23	29	21	15
iw_lead11	37	17	23	13	30	20	51	18
iw_part12	34	30	23	28	35	34	32	22
iw_prestige13	34	22	19	14	39	22	60	22
iw_qom14	15	32	14	37	34	45	22	32
iw_recog15	29	27	15	14	41	28	49	22
iw_resp16	35	21	25	20	30	23	44	18
iw_security17	5	18	8	16	42	26	16	17
iw_soc_int18	13	25	17	40	25	33	20	50
iw_structure19	21	13	15	19	37	24	36	25
iw_team20	15	23	26	30	26	32	29	35
iw_var21	37	23	41	23	22	26	26	25
iw_wcond22	20	19	18	27	38	34	33	36
ca_aut1	41	10	13	3	3	2	22	6
ca_comfort2	7	11	-1	18	26	23	14	19
ca_feed3	18	24	10	12	27	25	32	15
ca_inter_rel4	14	23	12	29	25	36	19	24
ca_lead_resp5	23	18	18	12	21	18	34	4
ca_pay_fut6	3	6	-1	1	36	20	21	6
ca_self_act7	22	35	19	25	8	19	12	11
ca_status8	22	8	11	4	27	12	50	12
ca_var9	26	13	32	14	0	11	14	19
ca_alt10	0	21	10	42	1	15	9	14
mi_auto1	100	25	32	15	24	13	41	25
mi_achievemt2	25	100	19	38	26	30	18	29
mi_activity3	32	19	100	13	18	19	24	22

mi_altru ism4	15	38	13	100	20	36	11	37
mi_pay5	24	26	18	20	100	50	45	32
mi_quali tyom6	13	30	19	36	50	100	29	35
mi_recog nition_s tatus7	41	18	24	11	45	29	100	29
mi_inter pers_rel 8	25	29	22	37	32	35	29	100

The FACTOR Procedure
Initial Factor Method: Principal Components

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 73 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	15.3892422	5.7651424	0.2108	0.2108
2	9.6240998	4.2438537	0.1318	0.3426
3	5.3802461	0.7035511	0.0737	0.4164
4	4.6766950	1.6239590	0.0641	0.4804
5	3.0527360	0.4548920	0.0418	0.5222
6	2.5978440	0.2789164	0.0356	0.5578
7	2.3189276	0.0865959	0.0318	0.5896
8	2.2323317	0.2945371	0.0306	0.6202
9	1.9377945	0.1991964	0.0265	0.6467
10	1.7385982	0.0638695	0.0238	0.6705
11	1.6747286	0.0304097	0.0229	0.6935
12	1.6443190	0.4133818	0.0225	0.7160
13	1.2309372	0.0806878	0.0169	0.7329
14	1.1502494	0.1610698	0.0158	0.7486
15	0.9891796	0.0283246	0.0136	0.7622
16	0.9608550	0.1130100	0.0132	0.7753
17	0.8478449	0.0961342	0.0116	0.7869
18	0.7517108	0.0170022	0.0103	0.7972
19	0.7347085	0.0868608	0.0101	0.8073
20	0.6478477	0.0422566	0.0089	0.8162
21	0.6055911	0.0275162	0.0083	0.8245
22	0.5780749	0.0092728	0.0079	0.8324
23	0.5688021	0.0387090	0.0078	0.8402
24	0.5300931	0.0218359	0.0073	0.8474
25	0.5082571	0.0304364	0.0070	0.8544
26	0.4778207	0.0122848	0.0065	0.8610
27	0.4655359	0.0352436	0.0064	0.8673
28	0.4302923	0.0236632	0.0059	0.8732
29	0.4066292	0.0044818	0.0056	0.8788
30	0.4021474	0.0073031	0.0055	0.8843
31	0.3948442	0.0039172	0.0054	0.8897
32	0.3909271	0.0285235	0.0054	0.8951
33	0.3624036	0.0202060	0.0050	0.9000
34	0.3421976	0.0066449	0.0047	0.9047
35	0.3355526	0.0218603	0.0046	0.9093
36	0.3136924	0.0092487	0.0043	0.9136
37	0.3044437	0.0094418	0.0042	0.9178
38	0.2950019	0.0054532	0.0040	0.9218
39	0.2895488	0.0057976	0.0040	0.9258

```
                        The FACTOR Procedure
                Initial Factor Method: Principal Components

        Eigenvalues of the Correlation Matrix: Total = 73  Average = 1

                Eigenvalue    Difference    Proportion    Cumulative

        40      0.2837512     0.0173578       0.0039        0.9297
        41      0.2663934     0.0144677       0.0036        0.9333
        42      0.2519257     0.0090492       0.0035        0.9368
        43      0.2428765     0.0067152       0.0033        0.9401
        44      0.2361613     0.0036113       0.0032        0.9433
        45      0.2325500     0.0092220       0.0032        0.9465
        46      0.2233281     0.0040820       0.0031        0.9496
        47      0.2192460     0.0135067       0.0030        0.9526
        48      0.2057394     0.0043830       0.0028        0.9554
        49      0.2013563     0.0078673       0.0028        0.9582
        50      0.1934890     0.0028525       0.0027        0.9608
        51      0.1906365     0.0053510       0.0026        0.9634
        52      0.1852855     0.0078697       0.0025        0.9660
        53      0.1774158     0.0157460       0.0024        0.9684
        54      0.1616697     0.0050934       0.0022        0.9706
        55      0.1565764     0.0043383       0.0021        0.9728
        56      0.1522380     0.0014011       0.0021        0.9748
        57      0.1508370     0.0074721       0.0021        0.9769
        58      0.1433649     0.0084789       0.0020        0.9789
        59      0.1348860     0.0024686       0.0018        0.9807
        60      0.1324174     0.0052255       0.0018        0.9825
        61      0.1271919     0.0057916       0.0017        0.9843
        62      0.1214003     0.0026086       0.0017        0.9859
        63      0.1187917     0.0054331       0.0016        0.9876
        64      0.1133586     0.0043120       0.0016        0.9891
        65      0.1090466     0.0051499       0.0015        0.9906
        66      0.1038967     0.0033982       0.0014        0.9920
        67      0.1004984     0.0030049       0.0014        0.9934
        68      0.0974935     0.0112488       0.0013        0.9947
        69      0.0862447     0.0050343       0.0012        0.9959
        70      0.0812103     0.0033425       0.0011        0.9970
        71      0.0778679     0.0056072       0.0011        0.9981
        72      0.0722607     0.0064172       0.0010        0.9991
        73      0.0658435                     0.0009        1.0000

         14 factors will be retained by the MINEIGEN criterion.
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The FACTOR Procedure Rotation Method: Varimax   Rotated Factor Pattern

	Factor1		Factor2		Factor3		Factor4		Factor5	
iw_resp16	83	*	-2		-3		18		3	
iw_part12	82	*	-4		-9		8		0	
iw_achieve1	82	*	-7		-12		-8		6	
iw_growth10	81	*	10		-11		-7		6	
iw_lead11	76	*	-6		2		24		1	
iw_creat8	73	*	20		-8		-12		-7	
iw_prestige13	72	*	-11		-2		9		-2	
iw_team20	70	*	5		6		8		5	
iw_var21	69	*	6		2		-6		-8	
iw_recog15	68	*	-1		-5		2		-6	
iw_qom14	66	*	-9		-6		-1		0	
iw_adv3	64	*	2		-9		18		-9	
iw_alt4	62	*	-22		8		-3		32	
iw_soc_int18	56	*	-4		0		-3		5	
iw_culture9	54	*	-9		11		1		8	
sp_eng5	0		89	*	6		12		8	
sp_hardware11	-3		84	*	15		-2		-5	
in_work_thing2	1		79	*	11		-2		-11	
in_eng5	4		73	*	4		2		-5	
in_sci_math4	-1		68	*	-3		0		41	
sp_scientific10	-2		62	*	1		2		58	*
us_mechanical5	-6		62	*	53	*	-7		-2	
us_bus_detail7	-8		1		79	*	30		10	
us_industrial6	-8		20		78	*	8		3	
us_accomodating9	-10		6		76	*	11		9	
us_selling8	2		0		58	*	39		-3	
us_leading_influ11	5		-1		57	*	49	*	16	
us_protective4	-1		26		55	*	3		13	
sp_leader_enter8	14		4		7		83	*	3	
in_lead_ent7	13		-10		7		76	*	-1	
sp_clerical3	-5		25		27		75	*	8	
in_off_bus3	2		0		24		71	*	5	
sp_cust_sales4	-3		8		29		56	*	17	
in_health10	1		3		1		1		83	*
sp_health6	1		6		9		15		82	*
us_scientific2	2		25		39		-3		67	*
us_humanitarian10	1		-21		46	*	7		51	*
iw_compart6	37		-2		-6		-6		-1	
iw_security17	37		-4		-14		0		1	
ca_comfort2	6		-5		0		1		-2	
iw_wcond22	55	*	-5		1		11		-1	
iw_structure19	51	*	-3		7		12		-1	
iw_comp7	46	*	2		-11		13		-7	
sp_artistic1	4		9		7		14		10	
in_arts1	9		-14		-1		-1		4	
us_art1	1		12		37		-6		10	
sp_human_dev7	3		-17		6		38		49	*
in_human_dev8	2		-34		5		32		40	
ca_self_act7	50	*	6		-6		-14		7	
ca_inter_rel4	42		-10		-3		0		5	
ca_pay_fut6	18		-3		-9		11		-5	
ca_feed3	40		3		2		-3		-4	
ca_lead_resp5	50	*	-4		2		17		3	
ca_alt10	26		-26		13		-2		35	
mi_interpers_rel8	15		3		1		-1		-2	
mi_qualityom6	21		-6		-3		6		3	
mi_altruism4	22		-18		2		-7		23	
mi_pay5	18		0		-3		14		-4	
mi_achievemt2	27		3		-7		-12		2	
mi_activity3	26		7		2		-2		1	
in_sec9	-1		24		7		14		16	
sp_protection9	-1		37		12		19		18	
us_physical12	1		32		34		1		0	
sp_caring_an2	-2		28		8		5		33	
in_an_plant6	2		9		6		-2		36	
us_plants3	-4		17		54	*	-8		16	
ca_var9	30		14		14		-12		-9	
mi_recognition_status7	29		-6		2		15		-2	
ca_status8	34		-11		1		13		-1	
ca_aut1	26		2		1		2		-3	
iw_aut5	57	*	-1		-3		4		-2	
mi_auto1	28		9		-3		-5		-11	
iw_act2	36		17		12		-7		-7	

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Rotated Factor Pattern
                         Factor6    Factor7    Factor8    Factor9    Factor10
iw_resp16                   1        -13          8          5         12
iw_part12                  17          3         16         17         -2
iw_achieve1                14          8         21         18         -7
iw_growth10                 9         15         18         13        -11
iw_lead11                   3        -16          7          2         13
iw_creat8                   4         26          6          8        -11
iw_prestige13              17         -1         10          4          7
iw_team20                  14         -9          8         25          3
iw_var21                   16          6          1         17          7
iw_recog15                 29         -1         12          9         -3
iw_qom14                   46 *       10         15         30         -4
iw_adv3                    28         -7         11          1         11
iw_alt4                    10         14         12         23         11
iw_soc_int18               43          5          6         35         -1
iw_culture9                -5         34         -2          7          0
sp_eng5                     0          4          1         -2          5
sp_hardware11              -1         -6          0         -4         24
in_work_thing2             -5        -13         -6          0         24
in_eng5                    -1          3          1          2         12
in_sci_math4               -2         -5         -9         -1         -3
sp_scientific10            -6         12          0         -4         -3
us_mechanical5             -3          5          4         -6         19
us_bus_detail7              3          3          2          1        -12
us_industrial6             -8          1         -6          1          4
us_accomodating9           -6          7         -4         -1          8
us_selling8                -5         -1         -4         -3         15
us_leading_influ11         -4         16          7         -5         15
us_protective4             -3          6          2         -6         52 *
sp_leader_enter8           -7         11          8         -2         15
in_lead_ent7               -3         -6          1          0         18
sp_clerical3                9          4          1         -8        -11
in_off_bus3                11         -3         -9          4         -7
sp_cust_sales4             12         31          3         -3         11
in_health10                -1          1         -3          6          9
sp_health6                  0         11          2          0          7
us_scientific2             -4          3          2         -3          4
us_humanitarian10           3         24          6          7         10
iw_compart6                71 *       12          3         15          0
iw_security17              66 *       -3         11         10         -3
ca_comfort2                63 *        8         42         12        -12
iw_wcond22                 59 *        3          1         21        -10
iw_structure19             54 *      -10         -6         11          5
iw_comp7                   51 *      -11          5         -5          5
sp_artistic1                2         86 *        2         -2          3
in_arts1                    0         80 *       -5          9          1
us_art1                     7         70 *        2         -3         13
sp_human_dev7              -2         50 *       11         11         14
in_human_dev8               1         41 *        1         15         18
ca_self_act7                0         15         63 *       10        -13
ca_inter_rel4              33          2         60 *       23         -2
ca_pay_fut6                49 *      -12         58 *       -4          1
ca_feed3                   21         -2         54 *        9         -4
ca_lead_resp5              -9        -13         52 *        2          7
ca_alt10                    2         12         36         19         12
mi_interpers_rel8          18         -1         -5         59 *        0
mi_qualityom6              16          0         11         58 *        1
mi_altruism4                7         14          7         54 *        2
mi_pay5                    29        -12          3         49 *        0
mi_achievemt2              -5         11         13         46 *       -7
mi_activity3              -11          0         -2         29         -2
in_sec9                    -3          2         -6          3         75 *
sp_protection9             -4         15         -1         -7         72 *
us_physical12              -4         21          1         -8         52 *
sp_caring_an2              -2         23         -2          0         13
in_an_plant6               -2         15         -5          9          9
us_plants3                 -3         15          1          0         15
ca_var9                    -6          2         22         14         31
mi_recognition_status7      3         -7          3         31          2
ca_status8                 11         -2         38         -2          6
ca_aut1                    10          4         24         -8          2
iw_aut5                    27          1         -5         -2          2
mi_auto1                   -8          6         -3         27         -8
iw_act2                    -2        -11         -6          6         35
```

```
Rotated Factor Pattern
                          Factor11      Factor12      Factor13      Factor14
iw_resp16                      -6            19            18             1
iw_part12                      -1             2             8           -14
iw_achieve1                     0            -1            -5           -13
iw_growth10                    -5            -7             2            -8
iw_lead11                      -4            26            28             4
iw_creat8                       0             0            28            -2
iw_prestige13                  -6            52 *          13             1
iw_team20                       6            -2            -8            24
iw_var21                       19             0            27            15
iw_recog15                     -1            43            -3            -6
iw_qom14                        5            -6           -19            -1
iw_adv3                         -6            41             6           -17
iw_alt4                         4           -13             8            32
iw_soc_int18                   18           -12           -11            16
iw_culture9                     5            -1            29            35
sp_eng5                        -3             5            -3            -5
sp_hardware11                  15            -2             0            15
in_work_thing2                  6            -6             7             7
in_eng5                         5            -6             3            -3
in_sci_math4                    7             0             4            -6
sp_scientific10                14             7            -3            -2
us_mechanical5                 13           -10             1            -8
us_bus_detail7                 -8             2            -4             9
us_industrial6                  4             3             1            14
us_accomodating9               10            -4            -3             8
us_selling8                     8             7             9            -6
us_leading_influ11            -10             0             4           -26
us_protective4                  8            -4             0            -7
sp_leader_enter8               -2            17             6           -16
in_lead_ent7                   -6             4             9           -22
sp_clerical3                    5             7            -9            23
in_off_bus3                    -4            -1            -5            14
sp_cust_sales4                 25             1           -16            29
in_health10                    11             0             0            -3
sp_health6                     25             4            -8            14
us_scientific2                  6             1            -3           -23
us_humanitarian10              12           -21            -8             3
iw_compart6                    -1            -3            13             1
iw_security17                  -5             9           -15           -20
ca_comfort2                     1             3            16            14
iw_wcond22                      4            11             6            13
iw_structure19                 -7            15            16            27
iw_comp7                      -10            41             6           -22
sp_artistic1                   21             3            -2            10
in_arts1                        3            -3             7            -1
us_art1                        14            -6             2           -19
sp_human_dev7                   1           -17            -6            13
in_human_dev8                  -7           -22             0             8
ca_self_act7                   -2            -8            11             0
ca_inter_rel4                   4            -8             4            -3
ca_pay_fut6                    -5            23            -1           -14
ca_feed3                        0            31            -3             6
ca_lead_resp5                  -7            17            19            -5
ca_alt10                        2           -20             9            25
mi_interpers_rel8              12             7             7             8
mi_qualityom6                  -3             7            -6            -5
mi_altruism4                    6           -16            -1            12
mi_pay5                       -14            37            -2           -15
mi_achievemt2                  -8             1             2            -4
mi_activity3                   12             9            19             7
in_sec9                         3            -1             1             3
sp_protection9                 15             9            -7            10
us_physical12                  28             3             1           -15
sp_caring_an2                  76 *          -5             1             9
in_an_plant6                   72 *          -9             5             1
us_plants3                     58 *         -13             5           -12
ca_var9                        34             2            32            28
mi_recognition_status7         -7            57 *          20             6
ca_status8                     -8            49 *          18             8
ca_aut1                         5             5            68 *           3
iw_aut5                         2             9            64 *           2
mi_auto1                        3            24            49 *          -4
iw_act2                        36             9            22            39
```

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Printed values are multiplied by 100 and rounded to the nearest integer. Values greater
than 0.45 are flagged by an '*'.

Variance Explained by Each Factor

Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7
10.836460	5.172517	4.485534	3.911148	3.799096	3.688514	3.203894

The FACTOR Procedure
Rotation Method: Varimax

Factor8	Factor9	Factor10	Factor11	Factor12	Factor13	Factor14
2.546475	2.499324	2.481744	2.313036	2.263207	2.074689	1.575497

APPENDIX O

Canonical Correlations: 8 Interest Factors & 8 Need Factors

```
CanCor using 8 Interest and Need Factors

                        The CANCORR Procedure

            Interest Factors              8
            Need Factors                  8
            Observations                714


                  Means and Standard Deviations

                                           Standard
            Variable           Mean        Deviation

            F1TECH          -0.002495       0.965811
            F2OFFICELOW      0.000925       0.955142
            F3HEALTH         0.002300       0.950689
            F4OFFICEHI      -0.001348       0.955553
            F5LIBERAL        0.004044       0.947678
            F6PLANTS        -0.000809       0.931187
            F7SECUR          0.002384       0.927872
            F8SELLING        0.000717       0.896339
            F1LEADING       -0.001742       0.963120
            F2COMFORT       -0.001609       0.944087
            F3SELFACT        0.002610       0.938549
            F4CA            -0.001833       0.927799
            F5HELP          -0.002371       0.918687
            F6STIMUL        -0.001323       0.900826
            F7MI             0.000289       0.869825
            F8AUTON         -0.003306       0.899279
              CanCor using 8 Interest and Need

                      The CANCORR Procedure

          Correlations Among the Original Variables

          Correlations Among the Interest Factors

                F1TECH       F2OFFICELOW      F3HEALTH      F4OFFICEHI

   F1TECH       1.0000         0.0159         -0.0095         0.0003
   F2OFFICELOW  0.0159         1.0000          0.0328         0.0056
   F3HEALTH    -0.0095         0.0328          1.0000         0.0097
   F4OFFICEHI   0.0003         0.0056          0.0097         1.0000
   F5LIBERAL   -0.0161         0.0113          0.0108         0.0186
   F6PLANTS     0.0324         0.0144          0.0191         0.0081
   F7SECUR      0.0137         0.0174         -0.0333         0.0387
   F8SELLING    0.0018        -0.0119          0.0500         0.0149

          Correlations Among the Interest Factors

                F5LIBERAL      F6PLANTS        F7SECUR       F8SELLING

   F1TECH      -0.0161         0.0324          0.0137         0.0018
   F2OFFICELOW  0.0113         0.0144          0.0174        -0.0119
   F3HEALTH     0.0108         0.0191         -0.0333         0.0500
   F4OFFICEHI   0.0186         0.0081          0.0387         0.0149
   F5LIBERAL    1.0000         0.0125          0.0308         0.0109
   F6PLANTS     0.0125         1.0000          0.0206        -0.0047
   F7SECUR      0.0308         0.0206          1.0000         0.0256
   F8SELLING    0.0109        -0.0047          0.0256         1.0000

             Correlations Among the Need Factors

                F1LEADING      F2COMFORT       F3SELFACT        F4CA

   F1LEADING    1.0000         0.0248          0.0357         0.0179
   F2COMFORT    0.0248         1.0000          0.0287         0.0345
```

```
F3SELFACT           0.0357          0.0287          1.0000          0.0212
F4CA                0.0179          0.0345          0.0212          1.0000
F5HELP             -0.0047          0.0042          0.0385          0.0110
F6STIMUL            0.0214          0.0027          0.0155         -0.0262
F7MI                0.0075          0.0641          0.0317          0.0114
F8AUTON             0.0329         -0.0035          0.0172          0.0071
```

<center>Correlations Among the Need Factors</center>

```
                    F5HELP        F6STIMUL           F7MI         F8AUTON

F1LEADING          -0.0047          0.0214          0.0075          0.0329
F2COMFORT           0.0042          0.0027          0.0641         -0.0035
F3SELFACT           0.0385          0.0155          0.0317          0.0172
```
<center>CanCor using 8 Interest and Need</center>

<center>The CANCORR Procedure</center>

<center>Correlations Among the Original Variables</center>

<center>Correlations Among the Need Factors</center>

```
                    F5HELP        F6STIMUL           F7MI         F8AUTON

F4CA                0.0110         -0.0262          0.0114          0.0071
F5HELP              1.0000          0.0701          0.0375         -0.0037
F6STIMUL            0.0701          1.0000          0.0177          0.0723
F7MI                0.0375          0.0177          1.0000         -0.0386
F8AUTON            -0.0037          0.0723         -0.0386          1.0000
```

<center>Correlations Between the Interest Factors and the Need Factors</center>

```
                  F1LEADING       F2COMFORT       F3SELFACT            F4CA

F1TECH             -0.0493         -0.0544          0.0770         -0.0252
F2OFFICELOW        -0.0936         -0.0702         -0.2086         -0.0210
F3HEALTH            0.4109          0.0237         -0.1166          0.0235
F4OFFICEHI         -0.0666         -0.0520          0.0526          0.0035
F5LIBERAL          -0.1932          0.0688          0.2005          0.0107
F6PLANTS            0.1021         -0.1008         -0.0983         -0.0436
F7SECUR            -0.1502          0.0224         -0.0232         -0.0642
F8SELLING          -0.1022          0.1129         -0.1544         -0.0564
```

<center>Correlations Between the Interest Factors and the Need Factors</center>

```
                    F5HELP        F6STIMUL           F7MI         F8AUTON

F1TECH             -0.3149          0.2303         -0.0637          0.0379
F2OFFICELOW         0.1265          0.1194         -0.0540         -0.0369
F3HEALTH           -0.0068         -0.0707         -0.0258         -0.0143
F4OFFICEHI          0.3073         -0.1040          0.0473         -0.0903
F5LIBERAL           0.2147         -0.0207          0.0362          0.1339
F6PLANTS            0.0638          0.2617         -0.0715         -0.0675
F7SECUR             0.1195          0.3132          0.0062          0.0182
F8SELLING           0.1930          0.0426          0.0367         -0.1017
```
<center>CanCor using 8 Interest and Need Factors</center>
<center>The CANCORR Procedure</center>

<center>Canonical Correlation Analysis</center>

```
                                   Adjusted     Approximate        Squared
                    Canonical     Canonical        Standard      Canonical
                  Correlation   Correlation           Error    Correlation

              1      0.620858      0.605353        0.023015       0.385465
              2      0.562870      0.551560        0.025585       0.316823
              3      0.513101      0.511967        0.027591       0.263273
              4      0.243259      0.214503        0.035234       0.059175
              5      0.190411      0.176913        0.036092       0.036256
              6      0.120884             .        0.036903       0.014613
              7      0.031424             .        0.037413       0.000987
              8      0.001209             .        0.037450       0.000001
```

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```
     Test of H0: The canonical correlations in the current row and all
                Eigenvalues of Inv(E)*H                    that follow are zero
                = CanRsq/(1-CanRsq)
                                                    Likelihood Approximate
        Eigenvalue Difference Proportion Cumulative    Ratio     F Value Num DF Den DF Pr > F

    1      0.6272     0.1635     0.4009     0.4009 0.27607944      15.75      64 4032.5 <.0001
    2      0.4637     0.1064     0.2964     0.6973 0.44924941      12.38      49 3553.1 <.0001
    3      0.3574     0.2945     0.2284     0.9256 0.65758870       8.56      36 3076.7 <.0001
    4      0.0629     0.0253     0.0402     0.9658 0.89258064       3.24      25 2605.6 <.0001
    5      0.0376     0.0228     0.0240     0.9899 0.94872135       2.33      16 2145.3 0.0020
    6      0.0148     0.0138     0.0095     0.9994 0.98441268       1.23       9 1711.1 0.2711
    7      0.0010     0.0010     0.0006     1.0000 0.99901107       0.17       4   1408 0.9517
    8      0.0000                0.0000     1.0000 0.99999854       0.00       1    705 0.9744




                     Multivariate Statistics and F Approximations

                         S=8     M=-0.5    N=348

        Statistic                       Value    F Value    Num DF    Den DF    Pr > F

        Wilks' Lambda                0.27607944     15.75        64    4032.5    <.0001
        Pillai's Trace               1.07659408     13.70        64      5640    <.0001
        Hotelling-Lawley Trace       1.56468756     17.03        64    2687.3    <.0001
        Roy's Greatest Root          0.62724686     55.28         8       705    <.0001

            NOTE: F Statistic for Roy's Greatest Root is an upper bound.
                      CanCor using 8 Interest and Need Factors

                            The CANCORR Procedure

                        Canonical Correlation Analysis

              Raw Canonical Coefficients for the Interest Factors

                         inter1           inter2           inter3           inter4

    F1TECH         -0.406121852      0.5782181971     -0.261656047      0.0432141593
    F2OFFICELOW     0.2050542594     0.1981286938      0.453973289     -0.328607475
    F3HEALTH       -0.465969611     -0.496272163       0.3830999715     0.3931263265
    F4OFFICEHI      0.4723688421     -0.296100443      0.097756624      0.2562350244
    F5LIBERAL       0.5060660226     0.0279580954     -0.405421188      0.5071207843
    F6PLANTS       -0.110512592      0.2692548423      0.5580938113     0.4798099948
    F7SECUR         0.2053233346     0.544713583       0.2555999682     0.321519698
    F8SELLING       0.3882153852     0.0456540809      0.3966972823    -0.494172242

              Raw Canonical Coefficients for the Interest Factors

                         inter5           inter6           inter7           inter8

    F1TECH         -0.114124854      0.1978547956     -0.36749283       0.5632197144
    F2OFFICELOW    -0.253449384     -0.734766811     -0.081134129      0.304033528
    F3HEALTH        0.3874856844    -0.103324219     -0.038406633      0.4307896663
    F4OFFICEHI     -0.59106638       0.3896234454      0.0620602843     0.454449988
    F5LIBERAL       0.3197584108    -0.357622705      -0.45363015      0.0364994922
    F6PLANTS       -0.291787451      0.1099854538     -0.374924568     -0.540061163
    F7SECUR         0.397084918      0.0959061113      0.6856736598     0.151504883
    F8SELLING       0.4829399023     0.4785919188     -0.477546561      0.0682775434

                Raw Canonical Coefficients for the Need Factors

                         needs1           needs2           needs3           needs4

    F1LEADING      -0.632036271     -0.533626259      0.3800029827     0.4720042738
    F2COMFORT       0.1085143238    -0.067710393     -0.078278891     -0.198932454
    F3SELFACT       0.0779191882     0.0379727025     -0.720603079      0.630185259
    F4CA           -0.05151393      -0.105491101     -0.096836262      0.0192541276
    F5HELP          0.8336737455    -0.34203885       0.4481734389     0.4097739842
    F6STIMUL       -0.131041191      0.8996861323      0.4118085913     0.397888232
    F7MI            0.124296318     -0.114179818     -0.121561279     -0.084825847
    F8AUTON         0.0080286428     0.0233797799     -0.374171293      0.2624938216

                Raw Canonical Coefficients for the Need Factors

                         needs5           needs6           needs7           needs8

    F1LEADING       0.1382135        0.0899927463      0.0401882883    -0.041378936
    F2COMFORT       0.9228617745     0.2696931925     -0.322207798      0.1974060216
    F3SELFACT      -0.146873431      0.4045094135     -0.177818099      0.0182018918
                      CanCor using 8 Interest and Need Factors

                            The CANCORR Procedure

                        Canonical Correlation Analysis
```

```
                   Raw Canonical Coefficients for the Need Factors

                        needs5            needs6            needs7            needs8

        F4CA        -0.136514131      -0.272638964      0.1365197428      1.0148552919
        F5HELP       0.0079067983     -0.097883351     -0.060265956      0.0108132669
        F6STIMUL     0.1632636229      0.1240530468      0.1164182575      0.1920187415
        F7MI         0.1505129389      0.3415975557      1.0674759772     -0.058096172
        F8AUTON      0.4167971818     -0.862898096      0.2319589187     -0.255270001
                       CanCor using 8 Interest and Need Factors

                              The CANCORR Procedure

                          Canonical Correlation Analysis

                  Standardized Canonical Coefficients for the Interest Factors

                  inter1    inter2    inter3    inter4    inter5    inter6    inter7    inter8

    F1TECH       -0.3922    0.5584   -0.2527    0.0417   -0.1102    0.1911   -0.3549    0.5440
    F2OFFICELOW   0.1959    0.1892    0.4336   -0.3139   -0.2421   -0.7018   -0.0775    0.2904
    F3HEALTH     -0.4430   -0.4718    0.3642    0.3737    0.3684   -0.0982   -0.0365    0.4095
    F4OFFICEHI    0.4514   -0.2829    0.0934    0.2448   -0.5648    0.3723    0.0593    0.4343
    F5LIBERAL     0.4796    0.0265   -0.3842    0.4806    0.3030   -0.3390   -0.4299    0.0346
    F6PLANTS     -0.1029    0.2507    0.5197    0.4468   -0.2717    0.1024   -0.3491   -0.5029
    F7SECUR       0.1905    0.5054    0.2372    0.2983    0.3684    0.0890    0.6362    0.1406
    F8SELLING     0.3480    0.0409    0.3556   -0.4429    0.4329    0.4290   -0.4280    0.0612

                  Standardized Canonical Coefficients for the Need Factors

                  needs1    needs2    needs3    needs4    needs5    needs6    needs7    needs8

    F1LEADING    -0.6087   -0.5139    0.3660    0.4546    0.1331    0.0867    0.0387   -0.0399
    F2COMFORT     0.1024   -0.0639   -0.0739   -0.1878    0.8713    0.2546   -0.3042    0.1864
    F3SELFACT     0.0731    0.0356   -0.6763    0.5915   -0.1378    0.3797   -0.1669    0.0171
    F4CA         -0.0478   -0.0979   -0.0898    0.0179   -0.1267   -0.2530    0.1267    0.9416
    F5HELP        0.7659   -0.3142    0.4117    0.3765    0.0073   -0.0899   -0.0554    0.0099
    F6STIMUL     -0.1180    0.8105    0.3710    0.3584    0.1471    0.1118    0.1049    0.1730
    F7MI          0.1081   -0.0993   -0.1057   -0.0738    0.1309    0.2971    0.9285   -0.0505
    F8AUTON       0.0072    0.0210   -0.3365    0.2361    0.3748   -0.7760    0.2086   -0.2296
                       CanCor using 8 Interest and Need Factors

                              The CANCORR Procedure

                              Canonical Structure

              Correlations Between the Interest Factors and Their Canonical Variables

                  inter1    inter2    inter3    inter4    inter5    inter6    inter7    inter8

    F1TECH       -0.3926    0.5806   -0.2223    0.0433   -0.1257    0.1918   -0.3522    0.5300
    F2OFFICELOW   0.1808    0.1933    0.4451   -0.2772   -0.2341   -0.7058   -0.0777    0.3098
    F3HEALTH     -0.4141   -0.4834    0.3974    0.3471    0.3635   -0.1027   -0.0890    0.4073
    F4OFFICEHI    0.4687   -0.2636    0.1109    0.2642   -0.5385    0.3718    0.0658    0.4430
    F5LIBERAL     0.5001    0.0284   -0.3518    0.4949    0.3083   -0.3354   -0.4138    0.0403
    F6PLANTS     -0.1059    0.2708    0.5239    0.4670   -0.2670    0.0952   -0.3523   -0.4667
    F7SECUR       0.2423    0.5282    0.2407    0.3032    0.3434    0.0997    0.6021    0.1485
    F8SELLING     0.3401    0.0239    0.3690   -0.4060    0.4596    0.4364   -0.4155    0.0920

              Correlations Between the Need Factors and Their Canonical Variables

                  needs1    needs2    needs3    needs4    needs5    needs6    needs7    needs8

    F1LEADING    -0.6095   -0.4972    0.3326    0.4845    0.1640    0.0815    0.0438   -0.0220
    F2COMFORT     0.0976   -0.0846   -0.0902   -0.1620    0.8737    0.2807   -0.2448    0.2165
    F3SELFACT     0.0845    0.0111   -0.6548    0.6244   -0.0976    0.3791   -0.1390    0.0385
    F4CA         -0.0408   -0.1342   -0.1090    0.0277   -0.0967   -0.2406    0.1220    0.9410
    F5HELP        0.7672   -0.2588    0.4060    0.4180    0.0174   -0.0556   -0.0204    0.0330
    F6STIMUL     -0.0723    0.7801    0.3731    0.4185    0.1833    0.0697    0.1266    0.1314
    F7MI          0.1383   -0.1055   -0.0952   -0.0521    0.1704    0.3518    0.8972   -0.0153
    F8AUTON      -0.0278    0.0678   -0.3071    0.2893    0.3784   -0.7724    0.1809   -0.2101

     Correlations Between the Interest Factors and the Canonical Variables of the Need Factors

                  needs1    needs2    needs3    needs4    needs5    needs6    needs7    needs8

    F1TECH       -0.2437    0.3268   -0.1141    0.0105   -0.0239    0.0232   -0.0111    0.0006
    F2OFFICELOW   0.1123    0.1088    0.2284   -0.0674   -0.0446   -0.0853   -0.0024    0.0004
    F3HEALTH     -0.2571   -0.2721    0.2039    0.0844    0.0692   -0.0124   -0.0028    0.0005
    F4OFFICEHI    0.2910   -0.1484    0.0569    0.0643   -0.1025    0.0449    0.0021    0.0005
    F5LIBERAL     0.3105    0.0160   -0.1805    0.1204    0.0587   -0.0405   -0.0130    0.0000
    F6PLANTS     -0.0679    0.1524    0.2688    0.1136   -0.0508    0.0115   -0.0111   -0.0006
    F7SECUR       0.1504    0.2973    0.1235    0.0737    0.0654    0.0120    0.0189    0.0002
    F8SELLING     0.2111    0.0135    0.1893   -0.0988    0.0875    0.0527   -0.0131    0.0001
                       CanCor using 8 Interest and Need Factors
```

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                        The CANCORR Procedure

                         Canonical Structure

Correlations Between the Need Factors and the Canonical Variables of the Interest Factors

             inter1     inter2     inter3     inter4     inter5     inter6     inter7     inter8

F1LEADING   -0.3784    -0.2799     0.1706     0.1179     0.0312     0.0099     0.0014    -0.0000
F2COMFORT    0.0606    -0.0476    -0.0463    -0.0394     0.1664     0.0339    -0.0077     0.0003
F3SELFACT    0.0525     0.0062    -0.3360     0.1519    -0.0186     0.0458    -0.0044     0.0000
F4CA        -0.0253    -0.0755    -0.0559     0.0067    -0.0184    -0.0291     0.0038     0.0011
F5HELP       0.4763    -0.1457     0.2083     0.1017     0.0033    -0.0067    -0.0006     0.0000
F6STIMUL    -0.0449     0.4391     0.1914     0.1018     0.0349     0.0084     0.0040     0.0002
F7MI         0.0859    -0.0594    -0.0488    -0.0127     0.0324     0.0425     0.0282    -0.0000
F8AUTON     -0.0173     0.0382    -0.1576     0.0704     0.0720    -0.0934     0.0057    -0.0003
                   CanCor using 8 Interest and Need Factors

                        The CANCORR Procedure

                    Canonical Redundancy Analysis

              Raw Variance of the Interest Factors Explained by
                         Their Own                    The Opposite
                    Canonical Variables             Canonical Variables
     Canonical
      Variable                Cumulative     Canonical                   Cumulative
       Number    Proportion   Proportion     R-Square    Proportion      Proportion

          1        0.1280       0.1280        0.3855       0.0493          0.0493
          2        0.1309       0.2588        0.3168       0.0415          0.0908
          3        0.1254       0.3842        0.2633       0.0330          0.1238
          4        0.1220       0.5062        0.0592       0.0072          0.1310
          5        0.1223       0.6285        0.0363       0.0044          0.1355
          6        0.1262       0.7547        0.0146       0.0018          0.1373
          7        0.1191       0.8738        0.0010       0.0001          0.1374
          8        0.1262       1.0000        0.0000       0.0000          0.1374


                Raw Variance of the Need Factors Explained by
                         Their Own                    The Opposite
                    Canonical Variables             Canonical Variables
     Canonical
      Variable                Cumulative     Canonical                   Cumulative
       Number    Proportion   Proportion     R-Square    Proportion      Proportion

          1        0.1293       0.1293        0.3855       0.0498          0.0498
          2        0.1200       0.2493        0.3168       0.0380          0.0879
          3        0.1228       0.3722        0.2633       0.0323          0.1202
          4        0.1393       0.5115        0.0592       0.0082          0.1284
          5        0.1308       0.6423        0.0363       0.0047          0.1332
          6        0.1232       0.7655        0.0146       0.0018          0.1350
          7        0.1082       0.8737        0.0010       0.0001          0.1351
          8        0.1263       1.0000        0.0000       0.0000          0.1351
                   CanCor using 8 Interest and Need Factors

                        The CANCORR Procedure

                    Canonical Redundancy Analysis

           Standardized Variance of the Interest Factors Explained by
                         Their Own                    The Opposite
                    Canonical Variables             Canonical Variables
     Canonical
      Variable                Cumulative     Canonical                   Cumulative
       Number    Proportion   Proportion     R-Square    Proportion      Proportion

          1        0.1268       0.1268        0.3855       0.0489          0.0489
          2        0.1289       0.2557        0.3168       0.0408          0.0897
          3        0.1263       0.3820        0.2633       0.0332          0.1230
          4        0.1236       0.5056        0.0592       0.0073          0.1303
          5        0.1235       0.6291        0.0363       0.0045          0.1347
          6        0.1257       0.7548        0.0146       0.0018          0.1366
          7        0.1216       0.8764        0.0010       0.0001          0.1367
          8        0.1236       1.0000        0.0000       0.0000          0.1367


            Standardized Variance of the Need Factors Explained by
                         Their Own                    The Opposite
                    Canonical Variables             Canonical Variables
     Canonical
      Variable                Cumulative     Canonical                   Cumulative
       Number    Proportion   Proportion     R-Square    Proportion      Proportion

          1        0.1254       0.1254        0.3855       0.0484          0.0484
```

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2       0.1205      0.2459      0.3168      0.0382      0.0865
3       0.1208      0.3668      0.2633      0.0318      0.1183
4       0.1360      0.5028      0.0592      0.0080      0.1264
5       0.1269      0.6297      0.0363      0.0046      0.1310
6       0.1269      0.7566      0.0146      0.0019      0.1328
7       0.1188      0.8754      0.0010      0.0001      0.1330
8       0.1246      1.0000      0.0000      0.0000      0.1330
```

CanCor using 8 Interest and Need Factors

The CANCORR Procedure

Canonical Redundancy Analysis

Squared Multiple Correlations Between the Interest Factors
and the First M Canonical Variables of the Need Factors

M	1	2	3	4	5	6	7	8
F1TECH	0.0594	0.1662	0.1792	0.1793	0.1799	0.1804	0.1806	0.1806
F2OFFICELOW	0.0126	0.0244	0.0766	0.0811	0.0831	0.0904	0.0904	0.0904
F3HEALTH	0.0661	0.1401	0.1817	0.1888	0.1936	0.1938	0.1938	0.1938
F4OFFICEHI	0.0847	0.1067	0.1099	0.1140	0.1246	0.1266	0.1266	0.1266
F5LIBERAL	0.0964	0.0967	0.1293	0.1437	0.1472	0.1488	0.1490	0.1490
F6PLANTS	0.0046	0.0278	0.1001	0.1130	0.1156	0.1157	0.1158	0.1158
F7SECUR	0.0226	0.1110	0.1263	0.1317	0.1360	0.1361	0.1365	0.1365
F8SELLING	0.0446	0.0448	0.0806	0.0904	0.0980	0.1008	0.1010	0.1010

Squared Multiple Correlations Between the Need Factors and
the First M Canonical Variables of the Interest Factors

M	1	2	3	4	5	6	7	8
F1LEADING	0.1432	0.2215	0.2506	0.2645	0.2655	0.2656	0.2656	0.2656
F2COMFORT	0.0037	0.0059	0.0081	0.0096	0.0373	0.0385	0.0385	0.0385
F3SELFACT	0.0028	0.0028	0.1157	0.1388	0.1391	0.1412	0.1412	0.1412
F4CA	0.0006	0.0063	0.0095	0.0095	0.0099	0.0107	0.0107	0.0107
F5HELP	0.2269	0.2481	0.2915	0.3018	0.3018	0.3019	0.3019	0.3019
F6STIMUL	0.0020	0.1948	0.2315	0.2419	0.2431	0.2431	0.2432	0.2432
F7MI	0.0074	0.0109	0.0133	0.0134	0.0145	0.0163	0.0171	0.0171
F8AUTON	0.0003	0.0018	0.0266	0.0315	0.0367	0.0454	0.0455	0.0455

Canonical Correlations: 11 CareerOp-Work Activity Preference Scales & 5 Need Factors

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The CANCORR Procedure
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```
                    Spetz_Interest_Scales          11
                    IWRN_5_Factors                  5
                    Observations                  721
```

```
                    Means and Standard Deviations

                                        Standard
            Variable            Mean    Deviation   Label

            sp_artistic1      2.808928   0.772598   sp_artistic1
            sp_caring_an2     2.549997   0.830205   sp_caring_an2
            sp_clerical3      2.292857   0.728637   sp_clerical3
            sp_cust_sales4    2.447328   0.683759   sp_cust_sales4
            sp_eng5           2.769184   0.880877   sp_eng5
            sp_hardware11     2.579098   0.931017   sp_hardware11
            sp_health6        2.482573   0.845465   sp_health6
            sp_human_dev7     2.879180   0.747604   sp_human_dev7
            sp_leader_enter8  2.844554   0.774971   sp_leader_enter8
            sp_protection9    2.661973   0.750126   sp_protection9
            sp_scientific10   2.588040   0.866244   sp_scientific10
            IW1_LEADERSHIP    0.009099   0.946168
            IW2_WORKENV      -0.010302   0.929331
            IW3_SELFACT       0.009607   0.896726
            IW4_STIMUL       -0.019367   0.894570
            IW5_HELPING       0.008187   0.855942
         CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

                    The CANCORR Procedure

            Correlations Among the Original Variables

            Correlations Among the Spetz_Interest_Scales

                                     sp_caring_                        sp_cust_
                   sp_artistic1          an2      sp_clerical3          sales4

   sp_artistic1        1.0000          0.4321        0.2266            0.4991
   sp_caring_an2       0.4321          1.0000        0.2033            0.4502
   sp_clerical3        0.2266          0.2033        1.0000            0.6729
   sp_cust_sales4      0.4991          0.4502        0.6729            1.0000
   sp_eng5             0.1288          0.2871        0.3279            0.1576
   sp_hardware11       0.0835          0.4180        0.2544            0.2129
   sp_health6          0.3145          0.5286        0.2881            0.4583

   sp_human_dev7       0.5173          0.3207        0.3161            0.5285
   sp_leader_enter8    0.2335          0.0691        0.6070            0.4517
   sp_protection9      0.3006          0.4647        0.2745            0.4295
   sp_scientific10     0.2492          0.4989        0.2441            0.2154

            Correlations Among the Spetz_Interest_Scales

                                                                  sp_human_
                   sp_eng5      sp_hardware11     sp_health6          dev7

   sp_artistic1        0.1288        0.0835          0.3145           0.5173
   sp_caring_an2       0.2871        0.4180          0.5286           0.3207
   sp_clerical3        0.3279        0.2544          0.2881           0.3161
   sp_cust_sales4      0.1576        0.2129          0.4583           0.5285
   sp_eng5             1.0000        0.7684          0.1224          -0.0424
   sp_hardware11       0.7684        1.0000          0.0909          -0.1158
   sp_health6          0.1224        0.0909          1.0000           0.5270
   sp_human_dev7      -0.0424       -0.1158          0.5270           1.0000
   sp_leader_enter8    0.1912        0.0192          0.1717           0.3720
   sp_protection9      0.4296        0.5132          0.3550           0.2953
   sp_scientific10     0.6422        0.4704          0.5444           0.2503

            Correlations Among the Spetz_Interest_Scales

                       sp_leader_
                         enter8     sp_protection9    sp_scientific10

   sp_artistic1           0.2335        0.3006            0.2492
   sp_caring_an2          0.0691        0.4647            0.4989
   sp_clerical3           0.6070        0.2745            0.2441
   sp_cust_sales4         0.4517        0.4295            0.2154
```

```
sp_eng5                        0.1912              0.4296              0.6422
sp_hardware11                  0.0192              0.5132              0.4704
sp_health6                     0.1717              0.3550              0.5444
           CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS
```

Correlations Among the Original Variables

Correlations Among the Spetz_Interest_Scales

	sp_leader_enter8	sp_protection9	sp_scientific10
sp_human_dev7	0.3720	0.2953	0.2503
sp_leader_enter8	1.0000	0.3136	0.0973
sp_protection9	0.3136	1.0000	0.3998
sp_scientific10	0.0973	0.3998	1.0000

Correlations Among the IWRN_5_Factors

	IW1_LEADERSHIP	IW2_WORKENV	IW3_SELFACT	IW4_STIMUL	IW5_HELPING
IW1_LEADERSHIP	1.0000	0.0449	0.0395	0.0487	-0.0149
IW2_WORKENV	0.0449	1.0000	0.0449	-0.0082	0.0790
IW3_SELFACT	0.0395	0.0449	1.0000	0.0296	0.0805
IW4_STIMUL	0.0487	-0.0082	0.0296	1.0000	0.0550
IW5_HELPING	-0.0149	0.0790	0.0805	0.0550	1.0000

Correlations Between the Spetz_Interest_Scales and the IWRN_5_Factors

	IW1_LEADERSHIP	IW2_WORKENV	IW3_SELFACT	IW4_STIMUL	IW5_HELPING
sp_artistic1	-0.1988	0.0489	0.1997	0.1688	0.0442
sp_caring_an2	-0.2205	-0.0285	0.0307	0.2295	0.0996
sp_clerical3	0.0890	0.0129	-0.2256	0.0951	0.0416
sp_cust_sales4	-0.0663	0.0613	-0.1523	0.1724	0.1909
sp_eng5	0.0237	-0.0480	0.0246	0.0297	-0.1291
sp_hardware11	-0.0441	-0.0835	-0.0678	0.1696	-0.1043
sp_health6	-0.1185	-0.0374	-0.0079	0.1162	0.2531
sp_human_dev7	-0.1350	-0.0101	0.1202	0.0811	0.2663
sp_leader_enter8	0.3908	-0.0803	-0.0686	0.0625	0.0437
sp_protection9	0.0312	-0.1187	-0.1105	0.1908	0.0409
sp_scientific10	-0.1220	-0.0851	0.0866	0.0499	-0.0077

```
           CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS
```

Canonical Correlation Analysis

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation
1	0.609066	0.597353	0.023443	0.370961
2	0.454714	0.437920	0.029562	0.206765
3	0.338171	.	0.033006	0.114360
4	0.313885	.	0.033596	0.098524
5	0.166587	0.148956	0.036234	0.027751

Test of H0: The canonical correlations in the current row and all that follow are zero

Eigenvalues of Inv(E)*H
= CanRsq/(1-CanRsq)

	Eigenvalue	Difference	Proportion	Cumulative	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.5897	0.3291	0.5278	0.5278	0.38731877	13.51	55	3266.9	<.0001
2	0.2607	0.1315	0.2333	0.7611	0.61573132	9.14	40	2678.9	<.0001
3	0.1291	0.0198	0.1156	0.8766	0.77622768	6.93	27	2065.4	<.0001
4	0.1093	0.0807	0.0978	0.9745	0.87645927	6.03	16	1416	<.0001
5	0.0285		0.0255	1.0000	0.97224886	2.89	7	709	0.0055

Multivariate Statistics and F Approximations

S=5   M=2.5   N=351.5

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.38731877	13.51	55	3266.9	<.0001
Pillai's Trace	0.81836047	12.61	55	3545	<.0001
Hotelling-Lawley Trace	1.11734860	14.29	55	2346.6	<.0001
Roy's Greatest Root	0.58972755	38.01	11	709	<.0001

NOTE: F Statistic for Roy's Greatest Root is an upper bound.
CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Correlation Analysis

Raw Canonical Coefficients for the Spetz_Interest_Scales

		sp_inter1	sp_inter2	sp_inter3
sp_artistic1	sp_artistic1	-0.519916886	-0.580831995	-0.432632686
sp_caring_an2	sp_caring_an2	-0.296707165	0.1364957475	-0.119702544
sp_clerical3	sp_clerical3	-0.052784317	0.5910664018	-1.03806298
sp_cust_sales4	sp_cust_sales4	-0.057926523	0.8145081045	0.2439428036
sp_eng5	sp_eng5	-0.162162845	-0.483090505	0.2768103003
sp_hardware11	sp_hardware11	0.0794274477	0.1959998915	-0.149917723
sp_health6	sp_health6	0.1346965417	0.3951965615	0.6444562196
sp_human_dev7	sp_human_dev7	-0.596273127	-0.062250931	0.9136876321
sp_leader_enter8	sp_leader_enter8	1.1516107641	-0.53988153	0.6279526934
sp_protection9	sp_protection9	0.3117557712	0.4269061232	-0.368710209
sp_scientific10	sp_scientific10	-0.059337703	-0.366425979	-0.240336559

Raw Canonical Coefficients for the Spetz_Interest_Scales

		sp_inter4	sp_inter5
sp_artistic1	sp_artistic1	0.5721784709	0.752559202
sp_caring_an2	sp_caring_an2	0.3357354871	0.2227033345
sp_clerical3	sp_clerical3	-0.291824413	-0.398724621
sp_cust_sales4	sp_cust_sales4	-0.814385823	0.8776401001
sp_eng5	sp_eng5	-0.949328286	0.5756791535
sp_hardware11	sp_hardware11	1.0916745765	-0.203130977
sp_health6	sp_health6	0.0779398626	0.0929688933
sp_human_dev7	sp_human_dev7	0.0160431005	-0.534892154
sp_leader_enter8	sp_leader_enter8	0.8247524153	0.4639009431
sp_protection9	sp_protection9	0.2431626464	-0.660584407
sp_scientific10	sp_scientific10	0.1331085366	-0.84596301

Raw Canonical Coefficients for the IWRN_5_Factors

	iw51	iw52	iw53	iw54	iw55
IW1_LEADERSHIP	0.9602242449	-0.214852766	0.2435493477	0.0901689122	0.29743867
IW2_WORKENV	-0.213942763	0.0779780508	-0.195971454	-0.530413838	0.8932635648
IW3_SELFACT	-0.436954223	-0.87055501	0.4170031413	0.3087603363	0.1954874055
IW4_STIMUL	-0.128852537	0.3981169947	-0.254158636	0.9081848714	0.4393059652
IW5_HELPING	-0.078103929	0.6080449186	1.0026173111	-0.073934887	-0.005895005

The CANCORR Procedure

Canonical Correlation Analysis

Standardized Canonical Coefficients for the Spetz_Interest_Scales

		sp_inter1	sp_inter2	sp_inter3	sp_inter4	sp_inter5
sp_artistic1	sp_artistic1	-0.4017	-0.4487	-0.3343	0.4421	0.5814
sp_caring_an2	sp_caring_an2	-0.2463	0.1133	-0.0994	0.2787	0.1849
sp_clerical3	sp_clerical3	-0.0385	0.4307	-0.7564	-0.2126	-0.2905
sp_cust_sales4	sp_cust_sales4	-0.0396	0.5569	0.1668	-0.5568	0.6001
sp_eng5	sp_eng5	-0.1428	-0.4255	0.2438	-0.8362	0.5071
sp_hardware11	sp_hardware11	0.0739	0.1825	-0.1396	1.0164	-0.1891
sp_health6	sp_health6	0.1139	0.3341	0.5449	0.0659	0.0786
sp_human_dev7	sp_human_dev7	-0.4458	-0.0465	0.6831	0.0120	-0.3999
sp_leader_enter8	sp_leader_enter8	0.8925	-0.4184	0.4866	0.6392	0.3595
sp_protection9	sp_protection9	0.2339	0.3202	-0.2766	0.1824	-0.4955
sp_scientific10	sp_scientific10	-0.0514	-0.3174	-0.2082	0.1153	-0.7328

Standardized Canonical Coefficients for the IWRN_5_Factors

	iw51	iw52	iw53	iw54	iw55
IW1_LEADERSHIP	0.9085	-0.2033	0.2304	0.0853	0.2814
IW2_WORKENV	-0.1988	0.0725	-0.1821	-0.4929	0.8301
IW3_SELFACT	-0.3918	-0.7806	0.3739	0.2769	0.1753
IW4_STIMUL	-0.1153	0.3561	-0.2274	0.8124	0.3930
IW5_HELPING	-0.0669	0.5205	0.8582	-0.0633	-0.0050

The CANCORR Procedure

Canonical Structure

Correlations Between the Spetz_Interest_Scales and Their Canonical Variables

		sp_inter1	sp_inter2	sp_inter3	sp_inter4	sp_inter5
sp_artistic1	sp_artistic1	-0.4777	-0.0633	0.0577	0.4733	0.5147
sp_caring_an2	sp_caring_an2	-0.3937	0.3351	-0.0026	0.5857	0.0560
sp_clerical3	sp_clerical3	0.2511	0.4716	-0.1541	0.0429	0.2003
sp_cust_sales4	sp_cust_sales4	-0.0745	0.6543	0.1219	0.1593	0.4340
sp_eng5	sp_eng5	0.0436	-0.1850	-0.2784	0.2064	-0.0991
sp_hardware11	sp_hardware11	-0.0156	0.1363	-0.4388	0.5193	-0.1585
sp_health6	sp_health6	-0.2093	0.4412	0.4949	0.2694	-0.1284
sp_human_dev7	sp_human_dev7	-0.3199	0.2206	0.6676	0.2415	0.0313
sp_leader_enter8	sp_leader_enter8	0.6366	0.0294	0.3026	0.3248	0.3342
sp_protection9	sp_protection9	0.1157	0.3530	-0.0615	0.5831	-0.2064
sp_scientific10	sp_scientific10	-0.2185	-0.0774	0.0055	0.3077	-0.4211

Correlations Between the IWRN_5_Factors and Their Canonical Variables

	iw51	iw52	iw53	iw54	iw55
IW1_LEADERSHIP	0.8795	-0.2213	0.2132	0.1146	0.3448
IW2_WORKENV	-0.1800	0.0665	-0.0854	-0.4883	0.8470
IW3_SELFACT	-0.3737	-0.7330	0.4372	0.2770	0.2349
IW4_STIMUL	-0.0847	0.3512	-0.1564	0.8253	0.4048
IW5_HELPING	-0.1340	0.4860	0.8580	-0.0365	0.0921

Correlations Between the Spetz_Interest_Scales and the Canonical Variables of the IWRN_5_Factors

		iw51	iw52	iw53	iw54	iw55
sp_artistic1	sp_artistic1	-0.2910	-0.0288	0.0195	0.1486	0.0857
sp_caring_an2	sp_caring_an2	-0.2398	0.1524	-0.0009	0.1839	0.0093
sp_clerical3	sp_clerical3	0.1529	0.2145	-0.0521	0.0135	0.0334
sp_cust_sales4	sp_cust_sales4	-0.0454	0.2975	0.0412	0.0500	0.0723
sp_eng5	sp_eng5	0.0266	-0.0841	-0.0942	0.0648	-0.0165
sp_hardware11	sp_hardware11	-0.0095	0.0620	-0.1484	0.1630	-0.0264
sp_health6	sp_health6	-0.1275	0.2006	0.1674	0.0846	-0.0214
sp_human_dev7	sp_human_dev7	-0.1949	0.1003	0.2258	0.0758	0.0052
sp_leader_enter8	sp_leader_enter8	0.3877	0.0134	0.1023	0.1019	0.0557
sp_protection9	sp_protection9	0.0705	0.1605	-0.0208	0.1830	-0.0344
sp_scientific10	sp_scientific10	-0.1331	-0.0352	0.0019	0.0966	-0.0702

The CANCORR Procedure

Canonical Structure

Correlations Between the IWRN_5_Factors and the Canonical Variables of the Spetz_Interest_Scales

	sp_inter1	sp_inter2	sp_inter3	sp_inter4	sp_inter5
IW1_LEADERSHIP	0.5357	-0.1006	0.0721	0.0360	0.0574
IW2_WORKENV	-0.1096	0.0302	-0.0289	-0.1533	0.1411
IW3_SELFACT	-0.2276	-0.3333	0.1479	0.0870	0.0391
IW4_STIMUL	-0.0516	0.1597	-0.0529	0.2591	0.0674
IW5_HELPING	-0.0816	0.2210	0.2901	-0.0114	0.0153

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Redundancy Analysis

Raw Variance of the Spetz_Interest_Scales Explained by

Canonical Variable Number	Their Own Canonical Variables			The Opposite Canonical Variables	
	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.0922	0.0922	0.3710	0.0342	0.0342
2	0.0959	0.1881	0.2068	0.0198	0.0540
3	0.1026	0.2907	0.1144	0.0117	0.0658
4	0.1490	0.4397	0.0985	0.0147	0.0804
5	0.0753	0.5150	0.0278	0.0021	0.0825

Raw Variance of the IWRN_5_Factors Explained by

Canonical Variable Number	Their Own Canonical Variables			The Opposite Canonical Variables	
	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.2079	0.2079	0.3710	0.0771	0.0771
2	0.1835	0.3914	0.2068	0.0379	0.1151
3	0.1854	0.5768	0.1144	0.0212	0.1363
4	0.2015	0.7784	0.0985	0.0199	0.1561
5	0.2216	1.0000	0.0278	0.0062	0.1623

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Redundancy Analysis

Standardized Variance of the Spetz_Interest_Scales Explained by

Canonical Variable Number	Their Own Canonical Variables			The Opposite Canonical Variables	
	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.0970	0.0970	0.3710	0.0360	0.0360
2	0.1086	0.2055	0.2068	0.0225	0.0584
3	0.0998	0.3054	0.1144	0.0114	0.0698
4	0.1434	0.4488	0.0985	0.0141	0.0840
5	0.0801	0.5289	0.0278	0.0022	0.0862

Standardized Variance of the IWRN_5_Factors Explained by

Canonical Variable Number	Their Own Canonical Variables			The Opposite Canonical Variables	
	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.1941	0.1941	0.3710	0.0720	0.0720
2	0.1900	0.3842	0.2068	0.0393	0.1113
3	0.2009	0.5851	0.1144	0.0230	0.1343
4	0.2022	0.7872	0.0985	0.0199	0.1542
5	0.2128	1.0000	0.0278	0.0059	0.1601

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Redundancy Analysis

Squared Multiple Correlations Between the Spetz_Interest_Scales
and the First M Canonical Variables of the IWRN_5_Factors

M		1	2	3	4	5
sp_artistic1	sp_artistic1	0.0847	0.0855	0.0859	0.1079	0.1153
sp_caring_an2	sp_caring_an2	0.0575	0.0807	0.0807	0.1145	0.1146

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sp_clerical3        sp_clerical3        0.0234    0.0694    0.0721    0.0723    0.0734
sp_cust_sales4      sp_cust_sales4      0.0021    0.0906    0.0923    0.0948    0.1000
sp_eng5             sp_eng5             0.0007    0.0078    0.0167    0.0208    0.0211
sp_hardware11       sp_hardware11       0.0001    0.0039    0.0259    0.0525    0.0532
sp_health6          sp_health6          0.0162    0.0565    0.0845    0.0917    0.0921
sp_human_dev7       sp_human_dev7       0.0380    0.0480    0.0990    0.1048    0.1048
sp_leader_enter8    sp_leader_enter8    0.1503    0.1505    0.1610    0.1714    0.1745
sp_protection9      sp_protection9      0.0050    0.0307    0.0312    0.0647    0.0658
sp_scientific10     sp_scientific10     0.0177    0.0190    0.0190    0.0283    0.0332
```

Squared Multiple Correlations Between the IWRN_5_Factors and
the First M Canonical Variables of the Spetz_Interest_Scales

M	1	2	3	4	5
IW1_LEADERSHIP	0.2870	0.2971	0.3023	0.3036	0.3069
IW2_WORKENV	0.0120	0.0129	0.0138	0.0373	0.0572
IW3_SELFACT	0.0518	0.1629	0.1848	0.1923	0.1938
IW4_STIMUL	0.0027	0.0282	0.0310	0.0981	0.1026
IW5_HELPING	0.0067	0.0555	0.1397	0.1398	0.1400

APPENDIX Q

Canonical Correlation Analysis: 11 CareerOp-Work Activity Preference Scales & 9 Need Factors (22 I-WRN scales sorted into 9 Higher Order Factors)

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CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

     Spetz_Interest_Scales          11
     IWRN_9_Apriori                  9
     Observations                  721


              Means and Standard Deviations

                                   Standard
     Variable            Mean      Deviation   Label

     sp_artistic1       2.808928   0.772598    sp_artistic1
     sp_caring_an2      2.549997   0.830205    sp_caring_an2
     sp_clerical3       2.292857   0.728637    sp_clerical3
     sp_cust_sales4     2.447328   0.683759    sp_cust_sales4
     sp_eng5            2.769184   0.880877    sp_eng5
     sp_hardware11      2.579098   0.931017    sp_hardware11
     sp_health6         2.482573   0.845465    sp_health6
     sp_human_dev7      2.879180   0.747604    sp_human_dev7
     sp_leader_enter8   2.844554   0.774971    sp_leader_enter8
     sp_protection9     2.661973   0.750126    sp_protection9
     sp_scientific10    2.588040   0.866244    sp_scientific10
     income1_iw         4.060219   0.582285
     status2_iw         3.693225   0.690452
     altru3_iw          3.287056   0.700501
     auton4_iw          3.508108   0.720867
     growth5_iw         3.808071   0.605089
     actvar6_iw         3.164954   0.757026
     interpers7_iw      3.796671   0.612966
     leader8_iw         3.378206   0.752454
     structure9_iw      3.358477   0.657685
          CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

                   The CANCORR Procedure

             Correlations Among the Original Variables

          Correlations Among the Spetz_Interest_Scales


                                  sp_caring_                    sp_cust_
                   sp_artistic1       an2      sp_clerical3      sales4

     sp_artistic1      1.0000        0.4321       0.2266        0.4991
     sp_caring_an2     0.4321        1.0000       0.2033        0.4502
     sp_clerical3      0.2266        0.2033       1.0000        0.6729
     sp_cust_sales4    0.4991        0.4502       0.6729        1.0000
     sp_eng5           0.1288        0.2871       0.3279        0.1576
     sp_hardware11     0.0835        0.4180       0.2544        0.2129
     sp_health6        0.3145        0.5286       0.2881        0.4583
     sp_human_dev7     0.5173        0.3207       0.3161        0.5285
     sp_leader_enter8  0.2335        0.0691       0.6070        0.4517
     sp_protection9    0.3006        0.4647       0.2745        0.4295
     sp_scientific10   0.2492        0.4989       0.2441        0.2154


          Correlations Among the Spetz_Interest_Scales


                                                              sp_human_
                   sp_eng5     sp_hardware11   sp_health6       dev7

     sp_artistic1      0.1288       0.0835       0.3145        0.5173
     sp_caring_an2     0.2871       0.4180       0.5286        0.3207
     sp_clerical3      0.3279       0.2544       0.2881        0.3161
     sp_cust_sales4    0.1576       0.2129       0.4583        0.5285
     sp_eng5           1.0000       0.7684       0.1224       -0.0424
     sp_hardware11     0.7684       1.0000       0.0909       -0.1158
     sp_health6        0.1224       0.0909       1.0000        0.5270
     sp_human_dev7    -0.0424      -0.1158       0.5270        1.0000
     sp_leader_enter8  0.1912       0.0192       0.1717        0.3720
     sp_protection9    0.4296       0.5132       0.3550        0.2953
     sp_scientific10   0.6422       0.4704       0.5444        0.2503


          Correlations Among the Spetz_Interest_Scales


                   sp_leader_
```

	enter8	sp_protection9	sp_scientific10
sp_artistic1	0.2335	0.3006	0.2492
sp_caring_an2	0.0691	0.4647	0.4989
sp_clerical3	0.6070	0.2745	0.2441
sp_cust_sales4	0.4517	0.4295	0.2154
sp_eng5	0.1912	0.4296	0.6422
sp_hardware11	0.0192	0.5132	0.4704
sp_health6	0.1717	0.3550	0.5444

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Correlations Among the Original Variables

Correlations Among the Spetz_Interest_Scales

	sp_leader_ enter8	sp_protection9	sp_scientific10
sp_human_dev7	0.3720	0.2953	0.2503
sp_leader_enter8	1.0000	0.3136	0.0973
sp_protection9	0.3136	1.0000	0.3998
sp_scientific10	0.0973	0.3998	1.0000

Correlations Among the IWRN_9_Apriori

	income1_iw	status2_iw	altru3_iw	auton4_iw	growth5_iw
income1_iw	1.0000	0.6991	0.3228	0.4798	0.5590
status2_iw	0.6991	1.0000	0.5091	0.5745	0.7092
altru3_iw	0.3228	0.5091	1.0000	0.4811	0.6787
auton4_iw	0.4798	0.5745	0.4811	1.0000	0.5912
growth5_iw	0.5590	0.7092	0.6787	0.5912	1.0000
actvar6_iw	0.2496	0.4278	0.5988	0.5106	0.4732
interpers7_iw	0.6904	0.6174	0.6503	0.4599	0.6857
leader8_iw	0.4615	0.7790	0.6383	0.6440	0.7042
structure9_iw	0.6312	0.6026	0.5645	0.5413	0.4695

Correlations Among the IWRN_9_Apriori

	actvar6_iw	interpers7_ iw	leader8_iw	structure9_ iw
income1_iw	0.2496	0.6904	0.4615	0.6312
status2_iw	0.4278	0.6174	0.7790	0.6026
altru3_iw	0.5988	0.6503	0.6383	0.5645
auton4_iw	0.5106	0.4599	0.6440	0.5413
growth5_iw	0.4732	0.6857	0.7042	0.4695
actvar6_iw	1.0000	0.4217	0.5105	0.4448
interpers7_iw	0.4217	1.0000	0.5194	0.6560
leader8_iw	0.5105	0.5194	1.0000	0.5779
structure9_iw	0.4448	0.6560	0.5779	1.0000

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Correlations Among the Original Variables

Correlations Between the Spetz_Interest_Scales and the IWRN_9_Apriori

	income1_iw	status2_iw	altru3_iw	auton4_iw	growth5_iw
sp_artistic1	-0.0225	-0.0130	0.2381	0.0255	0.1332
sp_caring_an2	-0.1221	-0.1111	0.1408	0.0030	-0.0020
sp_clerical3	-0.0103	0.0288	0.0252	-0.0253	-0.1055
sp_cust_sales4	-0.0262	-0.0119	0.1745	-0.0361	-0.0607
sp_eng5	-0.0172	0.0004	-0.0788	-0.0359	0.0342
sp_hardware11	-0.0821	-0.0698	-0.0525	-0.0197	-0.0472
sp_health6	-0.0680	-0.0670	0.2112	-0.0357	-0.0022
sp_human_dev7	-0.0357	-0.0349	0.2834	-0.0194	0.0871
sp_leader_enter8	0.0880	0.2659	0.1000	0.1121	0.0917
sp_protection9	-0.0852	0.0021	0.0633	-0.0207	-0.0572
sp_scientific10	-0.0991	-0.0938	0.0218	-0.0509	0.0262

Correlations Between the Spetz_Interest_Scales and the IWRN_9_Apriori

	actvar6_iw	interpers7_ iw	leader8_iw	structure9_ iw
sp_artistic1	0.0846	0.1211	-0.0539	-0.0289
sp_caring_an2	0.2760	0.0473	-0.0584	-0.0558
sp_clerical3	0.0230	0.0141	0.0730	0.1311
sp_cust_sales4	0.1109	0.1126	0.0290	0.1131
sp_eng5	0.1007	-0.0630	-0.0088	-0.0312
sp_hardware11	0.2660	-0.1029	-0.0208	-0.0122

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sp_health6                    0.0764           0.0657           0.0219          -0.0032
sp_human_dev7                -0.0363           0.1144           0.0369           0.0039
sp_leader_enter8              0.0285           0.0546           0.3377           0.1167
sp_protection9                0.2630          -0.0646           0.0688           0.0105
sp_scientific10               0.0775          -0.0531          -0.0678          -0.0917
            CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS
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                        The CANCORR Procedure

                      Canonical Correlation Analysis

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation
1	0.634444	0.619026	0.022267	0.402519
2	0.553661	0.539620	0.025844	0.306540
3	0.444091	0.424803	0.029918	0.197217
4	0.376337	0.364005	0.031990	0.141630
5	0.231958	0.200717	0.035263	0.053804
6	0.157233	.	0.036346	0.024722
7	0.139273	.	0.036545	0.019397
8	0.084761	.	0.037000	0.007184
9	0.079097	.	0.037035	0.006256

Test of H0: The canonical correlations in the current row and all that follow are zero

Eigenvalues of Inv(E)*H = CanRsq/(1-CanRsq)

	Eigenvalue	Difference	Proportion	Cumulative	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.6737	0.2316	0.4103	0.4103	0.25489654	10.71	99	4954.9	<.0001
2	0.4420	0.1964	0.2692	0.6795	0.42661847	8.02	80	4461	<.0001
3	0.2457	0.0807	0.1496	0.8291	0.61520312	5.67	63	3965.4	<.0001
4	0.1650	0.1081	0.1005	0.9296	0.76633754	4.02	48	3468	<.0001
5	0.0569	0.0315	0.0346	0.9643	0.89278216	2.32	35	2968.1	<.0001
6	0.0253	0.0056	0.0154	0.9797	0.94354935	1.72	24	2464.1	0.0157
7	0.0198	0.0125	0.0120	0.9918	0.96746719	1.57	15	1952.1	0.0747
8	0.0072	0.0009	0.0044	0.9962	0.98660426	1.20	8	1416	0.2966
9	0.0063		0.0038	1.0000	0.99374370	1.49	3	709	0.2165

             Multivariate Statistics and F Approximations

                    S=9   M=0.5   N=349.5

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.25489654	10.71	99	4954.9	<.0001
Pillai's Trace	1.15926979	9.53	99	6381	<.0001
Hotelling-Lawley Trace	1.64192783	11.60	99	3338.1	<.0001
Roy's Greatest Root	0.67369267	43.42	11	709	<.0001

        NOTE: F Statistic for Roy's Greatest Root is an upper bound.
           CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

                        The CANCORR Procedure

                      Canonical Correlation Analysis

        Raw Canonical Coefficients for the Spetz_Interest_Scales

		sp_inter1	sp_inter2	sp_inter3
sp_artistic1	sp_artistic1	-0.634322469	0.0619175773	-0.367181403
sp_caring_an2	sp_caring_an2	-0.008446347	0.5710308178	-0.077431337
sp_clerical3	sp_clerical3	0.1549120957	0.3833340367	0.3987651533
sp_cust_sales4	sp_cust_sales4	-0.056610257	0.0971098388	0.6455075775
sp_eng5	sp_eng5	-0.368103698	-0.435249791	-0.493034673
sp_hardware11	sp_hardware11	0.3096553809	0.4253430311	0.1292942005
sp_health6	sp_health6	-0.012015736	-0.23860423	0.5958528797
sp_human_dev7	sp_human_dev7	-0.739428832	-0.34884026	0.2959904821
sp_leader_enter8	sp_leader_enter8	0.83925191	-0.848044532	-0.178712807
sp_protection9	sp_protection9	0.54181755	0.5118487919	0.1831880294
sp_scientific10	sp_scientific10	-0.051235275	0.0817650928	-0.43348575

        Raw Canonical Coefficients for the Spetz_Interest_Scales

		sp_inter4	sp_inter5	sp_inter6
sp_artistic1	sp_artistic1	0.3374067807	-0.350189753	1.1717213701
sp_caring_an2	sp_caring_an2	0.315726246	-0.964181647	-0.974979806
sp_clerical3	sp_clerical3	-1.007028283	0.3839903569	0.3629037162

```
sp_cust_sales4      sp_cust_sales4       -0.649459543        -0.7903921       -0.071059648
sp_eng5             sp_eng5              -0.474286817        -0.44014854      -0.181599607
sp_hardware11       sp_hardware11         0.7185901206        0.9635026156     -0.091246478
sp_health6          sp_health6            0.3791425603        0.250915759      -0.043088796
sp_human_dev7       sp_human_dev7         0.278589114         1.044022815      -0.509075453
sp_leader_enter8    sp_leader_enter8      1.127782421        -0.420541448      -0.211226789
sp_protection9      sp_protection9        0.0271923662        0.2078871513      1.004871787
sp_scientific10     sp_scientific10      -0.042729513         0.3312295557      0.0512584838
```

Raw Canonical Coefficients for the Spetz_Interest_Scales

		sp_inter7	sp_inter8	sp_inter9
sp_artistic1	sp_artistic1	-0.419416617	0.4874414871	-0.010301093
sp_caring_an2	sp_caring_an2	-0.15011199	-0.273545644	0.2706197069
sp_clerical3	sp_clerical3	-1.050312004	-0.136974037	0.6142177634
sp_cust_sales4	sp_cust_sales4	1.3774497993	0.0971140911	0.2239966486
sp_eng5	sp_eng5	1.7606213237	-0.285865095	-0.339168946
sp_hardware11	sp_hardware11	-0.488120204	1.3984594196	0.1484779931
sp_health6	sp_health6	0.3135696599	0.1974172921	-1.018591275
sp_human_dev7	sp_human_dev7	0.178995499	0.1450637994	0.442728394
sp_leader_enter8	sp_leader_enter8	-0.075420525	0.3189272504	0.3077197389
sp_protection9	sp_protection9	-0.031698804	-1.107718067	-0.41842754

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Correlation Analysis

Raw Canonical Coefficients for the Spetz_Interest_Scales

		sp_inter7	sp_inter8	sp_inter9
sp_scientific10	sp_scientific10	-0.68428669	-0.771808818	1.0115916167

Raw Canonical Coefficients for the IWRN_9_Apriori

	iw91	iw92	iw93	iw94	iw95
income1_iw	-0.071460356	-0.148216922	0.1191742832	0.3204085058	1.1446585109
status2_iw	0.3222890649	-0.460750865	-0.330731728	-0.090012291	-1.646775066
altru3_iw	-1.281781754	-0.384857387	1.3794479804	0.8996939617	0.4847390339
auton4_iw	-0.305147643	-0.091777747	-0.181956174	0.0639824784	-0.684652697
growth5_iw	-0.918989576	-0.063187333	-2.26369005	0.1460761346	1.0272219533
actvar6_iw	0.6087676055	1.4562788512	-0.252221947	0.4788555443	-0.148898778
interpers7_iw	-0.217993322	0.1162728475	0.7258854983	-0.519175409	-2.193884927
leader8_iw	1.4195650156	-0.744620891	0.7601157489	0.7042683113	0.71824375
structure9_iw	0.3401640688	0.2092077569	0.0297910732	-1.393009216	0.8119356736

Raw Canonical Coefficients for the IWRN_9_Apriori

	iw96	iw97	iw98	iw99
income1_iw	-0.03803002	0.5818885324	0.8987984056	-2.725312852
status2_iw	2.1695585452	-0.271018591	-0.962076772	0.3323399949
altru3_iw	1.1586708823	-0.428445155	-0.05379694	-0.655219869
auton4_iw	-0.278019631	-1.75567782	0.5511654138	-0.138378511
growth5_iw	-0.132511078	0.884134562	0.6383087372	1.3116704934
actvar6_iw	0.0649871767	0.4690395086	0.1346679998	-0.19651221
interpers7_iw	-1.736010512	0.5286437928	-0.417377867	0.4790455641
leader8_iw	-1.61104498	0.4735454089	-0.04049635	-0.084535946
structure9_iw	0.6303445284	0.1771831332	0.997591383	1.4619696868

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Correlation Analysis

Standardized Canonical Coefficients for the Spetz_Interest_Scales

	sp_inter1	sp_inter2	sp_inter3	sp_inter4	sp_inter5
sp_artistic1	-0.4901	0.0478	-0.2837	0.2607	-0.2706
sp_caring_an2	-0.0070	0.4741	-0.0643	0.2621	-0.8005
sp_clerical3	0.1129	0.2793	0.2906	-0.7338	0.2798
sp_cust_sales4	-0.0387	0.0664	0.4414	-0.4441	-0.5404
sp_eng5	-0.3243	-0.3834	-0.4343	-0.4178	-0.3877
sp_hardware11	0.2883	0.3960	0.1204	0.6690	0.8970
sp_health6	-0.0102	-0.2017	0.5038	0.3206	0.2121
sp_human_dev7	-0.5528	-0.2608	0.2213	0.2083	0.7805
sp_leader_enter8	0.6504	-0.6572	-0.1385	0.8740	-0.3259
sp_protection9	0.4064	0.3840	0.1374	0.0204	0.1559
sp_scientific10	-0.0444	0.0708	-0.3755	-0.0370	0.2869

```
              Standardized Canonical Coefficients for the Spetz_Interest_Scales

                    sp_inter6      sp_inter7      sp_inter8      sp_inter9

     sp_artistic1       0.9053        -0.3240         0.3766        -0.0080
     sp_caring_an2     -0.8094        -0.1246        -0.2271         0.2247
     sp_clerical3       0.2644        -0.7653        -0.0998         0.4475
     sp_cust_sales4    -0.0486         0.9418         0.0664         0.1532
     sp_eng5           -0.1600         1.5509        -0.2518        -0.2988
     sp_hardware11     -0.0850        -0.4544         1.3020         0.1382
     sp_health6        -0.0364         0.2651         0.1669        -0.8612
     sp_human_dev7     -0.3806         0.1338         0.1085         0.3310
     sp_leader_enter8  -0.1637        -0.0584         0.2472         0.2385
     sp_protection9     0.7538        -0.0238        -0.8309        -0.3139
     sp_scientific10    0.0444        -0.5928        -0.6686         0.8763

              Standardized Canonical Coefficients for the IWRN_9_Apriori

                       iw91          iw92          iw93          iw94          iw95

     income1_iw       -0.0416       -0.0863        0.0694        0.1866        0.6665
     status2_iw        0.2225       -0.3181       -0.2284       -0.0621       -1.1370
     altru3_iw        -0.8979       -0.2696        0.9663        0.6302        0.3396
     auton4_iw        -0.2200       -0.0662       -0.1312        0.0461       -0.4935
     growth5_iw       -0.5561       -0.0382       -1.3697        0.0884        0.6216
     actvar6_iw        0.4609        1.1024       -0.1909        0.3625       -0.1127
     interpers7_iw    -0.1336        0.0713        0.4449       -0.3182       -1.3448
     leader8_iw        1.0682       -0.5603        0.5720        0.5299        0.5404
     structure9_iw     0.2237        0.1376        0.0196       -0.9162        0.5340

                       iw96          iw97          iw98          iw99

     income1_iw       -0.0221        0.3388        0.5234       -1.5869
     status2_iw        1.4980       -0.1871       -0.6643        0.2295
     altru3_iw         0.8117       -0.3001       -0.0377       -0.4590
     auton4_iw        -0.2004       -1.2656        0.3973       -0.0998
     growth5_iw       -0.0802        0.5350        0.3862        0.7937
     actvar6_iw        0.0492        0.3551        0.1019       -0.1488
     interpers7_iw    -1.0641        0.3240       -0.2558        0.2936
     leader8_iw       -1.2122        0.3563       -0.0305       -0.0636
     structure9_iw     0.4146        0.1165        0.6561        0.9615
```

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Structure

Correlations Between the Spetz_Interest_Scales and Their Canonical Variables

```
                                     sp_inter1   sp_inter2   sp_inter3   sp_inter4   sp_inter5

sp_artistic1      sp_artistic1        -0.5307      0.1141      0.1171      0.3977     -0.2851
sp_caring_an2     sp_caring_an2       -0.1568      0.6150      0.2007      0.4730     -0.2846
sp_clerical3      sp_clerical3         0.2592     -0.0106      0.4755     -0.2017      0.0161
sp_cust_sales4    sp_cust_sales4      -0.0382      0.1686      0.6870      0.0395     -0.2263
sp_eng5           sp_eng5              0.1557      0.2363     -0.3883      0.0770      0.2253
sp_hardware11     sp_hardware11        0.2791      0.6184     -0.1846      0.2129      0.3357
sp_health6        sp_health6          -0.2262      0.0884      0.5616      0.3827      0.1378
sp_human_dev7     sp_human_dev7       -0.4675     -0.2100      0.5441      0.3916      0.2076
sp_leader_enter8  sp_leader_enter8     0.4458     -0.4839      0.2612      0.3752     -0.1720
sp_protection9    sp_protection9       0.2982      0.4359      0.2174      0.4269      0.1594
sp_scientific10   sp_scientific10     -0.1415      0.2563     -0.1634      0.2502      0.2865
```

Correlations Between the Spetz_Interest_Scales and Their Canonical Variables

```
                                     sp_inter6   sp_inter7   sp_inter8   sp_inter9

sp_artistic1      sp_artistic1         0.5546      0.0646      0.1152      0.3200
sp_caring_an2     sp_caring_an2       -0.2479      0.1313     -0.1625      0.3119
sp_clerical3      sp_clerical3         0.1858      0.0946      0.0739      0.6607
sp_cust_sales4    sp_cust_sales4       0.2149      0.3846      0.0670      0.4757
sp_eng5           sp_eng5              0.0708      0.6464     -0.0136      0.3959
sp_hardware11     sp_hardware11        0.0317      0.3803      0.3001      0.2875
sp_health6        sp_health6          -0.0898      0.1863     -0.3049      0.0112
sp_human_dev7     sp_human_dev7        0.0563      0.1316     -0.1390      0.3795
sp_leader_enter8  sp_leader_enter8     0.1910      0.1362      0.0090      0.5005
sp_protection9    sp_protection9       0.4302      0.3268     -0.3606      0.1365

sp_scientific10   sp_scientific10     -0.0521      0.2252     -0.4375      0.5135
```

Correlations Between the IWRN_9_Apriori and Their Canonical Variables

```
                       iw91          iw92          iw93          iw94          iw95
```

```
    income1_iw        0.0648      -0.2962      -0.0710      -0.0449      -0.2782
    status2_iw        0.2972      -0.4187      -0.0843       0.2976      -0.4766
    altru3_iw        -0.2841      -0.0907       0.4309       0.5722      -0.1354
    auton4_iw         0.1101      -0.1333      -0.0879       0.3395      -0.3351
    growth5_iw       -0.1773      -0.2935      -0.2880       0.4999      -0.2178
    actvar6_iw        0.2210       0.5367       0.0805       0.5541      -0.2411
    interpers7_iw    -0.1954      -0.1525       0.2101       0.0910      -0.5831
    leader8_iw        0.4111      -0.4102       0.1389       0.5522      -0.1485
    structure9_iw     0.1792      -0.1013       0.2947      -0.1549      -0.1341
```

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Structure

Correlations Between the IWRN_9_Apriori and Their Canonical Variables

	iw96	iw97	iw98	iw99
income1_iw	0.1259	0.3533	0.7022	-0.4357
status2_iw	0.3932	0.2490	0.4419	0.0395
altru3_iw	0.2140	0.1847	0.4919	0.2403
auton4_iw	-0.0279	-0.4158	0.7469	0.0576
growth5_iw	0.0368	0.3356	0.5764	0.2366
actvar6_iw	0.1471	0.1571	0.4798	0.1221
interpers7_iw	-0.1108	0.4433	0.5760	0.0746
leader8_iw	-0.0110	0.1539	0.4957	0.2166
structure9_iw	0.2387	0.1908	0.8212	0.2474

Correlations Between the Spetz_Interest_Scales and the Canonical Variables of the IWRN_9_Apriori

		iw91	iw92	iw93	iw94	iw95
sp_artistic1	sp_artistic1	-0.3367	0.0632	0.0520	0.1497	-0.0661
sp_caring_an2	sp_caring_an2	-0.0995	0.3405	0.0891	0.1780	-0.0660
sp_clerical3	sp_clerical3	0.1645	-0.0059	0.2112	-0.0759	0.0037
sp_cust_sales4	sp_cust_sales4	-0.0243	0.0933	0.3051	0.0149	-0.0525
sp_eng5	sp_eng5	0.0988	0.1308	-0.1724	0.0290	0.0523
sp_hardware11	sp_hardware11	0.1770	0.3424	-0.0820	0.0801	0.0779
sp_health6	sp_health6	-0.1435	0.0490	0.2494	0.1440	0.0320
sp_human_dev7	sp_human_dev7	-0.2966	-0.1162	0.2416	0.1474	0.0482
sp_leader_enter8	sp_leader_enter8	0.2828	-0.2679	0.1160	0.1412	-0.0399
sp_protection9	sp_protection9	0.1892	0.2414	0.0965	0.1607	0.0370
sp_scientific10	sp_scientific10	-0.0898	0.1419	-0.0726	0.0941	0.0665

Correlations Between the Spetz_Interest_Scales and the Canonical Variables of the IWRN_9_Apriori

		iw96	iw97	iw98	iw99
sp_artistic1	sp_artistic1	0.0872	0.0090	0.0098	0.0253
sp_caring_an2	sp_caring_an2	-0.0390	0.0183	-0.0138	0.0247
sp_clerical3	sp_clerical3	0.0292	0.0132	0.0063	0.0523
sp_cust_sales4	sp_cust_sales4	0.0338	0.0536	0.0057	0.0376
sp_eng5	sp_eng5	0.0111	0.0900	-0.0012	0.0313
sp_hardware11	sp_hardware11	0.0050	0.0530	0.0254	0.0227
sp_health6	sp_health6	-0.0141	0.0260	-0.0258	0.0009
sp_human_dev7	sp_human_dev7	0.0088	0.0183	-0.0118	0.0300
sp_leader_enter8	sp_leader_enter8	0.0300	0.0190	0.0008	0.0396
sp_protection9	sp_protection9	0.0676	0.0455	-0.0306	0.0108
sp_scientific10	sp_scientific10	-0.0082	0.0314	-0.0371	0.0406

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Structure

Correlations Between the IWRN_9_Apriori and the Canonical Variables of the Spetz_Interest_Scales

	sp_inter1	sp_inter2	sp_inter3	sp_inter4	sp_inter5
income1_iw	0.0411	-0.1640	-0.0315	-0.0169	-0.0645
status2_iw	0.1885	-0.2318	-0.0374	0.1120	-0.1106
altru3_iw	-0.1802	-0.0502	0.1914	0.2153	-0.0314
auton4_iw	0.0698	-0.0738	-0.0390	0.1278	-0.0777
growth5_iw	-0.1125	-0.1625	-0.1279	0.1881	-0.0505
actvar6_iw	0.1402	0.2972	0.0357	0.2085	-0.0559
interpers7_iw	-0.1240	-0.0844	0.0933	0.0342	-0.1353
leader8_iw	0.2608	-0.2271	0.0617	0.2078	-0.0345
structure9_iw	0.1137	-0.0561	0.1309	-0.0583	-0.0311

Correlations Between the IWRN_9_Apriori and the Canonical Variables of the Spetz_Interest_Scales

	sp_inter6	sp_inter7	sp_inter8	sp_inter9
income1_iw	0.0198	0.0492	0.0595	-0.0345
status2_iw	0.0618	0.0347	0.0375	0.0031
altru3_iw	0.0337	0.0257	0.0417	0.0190
auton4_iw	-0.0044	-0.0579	0.0633	0.0046
growth5_iw	0.0058	0.0467	0.0489	0.0187
actvar6_iw	0.0231	0.0219	0.0407	0.0097
interpers7_iw	-0.0174	0.0617	0.0488	0.0059
leader8_iw	-0.0017	0.0214	0.0420	0.0171
structure9_iw	0.0375	0.0266	0.0696	0.0196

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Redundancy Analysis

Raw Variance of the Spetz_Interest_Scales Explained by

Canonical Variable Number	Their Own Canonical Variables		Canonical R-Square	The Opposite Canonical Variables	
	Proportion	Cumulative Proportion		Proportion	Cumulative Proportion
1	0.0915	0.0915	0.4025	0.0368	0.0368
2	0.1383	0.2297	0.3065	0.0424	0.0792
3	0.1408	0.3705	0.1972	0.0278	0.1070
4	0.1039	0.4744	0.1416	0.0147	0.1217
5	0.0558	0.5302	0.0538	0.0030	0.1247
6	0.0571	0.5873	0.0247	0.0014	0.1261
7	0.0958	0.6831	0.0194	0.0019	0.1280
8	0.0567	0.7398	0.0072	0.0004	0.1284
9	0.1544	0.8942	0.0063	0.0010	0.1293

Raw Variance of the IWRN_9_Apriori Explained by

Canonical Variable Number	Their Own Canonical Variables		Canonical R-Square	The Opposite Canonical Variables	
	Proportion	Cumulative Proportion		Proportion	Cumulative Proportion
1	0.0611	0.0611	0.4025	0.0246	0.0246
2	0.1043	0.1653	0.3065	0.0320	0.0565
3	0.0482	0.2135	0.1972	0.0095	0.0660
4	0.1732	0.3867	0.1416	0.0245	0.0906
5	0.0968	0.4835	0.0538	0.0052	0.0958
6	0.0348	0.5183	0.0247	0.0009	0.0966
7	0.0814	0.5997	0.0194	0.0016	0.0982
8	0.3570	0.9567	0.0072	0.0026	0.1008
9	0.0433	1.0000	0.0063	0.0003	0.1011

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS
The CANCORR Procedure

Canonical Redundancy Analysis

Standardized Variance of the Spetz_Interest_Scales Explained by

Canonical Variable Number	Their Own Canonical Variables		Canonical R-Square	The Opposite Canonical Variables	
	Proportion	Cumulative Proportion		Proportion	Cumulative Proportion
1	0.0959	0.0959	0.4025	0.0386	0.0386

```
              2    0.1273    0.2231    0.3065    0.0390    0.0776
              3    0.1537    0.3768    0.1972    0.0303    0.1079
              4    0.1055    0.4823    0.1416    0.0149    0.1228
              5    0.0524    0.5347    0.0538    0.0028    0.1257
              6    0.0628    0.5976    0.0247    0.0016    0.1272
              7    0.0881    0.6856    0.0194    0.0017    0.1289
              8    0.0522    0.7378    0.0072    0.0004    0.1293
              9    0.1617    0.8995    0.0063    0.0010    0.1303
```

```
              Standardized Variance of the IWRN_9_Apriori Explained by
                         Their Own                          The Opposite
                    Canonical Variables                  Canonical Variables

      Canonical
      Variable                 Cumulative    Canonical                 Cumulative
      Number     Proportion    Proportion    R-Square     Proportion   Proportion

          1        0.0561        0.0561       0.4025        0.0226       0.0226
          2        0.0961        0.1522       0.3065        0.0295       0.0520
          3        0.0495        0.2017       0.1972        0.0098       0.0618
          4        0.1586        0.3603       0.1416        0.0225       0.0843
          5        0.1023        0.4626       0.0538        0.0055       0.0898
          6        0.0344        0.4970       0.0247        0.0008       0.0906
          7        0.0875        0.5845       0.0194        0.0017       0.0923
          8        0.3669        0.9514       0.0072        0.0026       0.0949
          9        0.0486        1.0000       0.0063        0.0003       0.0953
              CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS
```

The CANCORR Procedure

Canonical Redundancy Analysis

Squared Multiple Correlations Between the Spetz_Interest_Scales
and the First M Canonical Variables of the IWRN_9_Apriori

M		1	2	3	4	5
sp_artistic1	sp_artistic1	0.1134	0.1173	0.1201	0.1424	0.1468
sp_caring_an2	sp_caring_an2	0.0099	0.1258	0.1338	0.1655	0.1698
sp_clerical3	sp_clerical3	0.0271	0.0271	0.0717	0.0774	0.0774
sp_cust_sales4	sp_cust_sales4	0.0006	0.0093	0.1024	0.1026	0.1054
sp_eng5	sp_eng5	0.0098	0.0269	0.0566	0.0574	0.0602
sp_hardware11	sp_hardware11	0.0313	0.1486	0.1553	0.1617	0.1678
sp_health6	sp_health6	0.0206	0.0230	0.0852	0.1059	0.1070
sp_human_dev7	sp_human_dev7	0.0880	0.1015	0.1599	0.1816	0.1839
sp_leader_enter8	sp_leader_enter8	0.0800	0.1518	0.1652	0.1852	0.1867
sp_protection9	sp_protection9	0.0358	0.0940	0.1034	0.1292	0.1305
sp_scientific10	sp_scientific10	0.0081	0.0282	0.0335	0.0423	0.0468

Squared Multiple Correlations Between the Spetz_Interest_Scales
and the First M Canonical Variables of the IWRN_9_Apriori

M		6	7	8	9
sp_artistic1	sp_artistic1	0.1544	0.1545	0.1546	0.1552
sp_caring_an2	sp_caring_an2	0.1714	0.1717	0.1719	0.1725
sp_clerical3	sp_clerical3	0.0783	0.0785	0.0785	0.0812
sp_cust_sales4	sp_cust_sales4	0.1065	0.1094	0.1094	0.1108
sp_eng5	sp_eng5	0.0603	0.0684	0.0684	0.0694
sp_hardware11	sp_hardware11	0.1678	0.1706	0.1713	0.1718
sp_health6	sp_health6	0.1072	0.1078	0.1085	0.1085
sp_human_dev7	sp_human_dev7	0.1840	0.1843	0.1844	0.1853
sp_leader_enter8	sp_leader_enter8	0.1876	0.1880	0.1880	0.1896
sp_protection9	sp_protection9	0.1351	0.1372	0.1381	0.1382
sp_scientific10	sp_scientific10	0.0468	0.0478	0.0492	0.0508

CANCORR USING 10 SPETZ MEAN SCALES AND 5 IW NEED FACTORS

The CANCORR Procedure

Canonical Redundancy Analysis

Squared Multiple Correlations Between the IWRN_9_Apriori and
the First M Canonical Variables of the Spetz_Interest_Scales

M	1	2	3	4	5
income1_iw	0.0017	0.0286	0.0296	0.0299	0.0340
status2_iw	0.0355	0.0893	0.0907	0.1032	0.1155
altru3_iw	0.0325	0.0350	0.0716	0.1180	0.1190
auton4_iw	0.0049	0.0103	0.0118	0.0282	0.0342
growth5_iw	0.0126	0.0391	0.0554	0.0908	0.0934
actvar6_iw	0.0197	0.1080	0.1092	0.1527	0.1559
interpers7_iw	0.0154	0.0225	0.0312	0.0324	0.0507
leader8_iw	0.0680	0.1196	0.1234	0.1666	0.1678
structure9_iw	0.0129	0.0161	0.0332	0.0366	0.0376

Squared Multiple Correlations Between the IWRN_9_Apriori and
the First M Canonical Variables of the Spetz_Interest_Scales

M	6	7	8	9
income1_iw	0.0344	0.0368	0.0404	0.0416
status2_iw	0.1193	0.1205	0.1219	0.1219
altru3_iw	0.1201	0.1208	0.1225	0.1229
auton4_iw	0.0342	0.0376	0.0416	0.0416
growth5_iw	0.0934	0.0956	0.0980	0.0983
actvar6_iw	0.1564	0.1569	0.1585	0.1586
interpers7_iw	0.0510	0.0548	0.0572	0.0572
leader8_iw	0.1678	0.1682	0.1700	0.1703
structure9_iw	0.0390	0.0397	0.0445	0.0449

APPENDIX R

8 Multiple Regression Analyses

Multiple Regression for Technical Activities Using Need Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	120.08139	15.01017	19.42	<.0001
Error	705	544.99875	0.77305		
Corrected Total	713	665.08014			

Root MSE	0.87923	R-Square	0.1806
Dependent Mean	-0.00250	Adj R-Sq	0.1713
Coeff Var	-35236		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	-0.00335	0.03291	-0.10	0.9190	0
F1LEADING	1	-0.05833	0.03425	-1.70	0.0890	-0.05817
F2COMFORT	1	-0.05203	0.03499	-1.49	0.1374	-0.05086
F3SELFACT	1	0.09381	0.03517	2.67	0.0078	0.09116
F4REW ENV	1	-0.01408	0.03554	-0.40	0.6920	-0.01353
F5HELP	1	-0.35114	0.03598	-9.76	<.0001	-0.33400
F6ENRICHED	1	0.27135	0.03677	7.38	<.0001	0.25309
F7QUALITYMGMT	1	-0.06004	0.03801	-1.58	0.1147	-0.05408
F8AUTON	1	0.01779	0.03677	0.48	0.6286	0.01657

Multiple Regression for Office Detail Using Need Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	57.35160	7.16895	8.51	<.0001
Error	705	594.03080	0.84260		
Corrected Total	713	651.38241			

Root MSE	0.91793	R-Square	0.0880
Dependent Mean	0.00097310	Adj R-Sq	0.0777
Coeff Var	94330		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	0.00162	0.03435	0.05	0.9624	0
F1LEADING	1	-0.07228	0.03576	-2.02	0.0436	-0.07283
F2COMFORT	1	-0.06798	0.03653	-1.86	0.0632	-0.06715
F3SELFACT	1	-0.20848	0.03672	-5.68	<.0001	-0.20471
F4REW ENV	1	-0.00951	0.03711	-0.26	0.7978	-0.00923
F5HELP	1	0.12633	0.03757	3.36	0.0008	0.12143
F6ENRICHED	1	0.13226	0.03839	3.45	0.0006	0.12465
F7QUALITYMGMT	1	-0.06075	0.03969	-1.53	0.1263	-0.05528
F8AUTON	1	-0.04103	0.03839	-1.07	0.2855	-0.03860

Multiple Regression for Health Related Activities Using Need Factors

| | | Sum of | Mean | | |
Source	DF	Squares	Square	F Value	Pr > F
Model	8	77.56424	9.69553	11.94	<.0001
Error	705	572.70852	0.81235		
Corrected Total	713	650.27276			

Root MSE	0.90131	R-Square	0.1193
Dependent Mean	-0.00151	Adj R-Sq	0.1093
Coeff Var	-59768		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	-0.00153	0.03373	-0.05	0.9637	0
F1LEADING	1	-0.06001	0.03511	-1.71	0.0878	-0.06052
F2COMFORT	1	-0.05446	0.03587	-1.52	0.1294	-0.05384
F3SELFACT	1	0.04591	0.03606	1.27	0.2034	0.04512
F4REW ENV	1	0.00182	0.03643	0.05	0.9601	0.00177
F5HELP	1	0.31321	0.03689	8.49	<.0001	0.30130
F6ENRICHED	1	-0.12336	0.03769	-3.27	0.0011	-0.11636
F7QUALITYMGMT	1	0.03709	0.03897	0.95	0.3415	0.03379
F8AUTON	1	-0.08655	0.03769	-2.30	0.0219	-0.08150

Multiple Regression for Business/Leadership Activities Using Need Factors

| | | Sum of | Mean | | |
Source	DF	Squares	Square	F Value	Pr > F
Model	8	129.24332	16.15541	22.55	<.0001
Error	705	505.13970	0.71651		
Corrected Total	713	634.38302			

Root MSE	0.84647	R-Square	0.2037
Dependent Mean	0.00222	Adj R-Sq	0.1947
Coeff Var	38115		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	0.00312	0.03168	0.10	0.9215	0
F1LEADING	1	0.42477	0.03297	12.88	<.0001	0.43371
F2COMFORT	1	-0.00090026	0.03369	-0.03	0.9787	-0.00090105
F3SELFACT	1	-0.10654	0.03386	-3.15	0.0017	-0.10601
F4REW ENV	1	0.01946	0.03422	0.57	0.5697	0.01914
F5HELP	1	-0.00775	0.03464	-0.22	0.8230	-0.00755
F6ENRICHED	1	-0.09087	0.03540	-2.57	0.0105	-0.08678
F7QUALITYMGMT	1	-0.02519	0.03660	-0.69	0.4914	-0.02323
F8AUTON	1	-0.00574	0.03540	-0.16	0.8713	-0.00547

Multiple Regression for Liberal Arts & Humanity Interests Using Need Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	97.60621	12.20078	15.90	<.0001
Error	705	540.86650	0.76719		
Corrected Total	713	638.47271			

Root MSE	0.87589	R-Square	0.1529
Dependent Mean	0.00413	Adj R-Sq	0.1433
Coeff Var	21211		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	0.00431	0.03278	0.13	0.8954	0
F1LEADING	1	-0.19903	0.03412	-5.83	<.0001	-0.20257
F2COMFORT	1	0.06041	0.03486	1.73	0.0835	0.06027
F3SELFACT	1	0.20154	0.03504	5.75	<.0001	0.19989
F4REW ENV	1	0.00135	0.03541	0.04	0.9695	0.00133
F5HELP	1	0.22061	0.03585	6.15	<.0001	0.21418
F6ENRICHED	1	-0.05051	0.03663	-1.38	0.1684	-0.04808
F7QUALITYMGMT	1	0.03041	0.03787	0.80	0.4222	0.02796
F8AUTON	1	0.15350	0.03663	4.19	<.0001	0.14587

Multiple Regression for Caring for Plants & Animals Using Need Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	81.60857	10.20107	13.55	<.0001
Error	705	530.66291	0.75271		
Corrected Total	713	612.27148			

Root MSE	0.86759	R-Square	0.1333
Dependent Mean	0.00242	Adj R-Sq	0.1235
Coeff Var	35845		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	0.00284	0.03247	0.09	0.9304	0
F1LEADING	1	-0.14339	0.03380	-4.24	<.0001	-0.14903
F2COMFORT	1	0.01880	0.03453	0.54	0.5863	0.01915
F3SELFACT	1	-0.01830	0.03471	-0.53	0.5982	-0.01854
F4REW ENV	1	-0.05765	0.03507	-1.64	0.1007	-0.05772
F5HELP	1	0.10538	0.03551	2.97	0.0031	0.10447
F6ENRICHED	1	0.31243	0.03628	8.61	<.0001	0.30372
F7QUALITYMGMT	1	0.00250	0.03751	0.07	0.9468	0.00235
F8AUTON	1	0.00916	0.03628	0.25	0.8007	0.00889

Multiple Regression for Caring for Security & Physical Performing Using Need Factors

		Sum of	Mean		
Source	DF	Squares	Square	F Value	Pr > F
Model	8	83.77842	10.47230	13.93	<.0001
Error	705	530.07655	0.75188		
Corrected Total	713	613.85498			

	Root MSE	0.86711	R-Square	0.1365
	Dependent Mean	0.00238	Adj R-Sq	0.1267
	Coeff Var	36372		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	0.00280	0.03245	0.09	0.9313	0
F1LEADING	1	-0.14949	0.03378	-4.43	<.0001	-0.15517
F2COMFORT	1	0.02728	0.03451	0.79	0.4296	0.02775
F3SELFACT	1	-0.02561	0.03469	-0.74	0.4606	-0.02590
F4REW ENV	1	-0.05483	0.03505	-1.56	0.1182	-0.05483
F5HELP	1	0.09975	0.03549	2.81	0.0051	0.09877
F6ENRICHED	1	0.31766	0.03626	8.76	<.0001	0.30840
F7QUALITYMGMT	1	-0.00219	0.03749	-0.06	0.9533	-0.00206
F8AUTON	1	0.00233	0.03626	0.06	0.9488	0.00226

Multiple Regression for Caring for Selling Interests Using Need Factors

		Sum of	Mean		
Source	DF	Squares	Square	F Value	Pr > F
Model	8	55.89544	6.98693	9.46	<.0001
Error	705	520.63433	0.73849		
Corrected Total	713	576.52976			

	Root MSE	0.85935	R-Square	0.0970
	Dependent Mean	0.00085881	Adj R-Sq	0.0867
	Coeff Var	100063		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	1	0.00146	0.03216	0.05	0.9639	0
F1LEADING	1	-0.05283	0.03348	-1.58	0.1150	-0.05659
F2COMFORT	1	0.12891	0.03420	3.77	0.0002	0.13534
F3SELFACT	1	-0.17713	0.03438	-5.15	<.0001	-0.18488
F4REW ENV	1	-0.03993	0.03474	-1.15	0.2508	-0.04120
F5HELP	1	0.16114	0.03517	4.58	<.0001	0.16463
F6ENRICHED	1	0.05097	0.03594	1.42	0.1565	0.05106
F7QUALITYMGMT	1	0.00454	0.03715	0.12	0.9029	0.00439
F8AUTON	1	-0.10717	0.03594	-2.98	0.0030	-0.10718

11 Multiple Regression Analyses

Multiple Regression for Artistic Interests using 22 I-WRN Scales a priori sorted into 9 Higher Order Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	65.38746	7.26527	13.80	<.0001
Error	723	380.73098	0.52660		
Corrected Total	732	446.11844			

Root MSE	0.72567	R-Square	0.1466
Dependent Mean	2.81820	Adj R-Sq	0.1359
Coeff Var	25.74950		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.27461	0.20961	10.85	<.0001	0
income1_iw		1	-0.04922	0.08525	-0.58	0.5639	-0.03696
status2_iw		1	0.12347	0.08063	1.53	0.1261	0.10980
altru3_iw		1	0.50720	0.06967	7.28	<.0001	0.45599
auton4_iw		1	0.06887	0.05453	1.26	0.2070	0.06385
growth5_iw		1	0.10658	0.08453	1.26	0.2078	0.08363
actvar6_iw		1	-0.02496	0.04743	-0.53	0.5989	-0.02413
interpers7_iw		1	0.05175	0.08239	0.63	0.5301	0.04072
leader8_iw		1	-0.43433	0.07116	-6.10	<.0001	-0.42016
structure9_iw		1	-0.20142	0.06770	-2.98	0.0030	-0.16998

Multiple Regression for Caring for Animals & Plants using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	86.74702	9.63856	16.67	<.0001
Error	722	417.44151	0.57817		
Corrected Total	731	504.18853			

Root MSE	0.76038	R-Square	0.1721
Dependent Mean	2.54515	Adj R-Sq	0.1617
Coeff Var	29.87558		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.43706	0.21967	11.09	<.0001	0
income1_iw		1	-0.09124	0.08935	-1.02	0.3075	-0.06443
status2_iw		1	-0.17502	0.08452	-2.07	0.0387	-0.14639
altru3_iw		1	0.14738	0.07301	2.02	0.0439	0.12459
auton4_iw		1	0.01886	0.05714	0.33	0.7414	0.01644
growth5_iw		1	-0.09063	0.08858	-1.02	0.3066	-0.06688
actvar6_iw		1	0.41902	0.04971	8.43	<.0001	0.38111
interpers7_iw		1	0.21847	0.08637	2.53	0.0116	0.16171
leader8_iw		1	-0.13695	0.07457	-1.84	0.0667	-0.12457
structure9_iw		1	-0.23056	0.07096	-3.25	0.0012	-0.18290

Multiple Regression for Clerical Activities using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

| | | Sum of | Mean | | |
Source	DF	Squares	Square	F Value	Pr > F
Model	9	31.18415	3.46491	6.79	<.0001
Error	715	364.66595	0.51002		
Corrected Total	724	395.85010			

Root MSE	0.71416	R-Square	0.0788	
Dependent Mean	2.30228	Adj R-Sq	0.0672	
Coeff Var	31.01967			

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.58975	0.20933	12.37	<.0001	0
income1_iw		1	-0.09869	0.08425	-1.17	0.2419	-0.07763
status2_iw		1	0.04967	0.07958	0.62	0.5327	0.04634
altru3_iw		1	0.01463	0.06882	0.21	0.8317	0.01387
auton4_iw		1	-0.10485	0.05376	-1.95	0.0515	-0.10205
growth5_iw		1	-0.39608	0.08394	-4.72	<.0001	-0.32412
actvar6_iw		1	0.00834	0.04673	0.18	0.8585	0.00853
interpers7_iw		1	0.08763	0.08141	1.08	0.2821	0.07261
leader8_iw		1	0.21160	0.07025	3.01	0.0027	0.21490
structure9_iw		1	0.20350	0.06686	3.04	0.0024	0.18098

Multiple Regression for Customer & Sales Activities using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

| | | Sum of | Mean | | |
Source	DF	Squares	Square	F Value	Pr > F
Model	9	36.96579	4.10731	9.72	<.0001
Error	712	300.75959	0.42242		
Corrected Total	721	337.72538			

Root MSE	0.64993	R-Square	0.1095	
Dependent Mean	2.44879	Adj R-Sq	0.0982	
Coeff Var	26.54110			

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.48149	0.19103	12.99	<.0001	0
income1_iw		1	-0.06954	0.07670	-0.91	0.3649	-0.05913
status2_iw		1	0.00266	0.07249	0.04	0.9707	0.00268
altru3_iw		1	0.26837	0.06267	4.28	<.0001	0.27452
auton4_iw		1	-0.08792	0.04897	-1.80	0.0730	-0.09256
growth5_iw		1	-0.42706	0.07648	-5.58	<.0001	-0.37732
actvar6_iw		1	0.05533	0.04256	1.30	0.1940	0.06116
interpers7_iw		1	0.22541	0.07413	3.04	0.0024	0.20175
leader8_iw		1	0.04541	0.06402	0.71	0.4784	0.04990
structure9_iw		1	0.03223	0.06090	0.53	0.5968	0.03095

Multiple Regression for Engineering Related Activities using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	38.76745	4.30749	5.89	<.0001
Error	711	519.91183	0.73124		
Corrected Total	720	558.67928			

Root MSE	0.85513	R-Square	0.0694	
Dependent Mean	2.76918	Adj R-Sq	0.0576	
Coeff Var	30.88007			

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.68177	0.25136	10.67	<.0001	0
income1_iw		1	-0.01083	0.10093	-0.11	0.9146	-0.00716
status2_iw		1	-0.04301	0.09540	-0.45	0.6522	-0.03371
altru3_iw		1	-0.36077	0.08247	-4.37	<.0001	-0.28689
auton4_iw		1	-0.18571	0.06445	-2.88	0.0041	-0.15197
growth5_iw		1	0.41195	0.10066	4.09	<.0001	0.28297
actvar6_iw		1	0.29676	0.05600	5.30	<.0001	0.25504
interpers7_iw		1	-0.19156	0.09754	-1.96	0.0499	-0.13330
leader8_iw		1	-0.00720	0.08424	-0.09	0.9319	-0.00615
structure9_iw		1	0.11053	0.08013	1.38	0.1682	0.08253

Multiple Regression for Health Related Activities using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	55.84148	6.20461	9.61	<.0001
Error	711	458.82286	0.64532		
Corrected Total	720	514.66435			

Root MSE	0.80332	R-Square	0.1085	
Dependent Mean	2.48257	Adj R-Sq	0.0972	
Coeff Var	32.35830			

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.49197	0.23613	10.55	<.0001	0
income1_iw		1	0.08917	0.09481	0.94	0.3473	0.06141
status2_iw		1	-0.19397	0.08962	-2.16	0.0308	-0.15840
altru3_iw		1	0.53058	0.07747	6.85	<.0001	0.43960
auton4_iw		1	-0.06320	0.06055	-1.04	0.2969	-0.05389
growth5_iw		1	-0.31482	0.09456	-3.33	0.0009	-0.22531
actvar6_iw		1	-0.00605	0.05260	-0.11	0.9085	-0.00541
interpers7_iw		1	0.10359	0.09163	1.13	0.2586	0.07510
leader8_iw		1	0.09281	0.07914	1.17	0.2413	0.08260
structure9_iw		1	-0.19836	0.07527	-2.64	0.0086	-0.15430

Multiple Regression for Human Development and Assistance using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

Source		DF	Sum of Squares	Mean Square	F Value	Pr > F
Model		9	74.58587	8.28732	17.97	<.0001
Error		711	327.83103	0.46108		
Corrected Total		720	402.41690			

	Root MSE		0.67903	R-Square	0.1853
	Dependent Mean		2.87918	Adj R-Sq	0.1750
	Coeff Var		23.58422		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.67211	0.19960	13.39	<.0001	0
income1_iw		1	0.06543	0.08014	0.82	0.4146	0.05096
status2_iw		1	-0.13381	0.07576	-1.77	0.0778	-0.12358
altru3_iw		1	0.67096	0.06549	10.25	<.0001	0.62869
auton4_iw		1	-0.00869	0.05118	-0.17	0.8652	-0.00838
growth5_iw		1	-0.11149	0.07993	-1.39	0.1635	-0.09023
actvar6_iw		1	-0.25845	0.04447	-5.81	<.0001	-0.26170
interpers7_iw		1	0.04334	0.07745	0.56	0.5760	0.03553
leader8_iw		1	-0.01500	0.06689	-0.22	0.8226	-0.01510
structure9_iw		1	-0.18184	0.06363	-2.86	0.0044	-0.15997

Multiple Regression for Leadership & Enterprise Activities using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

Source		DF	Sum of Squares	Mean Square	F Value	Pr > F
Model		9	81.97460	9.10829	18.48	<.0001
Error		711	350.44250	0.49289		
Corrected Total		720	432.41710			

	Root MSE		0.70206	R-Square	0.1896
	Dependent Mean		2.84455	Adj R-Sq	0.1793
	Coeff Var		24.68081		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.63918	0.20636	12.79	<.0001	0
income1_iw		1	-0.04991	0.08286	-0.60	0.5471	-0.03750
status2_iw		1	0.23376	0.07833	2.98	0.0029	0.20826
altru3_iw		1	0.00698	0.06771	0.10	0.9179	0.00631
auton4_iw		1	-0.07222	0.05291	-1.36	0.1727	-0.06718
growth5_iw		1	-0.35703	0.08264	-4.32	<.0001	-0.27877
actvar6_iw		1	-0.13211	0.04597	-2.87	0.0042	-0.12905
interpers7_iw		1	-0.01383	0.08008	-0.17	0.8629	-0.01094
leader8_iw		1	0.55578	0.06916	8.04	<.0001	0.53963
structure9_iw		1	-0.08103	0.06578	-1.23	0.2184	-0.06877

Multiple Regression for Protective & Physical Performing Activities using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

Source		DF	Sum of Squares	Mean Square	F Value	Pr > F
Model		9	56.00868	6.22319	12.67	<.0001
Error		711	349.12696	0.49104		
Corrected Total		720	405.13564			

Root MSE	0.70074	R-Square	0.1382
Dependent Mean	2.66197	Adj R-Sq	0.1273
Coeff Var	26.32408		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.86145	0.20598	13.89	<.0001	0
income1_iw		1	0.01727	0.08270	0.21	0.8347	0.01340
status2_iw		1	0.00744	0.07818	0.10	0.9242	0.00685
altru3_iw		1	0.01028	0.06758	0.15	0.8792	0.00960
auton4_iw		1	-0.17218	0.05282	-3.26	0.0012	-0.16546
growth5_iw		1	-0.24025	0.08249	-2.91	0.0037	-0.19380
actvar6_iw		1	0.40000	0.04589	8.72	<.0001	0.40368
interpers7_iw		1	-0.13733	0.07993	-1.72	0.0862	-0.11222
leader8_iw		1	0.16115	0.06903	2.33	0.0199	0.16165
structure9_iw		1	-0.03006	0.06566	-0.46	0.6473	-0.02635

Multiple Regression for Scientific Activities using 22 I-WRN Scales a priori Sorted into 9 Higher Order Factors

Source		DF	Sum of Squares	Mean Square	F Value	Pr > F
Model		9	27.45981	3.05109	4.23	<.0001
Error		711	512.81276	0.72126		
Corrected Total		720	540.27257			

Root MSE	0.84927	R-Square	0.0508
Dependent Mean	2.58804	Adj R-Sq	0.0388
Coeff Var	32.81509		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.72234	0.24964	10.91	<.0001	0
income1_iw		1	-0.03681	0.10023	-0.37	0.7135	-0.02474
status2_iw		1	-0.14323	0.09475	-1.51	0.1311	-0.11417
altru3_iw		1	0.02575	0.08190	0.31	0.7534	0.02082
auton4_iw		1	-0.07861	0.06401	-1.23	0.2198	-0.06542
growth5_iw		1	0.32766	0.09997	3.28	0.0011	0.22887
actvar6_iw		1	0.17907	0.05561	3.22	0.0013	0.15650
interpers7_iw		1	-0.12609	0.09687	-1.30	0.1935	-0.08922
leader8_iw		1	-0.12832	0.08367	-1.53	0.1256	-0.11146
structure9_iw		1	-0.04973	0.07958	-0.62	0.5322	-0.03776

Multiple Regression for Working with Hardware using 22 I-WRN Scales a priori Sorted
into 9 Higher Order Factors

			Sum of	Mean		
Source		DF	Squares	Square	F Value	Pr > F
Model		9	107.20384	11.91154	16.38	<.0001
Error		711	516.88732	0.72699		
Corrected Total		720	624.09116			

Root MSE		0.85263	R-Square	0.1718
Dependent Mean		2.57910	Adj R-Sq	0.1613
Coeff Var		33.05943		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Standardized Estimate
Intercept	Intercept	1	2.67980	0.25063	10.69	<.0001	0
income1_iw		1	0.03086	0.10063	0.31	0.7592	0.01930
status2_iw		1	-0.21365	0.09513	-2.25	0.0250	-0.15845
altru3_iw		1	-0.36789	0.08223	-4.47	<.0001	-0.27680
auton4_iw		1	-0.18827	0.06426	-2.93	0.0035	-0.14577
growth5_iw		1	0.17240	0.10037	1.72	0.0863	0.11205
actvar6_iw		1	0.63120	0.05583	11.31	<.0001	0.51324
interpers7_iw		1	-0.23378	0.09725	-2.40	0.0165	-0.15392
leader8_iw		1	0.05634	0.08400	0.67	0.5026	0.04553
structure9_iw		1	0.14168	0.07989	1.77	0.0766	0.10009