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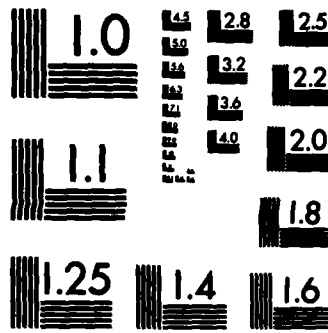
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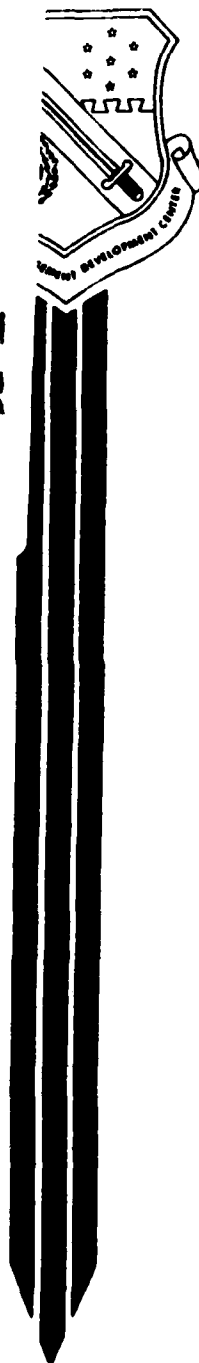


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TEMPORAL STABILITY OF THE FACTOR STRUCTURE
OF THE
ORGANIZATIONAL ASSESSMENT PACKAGE

CAPT JANICE M. HIGHTOWER, USAF

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Item 2) continued: acceptable for the individuals over a six month interval. The results support the use of the OAP database for identification and analysis of systemic trends, as well as consistency in the management consultation process in terms of factor interpretation.



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Abstract

The purpose of this report is to assess the stability of the Organizational Assessment Package (OAP) over time. Two aspects were examined: the stability of the factor structure for the OAP database over a three year period, and the stability of the OAP factor structure when administered twice to the same individuals at an interval of six months. In both cases, the factor structure comparison was by inspection of item content and by calculation of coefficients of congruence. Results showed excellent stability for the factor structure of the OAP database over the time period from 1979 to 1982. Stability was less strong but still acceptable for the individuals over a six month interval. The results support the use of the OAP database for identification and analysis of systemic trends, as well as consistency in the management consultation process in terms of factor interpretation.

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Background

The two principal questions confronting a survey instrument are those of reliability and validity (Isaac & Michael, 1971). The Organizational Assessment Package (OAP) has been the subject of several research investigations addressing the reliability and validity questions, and the present study is an extension of some of the earlier work. Short and Hamilton (1981) examined OAP reliability using both the test-retest method for stability and Cronbach's alpha for internal consistency with good results. Short and Wilkerson (1981) supported the group differences aspects of OAP construct validity across major functional area groups. Hightower and Short (1982) demonstrated the consistency of the OAP factor structure across major functional area groups as well as a variety of demographic groups. They also found factor structure consistency for the OAP between the pre-test sample (the OAP administered as a data-gathering tool) and the post-test sample (the OAP administered as a consulting evaluation tool).

The use of factor analysis for evaluating the reliability and validity of empirical measures is discussed by Carmines and Zeller (1979), and Lennon (1956) mentions it specifically in connection with content validity. The present study addresses a type of factorial invariance which Thurstone (1947) calls configurational invariance and about which he says, "The factor loadings might change markedly from one population to another; but, if the same test battery is used on both populations, the configuration should be invariant. As a matter of fact, this is a far more important consideration in factor analysis than the invariance of factor loadings (p. 365)." Studies of

factor invariance, or stability, over time can be used to detect or rule out the occurrence of beta change, apparent change complicated by measurement error or instrument recalibration. The importance of determining the stability over time for a survey instrument and the implications for measurement of change in organizational research have been addressed in several studies (for example, Cascio, 1976; Golembiewski, Billingsley, & Yeager, 1976; Armenakis & Zmud, 1979; Griffin, 1981). Some of these studies show invariance of factor structure over time, while some show changes. Since the studies used different instruments, different samples, and different time periods, it is not possible to generalize their results.

Purpose of the Study

The purpose of the current study was to examine the stability of the OAP factor structure over time. One aspect of this was to look for changes in the factor structure over the three year history of OAP administration. The other aspect was to look for changes in the factor structure when the OAP was administered twice to the same individuals at an interval of six months.

Concerning the first aspect, factor stability of the OAP over the longer time period (the three year history of the OAP database) is of particular importance considering the use of the database for research on systemic issues and analysis of trends. Also, variations in the OAP factor structure over time would make data-based management consultation problematic or at least more complex. Concerning the second aspect, stability of the factor structure over the six month interval between administrations becomes a critical issue because the OAP is typically administered twice in an organization. The first time for diagnosis; and the second time is for evaluation. If there is some effect on factor structure simply due to repeated administration or because of individual change during the time period, it would be

open to question whether observed differences following consulting were due to the consulting intervention or to one of these other causes.

In addition to providing information useful for the application of the current OAP, this study was designed to provide information for the future OAP. The instrument is presently being completely revised, and experience with the current version is one of the best sources of guidance for the revision.

Method

Instrumentation

The OAP was designed and developed jointly by the Air Force Human Resources Laboratory and the Leadership and Management Development Center, (LMDC) and is used to aid LMDC in its mission to: (a) provide management consultation service to Air Force commanders on request, (b) provide leadership and management training, and (c) conduct research on Air Force systemic issues using information in the OAP database. The OAP is a survey questionnaire consisting of 16 demographic items and 93 attitudinal items (a copy of the instrument is contained in Appendix A). Documentation of the factor analysis results during OAP development is provided in Hendrix and Halverson (1979a; 1979b).

In the LMDC management consultation process, the initial administration of the OAP in an organization is a key step in the data gathering process. The survey is given to a stratified random sample of the personnel in the organization to which LMDC has been invited. After approximately six weeks for analysis, the consultants return to the organization for the tailored visit. During this visit, the results of the analysis are provided to commanders and supervisors in the organization. The results are handled in a confidential manner between LMDC and the client. When specific problems are identified, a consultant and supervisor develop a management action plan designed to resolve the problem at that level of the organization.

Between four and seven months after the tailored visit, the consulting team returns to the organization to readminister the OAP and do other followup data gathering. In this case, the OAP is used as an evaluation tool to help assess the impact of the consulting process. After analysis, a final report and the results of comparing pre- and post- OAP administrations are mailed to the client organization.

The data from OAP administrations are stored in a cumulative database containing over 100,000 pre- and post- records at the time of this study. In addition to the 16 demographic items, other demographics stored on each record include work group code, personnel category and pay grade, age, sex, Air Force Specialty Code, base, and major command. In addition to supporting the consultation process, the database is used to conduct research on Air Force-wide issues related to leadership and management.

Samples

To examine the first area of concern, the stability of the OAP factor structure over the three year period of OAP administration, responses to the pre-intervention OAP were drawn from the database and divided chronologically into five approximately equal fractions. (Note: the database is actually stored in two computer files, one a history file of 1979 records, and the other file containing records from all administrations since 1 January 1980.) This chronological breakdown is shown in Table 1 along with sample sizes for each fraction, and number of bases and number of major commands (MAJCOMs) represented in each fraction. Demographic information (age, sex, personnel category, time in service, and major functional area) for each fraction is

given in Appendix B. The demographic information is provided simply to characterize the sample fractions, not as an alternative explanation for any between-fraction differences which might be found. The OAP factor structure has been shown to be very stable across demographic groups (Hightower & Short, 1982).

To examine the second area of concern, the stability of the instrument for individuals over the typical time period between OAP administrations, the sample was drawn from the control group for another study (Austin & Schunk, 1981). The sample consisted of individuals who had taken the OAP twice at a six month interval and whose matched Time 1-Time 2 responses were available. Since the sample came from a control group, there was no intervention between the two OAP administrations. The procedure for matching Time 1 and Time 2 records is described in Short & Hamilton (1981). There were 293 individuals in the Time 1 administration and 330 individuals in the Time 2 administration who responded to all 93 attitudinal items.

Table 1

Description of Sample Fractions for Three Year Study

<u>Fraction</u>	<u>Calendar Year/Quarters</u>	<u>N</u>	<u>N₁</u>	<u>Number of Bases</u>	<u>Number of MAJCOMs</u>
1	1979/2,3,4	22,045	12,682	27	7
2	1980/1,2	21,726	13,125	35	9
3	1980/3,4	17,602	10,080	22	6
4	1981/1	16,199	9,047	12	3
5	1981/2,3,4 1982/1	17,036	8,471	27	7

Note: N is the total number of individual OAP cases and N₁ is the number of individuals represented in the factor analysis. N₁ is smaller than N because the factor analysis procedure used only cases which had responses other than zero for all 93 attitudinal items.

Procedure

For each of the five chronological fractions and for the Time 1 and Time 2 responses of the matched individuals, principal component analyses were accomplished with a principal factor solution (1s on the main diagonal of the correlation matrix) using a varimax rotation from the procedures contained in the Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975). The minimum eigenvalue for factors extracted was 1.0. For each factor analysis, the variables were the item responses for the 93 attitudinal items on the OAP. Selection of the factoring technique was based on the premises that the principal factor procedure does not require prior assumptions about the underlying structure (Nie, et al, 1975), is the most widely used (Marradi, 1981), and is appropriate when the purpose is to determine the minimum number of independent dimensions accounting for the maximum amount of variance (Cooley & Lohnes, 1971).

The factor loading comparisons were accomplished by inspection of the factor loading patterns and by calculation of coefficients of congruence (Harman, 1967). Congruence coefficients were selected because they are widely used (Levine, 1977), they have an approximate test of significance (Korth & Tucker, 1975), and because previous analysis of groups in the OAP database showed consistent results for coefficient of congruence, root mean square, and s-index procedures (Hightower & Short, 1982). The factor loading matrices produced by the SPSS factor analysis procedure were used as input

data for a computer program which calculated the congruence coefficients. For the three year study, all of the ten possible pairs of the factor solutions for the five fractions were compared. For the six month study of matched individuals, the comparison was simply between Time 1 and Time 2. For each pair of factor loading matrices compared, congruence coefficients were calculated for all possible factor pairs between the two solutions. Matching factors are those with the largest congruence coefficient (absolute value). It should also be noted that the program truncates (rather than rounds) the congruence coefficients, so the results are conservative.

Results

The number of factors extracted for each group and the percent of variance explained by the factor solution is shown in Table 2. For each group, 13 of the factors were interpretable by examination of the pattern and magnitude of the factor loadings. The literature on factor analysis contains extensive discussion of the number of factors to interpret compared to the number of factors extracted (for example, Marradi, 1981; Hair, Anderson, Tatham, & Grablowsky, 1979; Guilford, 1952). Factors with small eigenvalues may consist of little more than error variance. For the purpose of this report, factors which did not contain the primary loading of at least two variables were classed as uninterpretable. The interpretable factors are listed for the two studies in Tables 3 and 4 along with the percent of variance explained by each factor for each group.

Table 2

Factor Analysis Results for Comparison Groups

<u>Group</u>	<u>Number of Factors in Solution</u>	<u>% Variance Accounted For</u>
Fraction 1	14	63.5
Fraction 2	14	63.9
Fraction 3	14	63.1
Fraction 4	14	62.8
Fraction 5	14	62.7
Time 1	16	70.5
Time 2	15	72.2

Table 3
Percent Of Variance Explained By Each Factor
Three Year Study

<u>Factor</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
Supervision	30.4	30.6	29.5	29.8	28.8
Organizational Climate	6.8	7.2	7.1	6.5	7.1
Work Group Effectiveness	4.9	3.1	3.2	5.0	5.1
Task Characteristics	3.2	5.0	4.8	2.7	3.1
Job Role Pride & Satisfaction	2.8	2.7	2.8	3.2	2.7
Need For Enrichment	2.7	2.8	3.0	2.8	2.9
Task Autonomy	2.4	2.4	2.5	2.3	2.5
Job Performance Goals	1.9	1.9	1.9	1.8	2.0
Advancement/Recognition	1.8	1.8	1.8	1.8	1.8
Work Support	1.5	1.5	1.5	1.6	1.6
Work Interference	1.4	1.4	1.4	1.5	1.5
Work Repetition	1.2	1.2	1.2	1.3	1.3
Desired Repetitive Easy Tasks	1.2	1.2	1.2	1.2	1.2

NOTE: Factors named based on item content.

Table 4
Percent Of Variance Explained By Each Factor
Time 1 - Time 2 Study

<u>Factor</u>	<u>Time 1</u>	<u>Time 2</u>
Supervision	35.4	38.7
Organizational Climate	6.3	6.9
Work Group Effectiveness	3.9	2.7
Task Characteristics	1.7	5.9
Job Role Pride and Satisfaction	1.6	1.2
Need For Enrichment	2.7	3.4
Task Autonomy	5.3	2.2
Job Performance Goals	2.4	1.9
Advancement/Recognition	2.1	1.7
Work Support	1.5	1.6
Work Interference	1.4	1.3
Work Repetition	1.4	1.4
Desired Repetitive Easy Tasks	1.3	1.2

NOTE: Factors named based on item content.

Factor-by-factor comparisons of item content for both studies are shown in the tables in Appendix D. The tables contain the primary (highest) loading of each item in each solution. For the sake of completeness, secondary loadings are given in parentheses for the cases where that item in another solution had its primary loading on that factor. In general, what this indicates is an item with a high secondary loading and a resultant tendency to shift from one factor to another depending on the group being analyzed. Even among the secondary loadings, there are few loadings below .30. Examination of the item content of the factors for the three year study (Appendix D, Tables 1-13) shows good consistency among the chronological fractions with no apparent time-related trends. Examination of the tables for the Time 1 - Time 2 study (Appendix D, tables 14-26) seems to show somewhat less stability in the item content of factors for individuals over a six month period. Based on previous experience with factor analysis using small samples and on recommendations in the literature concerning sample size, it seems likely that at least part of the apparent difference is due to sample size. Hair, Anderson, Tatham, and Grablovsky (1979) urge caution in any analysis where there are not at least four or five times as many observations as variables. In the Time 1 - Time 2 study, there were 293 observations for Time 1, 330 observations for Time 2, and 93 variables, for ratios closer to 3:1.

The item content results are supported by the results from calculation of coefficients of congruence. Appendix E contains the coefficients for both studies. Tables 1-10 show results for each fraction in the three year study compared with every other fraction. Factor pairs with the highest congruence

coefficient are also factor pairs which match on the basis of item content. For the three year study, the values of the congruence coefficients for matching factors range between .96 and .99. Table 11 in Appendix E shows the calculated congruence coefficients for the Time 1 - Time 2 comparison. Again, factors which match based on item content also have the highest congruence coefficients. For the Time 1 - Time 2 study, coefficients for matching factors range between .79 and .98.

The previously mentioned test for statistical significance of congruence coefficients is based on a simulation study by Korth and Tucker (1975). Using the tables they developed, minimum values for statistical significance of the congruence coefficients in the present study were calculated and are contained in Appendix F. Even when the most conservative estimates are used to account for number of variables, order of factor matching, number of factors, and in the choice of t - values, all the congruence coefficients for matching factors in both the three year study and the Time 1 - Time 2 study are significant at the .01 level.

Discussion and Conclusions

The results of both item content of factors and congruence coefficients for the three year study show good stability of the OAP factor structure across the chronological fractions. There are some differences in factor item content among the fractions, but these differences are minor and show no apparent trends over time. Congruence coefficients are uniformly high for matching factors. The stability of the OAP factor structure over three years supports the use of this database for identification and analysis of systemic trends.

Stability of factor structure is less strong but still acceptable in the case of the Time 1 - Time 2 study, particularly in view of the small sample size. The stability found is perhaps not surprising in light of the results of the reliability study with the same data (Short & Hamilton, 1981). However, the factor structure in the current study is somewhat different than that used for the reliability study. As already noted, pre-intervention factor structure and post-intervention factor structure for the OAP database were compared by Hightower and Short (1982). Strong similarity of factor structures were reported, but this result was based on a comparison of all pre-intervention data with all post-intervention data. Because of the personnel turnover in organizations, the stratified random sampling techniques used for selecting respondents within an organization, and the fact that the pre-database always leads the post-database, it was not known how many of the respondents were in both the pre-sample and the post-sample. To look at factor structure stability over time with the same individuals, therefore, a different sample was needed. By using a control group for this sample, the possibility of factor structure change due to an intervention could be eliminated. A larger sample would have been preferable, but the analysis was conducted on the only appropriate sample available. The results unambiguously demonstrate the existence of a consistent factor structure for individuals over a six month period. And stability for individuals supports the use of the OAP as an evaluation tool by eliminating the possibility that observed factor score changes are simply the result of a change in factor structure.

In relation to the other purpose of the study, to gather information useful for the revision of the OAP, a further look at the item content of factors in the three year study provides some insight. Across the five fractions analyzed, items can be classed in one of the following three categories:

Category A: Items which consistently have strong primary loadings on a single factor. The majority of OAP items (81 out of 93) are in Category A.

Category B: Items which consistently have primary loadings on one factor, but appear to have markedly lower loadings than the other items in that factor. Seven of the OAP items fall into Category B.

Category C: Items which have primary loadings on more than one factor, depending on the group being analyzed. Five of the OAP items fall into Category C.

The Category B items are listed in Table 5, and the Category C items in Table 6. Based on the factor analysis results, items in both categories should be considered candidates for elimination in the absence of overriding consulting needs. The literature strongly indicates that complex variables (variables which make substantial contributions to more than one factor) should be avoided (for example, Guilford, 1952; Comrey, 1978). Before deciding to drop an item, an analysis could be performed to check for the contribution of the item to factor reliability, although for Category C items it

is not clear which factor to check. If the items are retained, there seems to be a case for trying to reword some of them. For example, one of the Category B items is V279, and experience indicates that many respondents are not clear about the use of the word "bottleneck" in this item. Another Category B item, V209, appears to ask two questions. Also, four of the nine items having the format of the 700-series satisfaction items are classed as Category B or Category C.

In summary, the results of this study of the temporal stability of the OAP factor structure lend strong support to the use of the OAP database in analysis of systemic issues and to the use of the OAP as both a data gathering and evaluation tool in the management consultation process. Current results are particularly strong when combined with results of previous studies. In addition, information presented about specific items should be useful in the effort to revise the OAP.

Table 5

Category B Items - Three Year Study

<u>Factor</u>	<u>Variable Number</u>	<u>Item</u>	<u>Mean Factor Loading</u>
Supervision	V434	My supervisor lets me know when I am doing a poor job.	.45
Task Characteristics	V209	To what extent does your job provide the chance to know for yourself when you do a good job, and to be responsible for your own work?	.44
	V211	To what extent does your job provide you with a chance to finish completely the piece of work you have begun?	.39
Job Role Pride & Satisfaction	V705	<u>Feeling of Helpfulness</u> The chance to help people and improve their welfare through the performance of my job. The importance of my job performance to the welfare of others.	.46
	V712	<u>Technical Training (Other than OJT)</u> The technical training I have received to perform my current job.	.41
Task Autonomy	V272	To what extent are you able to determine how well you are doing your job without feedback from anyone else?	.42
Work Interference	V279	To what extent does a bottleneck in your organization seriously affect the flow of work either to or from your group?	.43

Table 6

Category C Items - Three Year Study

<u>Variable Number</u>	<u>Item</u>	<u>Factor</u>	<u>Frequency</u>
V216	To what extent do you feel accountable to your supervisor in accomplishing your job?	Supervision Factor 14	3/5 2/5
V711	<u>On-the-Job Training (OJT)</u> The OJT instructional methods and instructors' competence.	Supervision Org. Climate Job Role Pride & Satisfaction	1/5 2/5 2/5
V241	To what extent do people who perform well receive recognition?	Org. Climate Advancement/ Recognition	1/5 4/5
V218	To what extent are your job performance goals difficult to accomplish?	Task Char. Work Interf. Factor 14	1/5 2/5 2/5
V717	<u>Work Schedule</u> My work schedule; flexibility and regularity of my work schedule; the number of hours I work per week.	Job Role Pride & Satisfaction Task Autonomy	4/5 1/5

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Appendix A
The Organizational Assessment Package

SCN 82 - 81
Expires 31 Dec 83

GENERAL INFORMATION

The leaders of your organization are genuinely interested in improving the overall conditions within their areas of responsibility. Providing a more satisfying Air Force way of life and increasing organizational effectiveness are also goals. One method of reaching these goals is by continual refinement of the management processes of the Air Force. Areas of concern include job related issues such as leadership and management; training and utilization; motivation of and concern for people; and the communication process.

This survey is intended to provide a means of identifying areas within your organization needing the greatest emphasis in the immediate future. You will be asked questions about your job, work group, supervisor, and organization. For the results to be useful, it is important that you respond to each statement thoughtfully, honestly, and as frankly as possible. Remember, this is not a test, there are no right or wrong responses.

Your completed response sheet will be processed by automated equipment, and be summarized in statistical form. Your individual response will remain confidential, as it will be combined with the responses of many other persons, and used for organizational feedback and possibly Air Force wide studies.

KEY WORDS

The following should be considered as key words throughout the survey:

- Supervisor: The person to whom you report directly.
- Work Group: All persons who report to the same supervisor that you do.
- Organization: Your squadron. However, if you work in staff/support agencies, the division or directorate would be your organization.

INSTRUCTIONS

1. All statements may be answered by filling in the appropriate spaces on the response sheet provided. If you do not find a response that fits your case exactly, use the one that is the closest to the way you feel.
2. Be sure that you have completed Section 1 of the response sheet, as instructed by the survey administrator, before beginning Section 2.
3. Please use the pencil provided, and observe the following:
 - Make heavy black marks that fill the spaces.
 - Erase cleanly any responses you wish to change.
 - Make no stray markings of any kind on the response sheet.
 - Do not staple, fold or tear the response sheet.
 - Do not make any markings on the survey booklet.
4. The response sheet has a 0-7 scale. The survey statements normally require a 1-7 response. Use the zero (0) response only if the statement truly does not apply to your situation. Statements are responded to by marking the appropriate space on the response sheet as in the following example:

Using the scale below, evaluate the sample statement.

- | | |
|--------------------------------|----------------------|
| 1 = Strongly disagree | 5 = Slightly agree |
| 2 = Moderately disagree | 6 = Moderately agree |
| 3 = Slightly disagree | 7 = Strongly agree |
| 4 = Neither agree nor disagree | |

Sample Statement. The information your work group receives from other work groups is helpful.

If you moderately agree with the sample statement, you would blacken the oval (6) on the response sheet.

Sample Response: NA
(0) (1) (2) (3) (4) (5) (6) (7)

5. When you have completed the survey, please turn in the survey materials as instructed in the introduction.

BACKGROUND INFORMATION

This section of the survey concerns your background. The information requested is to insure that the groups you belong to are accurately represented and not to identify you as an individual. Please use the separate response sheet and darken the oval which corresponds to your response to each question.

1. Total years in the Air Force:

1. Less than 1 year.
2. More than 1 year, less than 2 years
3. More than 2 years, less than 3 years.
4. More than 3 years, less than 4 years.
5. More than 4 years, less than 8 years.
6. More than 8 years, less than 12 years.
7. More than 12 years.

2. Total months in present career field.

1. Less than 1 month.
2. More than 1 month, less than 6 months.
3. More than 6 months, less than 12 months.
4. More than 12 months, less than 18 months.
5. More than 18 months, less than 24 months.
6. More than 24 months, less than 36 months.
7. More than 36 months.

3. Total months at this station:

1. Less than 1 month.
2. More than 1 month, less than 6 months.
3. More than 6 months, less than 12 months.
4. More than 12 months, less than 18 months.
5. More than 18 months, less than 24 months.
6. More than 24 months, less than 36 months.
7. More than 36 months.

4. Total months in present position:

1. Less than 1 month.
2. More than 1 months, less than 6 months.
3. More than 6 months, less than 12 months.
4. More than 12 months, less than 18 months.
5. More than 18 months, less than 24 months.
6. More than 24 months, less than 36 months.
7. More than 36 months.

5. Your Ethnic Group is:

1. American Indian or Alaskan Native
2. Asian or Pacific Islander
3. Black, not of Hispanic Origin
4. Hispanic
5. White, not of Hispanic Origin
6. Other

6. Your highest education level attained is:

1. Non-high school graduate
2. High school graduate or GED
3. Less than two years college
4. Two years or more college
5. Bachelors Degree
6. Masters Degree
7. Doctoral Degree

7. Highest level of professional military education (residence or correspondence):

0. None or not applicable
1. NCO Orientation Course or USAF Supervisor Course (NCO Phase 1 or 2)
2. NCO Leadership School (NCO Phase 3)
3. NCO Academy (NCO Phase 4)
4. Senior NCO Academy (NCO Phase 5)
5. Squadron Officer School
6. Intermediate Service School (i.e., ACSC, AFSC)
7. Senior Service School (i.e., AWC, ICAF, NWC)

8. How many people do you directly supervise?

- | | |
|---------|--------------|
| 1. None | 4. 3 |
| 2. 1 | 5. 4 to 5 |
| 3. 2 | 6. 6 to 8 |
| | 7. 9 or more |

9. For how many people do you write performance reports?

- | | |
|---------|--------------|
| 1. None | 4. 3 |
| 2. 1 | 5. 4 to 5 |
| 3. 2 | 6. 6 to 8 |
| | 7. 9 or more |

10. Does your supervisor actually write your performance reports?

- | | | |
|--------|-------|-------------|
| 1. yes | 2. no | 3. not sure |
|--------|-------|-------------|

11. Which of the following "best" describes your marital status?

0. Not Married
1. Married: Spouse is a civilian employed outside home.
2. Married: Spouse is a civilian employed outside home-geographically separated.
3. Married: Spouse not employed outside home.
4. Married: Spouse not employed outside home-geographically separated.
5. Married: Spouse is a military member.
6. Married: Spouse is a military member-geographically separated.
7. Single Parent.

12. What is your usual work schedule?

1. Day shift, normally stable hours.
2. Swing shift (about 1600-2400)
3. Mid shift (about 2400-0800)
4. Rotating shift schedule
5. Day or shift work with irregular/unstable hours.
6. Frequent TDY/travel or frequently on-call to report to work.
7. Crew schedule.

13. How often does your supervisor hold group meetings?

- | | |
|-----------------|-----------------|
| 1. Never | 4. Weekly |
| 2. Occasionally | 5. Daily |
| 3. Monthly | 6. Continuously |

14. How often are group meetings used to solve problems and establish goals?

- | | |
|-----------------|------------------------|
| 1. Never | 3. About half the time |
| 2. Occasionally | 4. All of the time |

15. What is your aeronautical rating and current status?

- | | |
|-----------------------------|----------------------------------|
| 1. Nonrated, not on aircrew | 3. Rated, in crew/operations job |
| 2. Nonrated, now on aircrew | 4. Rated, in support job |

16. Which of the following best describes your career or employment intentions?

1. Planning to retire in the next 12 months
2. Will continue in/with the Air Force as a career
3. Will most likely continue in/with the Air Force as a career
4. May continue in/with the Air Force
5. Will most likely not make the Air Force a career
6. Will separate/terminate from the Air Force as soon as possible

JOB INVENTORY

Below are items which relate to your job. Read each statement carefully and then decide to what extent the statement is true of your job. Indicate the extent to which the statement is true for your job by choosing the phrase which best represents your job.

- | | |
|-----------------------------|------------------------------|
| 1 = Not at all | 5 = To a fairly large extent |
| 2 = To a very little extent | 6 = To a great extent |
| 3 = To a little extent | 7 = To a very great extent |
| 4 = To a moderate extent | |

Select the corresponding number for each question and enter it on the separate response sheet.

17. To what extent does your job require you to do many different things, using a variety of your talents and skills?
18. To what extent does your job involve doing a whole task or unit of work?
19. To what extent is your job significant, in that it affects others in some important way?
20. To what extent does your job provide a great deal of freedom and independence in scheduling your work?
21. To what extent does your job provide a great deal of freedom and independence in selecting your own procedures to accomplish it?
22. To what extent are you able to determine how well you are doing your job without feedback from anyone else?
23. To what extent do additional duties interfere with the performance of your primary job?
24. To what extent do you have adequate tools and equipment to accomplish your job?
25. To what extent is the amount of work space provided adequate?
26. To what extent does your job provide the chance to know for yourself when you do a good job, and to be responsible for your own work?
27. To what extent does doing your job well affect a lot of people?
28. To what extent does your job provide you with the chance to finish completely the piece of work you have begun?

1 = Not at all
2 = To a very little extent
3 = To a little extent
4 = To a moderate extent

5 = To a fairly large extent
6 = To a great extent
7 = To a very great extent

29. To what extent does your job require you to use a number of complex skills?
30. To what extent does your job give you freedom to do your work as you see fit?
31. To what extent are you allowed to make the major decisions required to perform your job well?
32. To what extent are you proud of your job?
33. To what extent do you feel accountable to your supervisor in accomplishing your job?
34. To what extent do you know exactly what is expected of you in performing your job?
35. To what extent are your job performance goals difficult to accomplish?
36. To what extent are your job performance goals clear?
37. To what extent are your job performance goals specific?
38. To what extent are your job performance goals realistic?
39. To what extent do you perform the same tasks repeatedly within a short period of time?
40. To what extent are you faced with the same type of problem on a weekly basis?
41. To what extent are you aware of promotion/advancement opportunities that affect you?
42. To what extent do co-workers in your work group maintain high standards of performance?
43. To what extent do you have the opportunity to progress up your career ladder?
44. To what extent are you being prepared to accept increased responsibility?
45. To what extent do people who perform well receive recognition?
46. To what extent does your work give you a feeling of pride?

- 1 = Not at all
- 2 = To a very little extent
- 3 = To a little extent
- 4 = To a moderate extent

- 5 = To a fairly large extent
- 6 = To a great extent
- 7 = To a very great extent

- 47. To what extent do you have the opportunity to learn skills which will improve your promotion potential?
- 48. To what extent do you have the necessary supplies to accomplish your job?
- 49. To what extent do details (tasks not covered by primary or additional duty descriptions) interfere with the performance of your primary job?
- 50. To what extent does a bottleneck in your organization seriously affect the flow of work either to or from your group?

JOB DESIRES

The statements below deal with job related characteristics. Read each statement and choose the response which best represents how much you would like to have each characteristic in your job.

In my job, I would like to have the characteristics described:

- 1 = Not at all
- 2 = A slight amount
- 3 = A moderate amount
- 4 = A fairly large amount

- 5 = A large amount
- 6 = A very large amount
- 7 = An extremely large amount

- 51. Opportunities to have independence in my work.
- 52. A job that is meaningful.
- 53. An opportunity for personal growth in my job.
- 54. Opportunities in my work to use my skills.
- 55. Opportunities to perform a variety of tasks.
- 56. A job in which tasks are repetitive.
- 57. A job in which tasks are relatively easy to accomplish.

SUPERVISION

The statements below describe characteristics of managers or supervisors. Indicate your agreement by choosing the phrase which best represents your attitude concerning your supervisor.

- | | |
|--------------------------------|----------------------|
| 1 = Strongly disagree | 5 = Slightly agree |
| 2 = Moderately disagree | 6 = Moderately agree |
| 3 = Slightly disagree | 7 = Strongly agree |
| 4 = Neither agree nor disagree | |

Select the corresponding number for each statement and enter it on the separate response sheet.

58. My supervisor is a good planner.
59. My supervisor sets high performance standards.
60. My supervisor encourages teamwork.
61. My supervisor represents the group at all times.
62. My supervisor establishes good work procedures.
63. My supervisor has made his responsibilities clear to the group.
64. My supervisor fully explains procedures to each group member.
65. My supervisor performs well under pressure.
66. My supervisor takes time to help me when needed.
67. My supervisor asks members for their ideas on task improvements.
68. My supervisor explains how my job contributes to the overall mission.
69. My supervisor helps me set specific goals.
70. My supervisor lets me know when I am doing a good job.
71. My supervisor lets me know when I am doing a poor job.
72. My supervisor always helps me improve my performance.
73. My supervisor insures that I get job related training when needed.
74. My job performance has improved due to feedback received from my supervisor.

75. When I need technical advice, I usually go to my supervisor.
76. My supervisor frequently gives me feedback on how well I am doing my job.

WORK GROUP PRODUCTIVITY

The statements below deal with the output of your work group. The term "your work group" refers to you and your co-workers who work for the same supervisor. Indicate your agreement with the statement by selecting the phrase which best expresses your opinion.

- | | |
|-------------------------|--------------------------------|
| 1 = Strongly disagree | 4 = Neither agree nor disagree |
| 2 = Moderately disagree | 5 = Slightly agree |
| 3 = Slightly disagree | 6 = Moderately agree |
| | 7 = Strongly agree |

Select the corresponding number for each statement and enter it on the separate response sheet.

77. The quantity of output of your work group is very high.
78. The quality of output of your work group is very high.
79. When high priority work arises, such as short suspenses, crash programs, and schedule changes, the people in my work group do an outstanding job in handling these situations.
80. Your work group always gets maximum output from available resources (e.g., personnel and material).
81. Your work group's performance in comparison to similar work groups is very high.

ORGANIZATION CLIMATE

Below are items which describe characteristics of your organization. The term "your organization" refers to your squadron or staff agency. Indicate your agreement by choosing the phrase which best represents your opinion concerning your organization.

- | | |
|--------------------------------|----------------------|
| 1 = Strongly disagree | 5 = Slightly agree |
| 2 = Moderately disagree | 6 = Moderately agree |
| 3 = Slightly disagree | 7 = Strongly agree |
| 4 = Neither agree nor disagree | |

Select the corresponding number for each item and enter it on the separate response sheet.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree or disagree

5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

82. Ideas developed by my work group are readily accepted by management personnel above my supervisor.
83. My organization provides all the necessary information for me to do my job effectively.
84. My organization provides adequate information to my work group.
85. My work group is usually aware of important events and situations.
86. My complaints are aired satisfactorily.
87. My organization is very interested in the attitudes of the group members toward their jobs.
88. My organization has a very strong interest in the welfare of its people.
89. I am very proud to work for this organization.
90. I feel responsible to my organization in accomplishing its mission.
91. The information in my organization is widely shared so that those needing it have it available.
92. Personnel in my unit are recognized for outstanding performance.
93. I am usually given the opportunity to show or demonstrate my work to others.
94. There is a high spirit of teamwork among my co-workers.
95. There is outstanding cooperation between work groups of my organization.
96. My organization has clear-cut goals.
97. I feel motivated to contribute my best efforts to the mission of my organization.
98. My organization rewards individuals based on performance.
99. The goals of my organization are reasonable.
100. My organization provides accurate information to my work group.

JOB RELATED ISSUES

The items below are used to determine how satisfied you are with specific job related issues. Indicate your degree of satisfaction or dissatisfaction with each issue by choosing the most appropriate phrase.

- | | |
|--|--------------------------|
| 1 = Extremely dissatisfied | 5 = Slightly satisfied |
| 2 = Moderately dissatisfied | 6 = Moderately satisfied |
| 3 = Slightly dissatisfied | 7 = Extremely satisfied |
| 4 = Neither satisfied nor dissatisfied | |

Select the corresponding number for each question and enter it on the separate response sheet.

101. Feeling of Helpfulness
The chance to help people and improve their welfare through the performance of my job. The importance of my job performance to the welfare of others.
102. Co-Worker Relationship
My amount of effort compared to the effort of my co-workers, the extent to which my co-workers share the load, and the spirit of teamwork which exists among my co-workers.
103. Family Attitude Toward Job
The recognition and the pride my family has in the work I do.
104. On-the-Job Training (OJT)
The OJT instructional methods and instructors' competence.
105. Technical Training (Other than OJT)
The technical training I have received to perform my current job.
106. Work Schedule
My work schedule; flexibility and regularity of my work schedule; the number of hours I work per week.
107. Job Security
108. Acquired Valuable Skills
The chance to acquire valuable skills in my job which prepare me for future opportunities.
109. My Job as a Whole

Appendix B
Demographic Information on Sample Fractions
for Three Year Study

Table 1
 Sample Demographics: Age, Sex, Personnel Category
 Three Year Study

<u>Fraction</u>	<u>Average Age</u>	<u>% Male</u>	<u>% Officers</u>	<u>% Enlisted</u>	<u>% Civilians</u>
1	30.8	84.2	15.8	66.6	17.6
2	30.2	84.9	10.0	68.3	21.7
3	31.3	81.8	16.7	60.4	22.9
4	30.6	82.6	13.6	76.2	10.2
5	31.3	82.1	16.3	59.3	24.4

Note: Age range for all samples was 17-64

Table 2
 Sample Demographics: Time in Service
 Three Year Study

<u>Time In Service</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
Less than 1 yr.	11.2	7.5	6.7	6.2	7.5
1-2 Years	8.8	9.6	11.1	9.3	11.4
2-3 years	7.9	9.0	10.3	9.3	10.4
3-4 years	8.2	9.2	10.6	8.7	8.2
4-8 years	16.2	17.7	17.2	19.3	17.1
8-12 years	47.2	46.4	43.7	29.2	12.8
More than 12 yrs.	$\frac{0.5}{100\%}$	$\frac{0.6}{100\%}$	$\frac{0.4}{100\%}$	$\frac{18.0}{100\%}$	$\frac{32.6}{100\%}$

Table 3
Functional Area Composition of Sample Fractions
Three Year Study

<u>Functional Area</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
Wing/Staff	2.8	2.0	8.7	6.8	1.2
Combat Spt Gp	18.5	37.5	20.4	19.3	22.1
Resources	7.9	10.4	10.9	13.7	10.3
Maintenance	13.2	18.8	8.7	28.4	24.8
Operations	4.4	5.5	2.1	6.1	7.3
Hospital	8.1	2.6	6.2	5.5	5.0
Missiles	0.0	0.0	8.3	0.0	0.2
Communications	2.1	0.5	2.2	4.0	4.0
Unique	40.8	18.5	13.9	2.7	4.1
Misc.	2.2	4.2	18.6	13.5	21.0
	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

Appendix C
Variable Numbers for OAP Attitudinal Items

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
201	17	To what extent does your job require you to do many different things, using a variety of your talents and skills?
202	18	To what extent does your job involve doing a <u>whole</u> task or unit of work?
206	23	To what extent to <u>additional duties</u> interfere with the <u>performance of your</u> primary job.
207	24	To what extent do you have adequate tools and equipment to accomplish your job?
208	25	To what extent is the amount of work space provided adequate?
209	26	To what extent does your job provide the chance to know for yourself when you do a good job, and to be responsible for your own work?
210	27	To what extent does doing your job well affect a lot of people?
211	28	To what extent does your job provide you with a chance to finish completely the piece of work you have begun?

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
213	30	To what extent does your job give you freedom to do your work as you see fit?
214	31	To what extent are you allowed to make the major decisions required to perform your job well?
215	32	To what extent are you proud of your job?
216	33	To what extent do you feel accountable to your supervisor in accomplishing your job?
217	34	To what extent do you know exactly what is expected of you in performing your job?
218	35	To what extent are your job performance goals difficult to accomplish?
221	38	To what extent are your job performance goals realistic?
226	39	To what extent do you perform the same tasks repeatedly within a short period of time?
227	40	To what extent are you faced with the same type of problem on a weekly basis?

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
234	41	To what extent are you aware of promotion/advancement opportunities that affect you?
238	42	To what extent do co-workers in your work group maintain high standards of performance?
239	43	To what extent do you have the opportunity to progress up your career ladder?
240	44	To what extent are you being prepared to accept increased responsibility?
241	45	To what extent do people who perform well receive recognition?
249	51	Opportunities to have independence in my work?
250	52	A job that is meaningful.
251	53	The opportunity for personal growth in my job.
252	54	Opportunities in my work to use my skills.
253	55	Opportunities to perform a variety of tasks.
255	56	A job in which tasks are repetitive.

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
258	57	A job in which tasks are relatively easy to accomplish.
259	77	The <u>quantity</u> of output of your work group is very high.
260	78	The <u>quality</u> of output of your work group is very high.
261	79	When high priority work arises, such as short suspenses, crash programs, and schedule changes, the people in my work group do an <u>outstanding job</u> in handling these <u>situations</u> .
264	80	Your work group always gets maximum output from available resources (e.g., personnel and material).
265	81	Your work group's performance in comparison to similar work groups is very high.
270	20	To what extent does your job provide a great deal of freedom and independence in scheduling your work?
271	21	To What extent does your job provide a great deal of freedom and independence in selecting your own procedures to accomplish it?
272	22	To what extent are you able to determine how well you are doing your job without feedback from anyone else?

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
273	36	To what extent are your job performance goals clear?
274	37	To what extent are your job performance goals specific?
275	46	To what extent does your work give you a feeling of pride?
276	47	To what extent do you have the opportunity to learn skills which will improve your promotion potential?
277	48	To what extent do you have the necessary supplies to accomplish your job?
278	49	To what extent do details (task not covered by primary or additional duty descriptions) interfere with the performance of your primary job?
279	50	To what extent does a bottleneck in your organization seriously affect the flow of work either to or from your group?
300	82	Ideas developed by my work group are readily accepted by management personnel above my supervisor.
301	83	My organization provides all the necessary information for me to do my job effectively.
302	84	My organization provides adequate information to my work group.

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
303	85	My work group is usually aware of important events and situations.
304	86	My complaints are aired satisfactorily.
305	87	My organization is very interested in the attitudes of the group members toward their jobs.
306	88	My organization has a very strong interest in the welfare of its people.
307	89	I am very proud to work for this organization.
308	90	I feel responsible to my organization in accomplishing its mission.
309	91	The information in my organization is widely shared so that those needing it have it available.
310	92	Personnel in my unit are recognized for outstanding performance.
311	93	I am usually given the opportunity to show or demonstrate my work to others.
312	94	There is a high spirit of teamwork among my co-workers.
313	95	There is outstanding cooperation between work groups of my organization.

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
314	96	My organization has clear-cut goals.
315	97	I feel motivated to contribute my best efforts to the mission of my organization.
316	98	My organization rewards individuals based on performance.
317	99	The goals of my organization are reasonable.
318	100	My organization provides accurate information to my work group.
404	58	My supervisor is a good planner.
405	59	My supervisor sets high performance standards.
410	60	My supervisor encourages teamwork.
411	61	My supervisor represents the group at all times.
412	62	My supervisor establishes good work procedures.
413	63	My supervisor has made his responsibilities clear to the group.
416	65	My supervisor performs well under pressure.
424	65	My supervisor takes time to help me when needed.

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
426	67	My supervisor asks members for their ideas on task improvements.
428	68	My supervisor explains how my job contributes to the overall mission.
431	69	My supervisor helps me set specific goals.
433	70	My supervisor lets me know when I am doing a good job.
434	71	My supervisor lets me know when I am doing a poor job.
435	72	My supervisor always helps me improve my performance.
436	73	My supervisor insures that I get job related training when needed.
437	74	My job performance has improved due to feedback received from my supervisor.
439	75	When I need technical advice, I usually go to my supervisor.
442	76	My supervisor frequently gives me feedback on how well I am doing my job.
445	64	My supervisor fully explains procedures to each group member.

OAP VARIABLES

<u>VARIABLE NUMBER</u>	<u>STATEMENT NUMBER</u>	<u>STATEMENT</u>
705	101	<u>Feeling of Helpfulness</u> The chance to help people and improve their welfare through the performance of my job. The importance of my job performance to the welfare of others.
709	102	<u>Co-worker Relationships</u> My amount of effort compared to the effort of my co-workers, the extent to which my co-workers share the load, and the spirit of teamwork which exists among my co-workers.
710	103	<u>Family Attitude Toward Job</u> The recognition and the pride my family has in the work I do.
711	104	<u>On-the-Job Training (OJT)</u> The OJT instructional methods and instructors' competence.
712	105	<u>Technical Training (Other than OJT)</u> The technical training I have received to perform my current job.
717	106	<u>Work Schedule</u> My work schedule; flexibility and regularity of my work schedule; the number of hours I work per week.
718	107	<u>Job Security</u>
719	108	<u>Acquired Valuable Skills</u> The chance to acquire valuable skills in my job which prepare me for future opportunities.
723	109	<u>My Job as a Whole</u>

Appendix D
Factor Structure by Items for
Three Year Study and Time 1 - Time 2 Study

Table 1
Factor Loading: Supervision

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V435	.83	.84	.83	.82	.83
V412	.82	.82	.82	.82	.82
V445	.80	.81	.80	.80	.80
V424	.79	.80	.78	.78	.79
V431	.79	.79	.79	.78	.79
V404	.78	.78	.77	.78	.78
V416	.78	.79	.77	.76	.76
V411	.77	.77	.76	.76	.76
V437	.77	.78	.77	.78	.78
V413	.76	.78	.76	.75	.77
V428	.76	.76	.75	.74	.75
V433	.75	.77	.75	.75	.76
V410	.75	.76	.75	.74	.74
V442	.75	.76	.75	.74	.76
V426	.74	.75	.74	.74	.75
V436	.71	.73	.72	.71	.71
V405	.70	.70	.71	.68	.69
V439	.69	.72	.70	.68	.68
V434	.47	.46	.44	.41	.47
V216	.39	(.37)	(.35)	.35	.38
V711	(.33)	(.34)	(.34)	.36	(.33)

Table 2
Factor Loading: Organizational Climate

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V318	.77	.78	.77	.79	.78
V306	.77	.77	.76	.77	.76
V309	.76	.76	.76	.76	.76
V305	.76	.75	.74	.76	.76
V302	.76	.76	.75	.76	.76
V301	.71	.72	.70	.71	.70
V316	.70	.70	.70	.69	.69
V303	.69	.69	.70	.69	.69
V310	.67	.68	.69	.67	.67
V307	.67	.65	.66	.66	.65
V304	.66	.67	.66	.68	.66
V314	.66	.66	.65	.66	.66
V317	.65	.65	.63	.64	.65
V313	.64	.63	.62	.66	.65
V300	.62	.63	.61	.62	.63
V315	.56	.56	.53	.56	.57
V311	.54	.54	.52	.53	.54
V308	.50	.48	.47	.47	.49
V711	.36	.37	(.34)	(.35)	(.34)
V241	(.42)	(.43)	(.43)	.43	(.44)

Table 3
Factor Loading: Work Group Effectiveness

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V260	.75	.75	.76	.76	.76
V261	.74	.73	.73	.73	.74
V265	.74	.74	.75	.74	.75
V264	.69	.67	.68	.66	.67
V259	.64	.68	.66	.66	.66
V238	.55	.54	.56	.56	.56
V709	.54	.53	.54	.54	.54
V312	.50	.49	.49	.49	.48

Table 4
Factor Loading: Task Characteristics

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V203	.70	.73	.70	.69	.74
V201	.69	.68	.69	.67	.61
V212	.69	.66	.68	.65	.60
V202	.67	.68	.64	.65	.62
V210	.63	.67	.66	.61	.67
V209	.42	.49	.43	.41	.45
V211	.38	.45	.37	.35	.38
V218	(.33)	(.27)	.35	(.26)	(.26)

Table 5
 Factor Loading: Job Role Pride & Satisfaction

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V723	.64	.61	.62	.61	.63
V710	.61	.59	.57	.58	.56
V215	.55	.50	.50	.53	.52
V275	.52	.48	.49	.51	.50
V719	.52	.51	.48	.49	.52
V718	.50	.53	.51	.49	.50
V705	.48	.44	.46	.48	.43
V712	.42	.42	.41	.38	.41
V717	(.38)	.45	.45	.42	.41
V711	(.35)	(.35)	.35	(.31)	.36

Table 6
 Factor Loading: Need For Enrichment

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V252	.88	.88	.88	.88	.87
V251	.86	.87	.86	.87	.87
V250	.85	.85	.85	.85	.86
V253	.76	.79	.78	.78	.78
V249	.70	.71	.69	.69	.68

Table 7
Factor Loading: Task Autonomy

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V271	.79	.79	.81	.80	.80
V213	.76	.76	.78	.76	.76
V270	.74	.73	.72	.74	.74
V214	.61	.62	.62	.62	.63
V272	.42	.41	.43	.44	.42
V717	.39	(.39)	(.38)	(.37)	(.40)

Table 8
Factor Loading: Job Performance Goals

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V274	.79	.79	.79	.78	.81
V273	.79	.78	.79	.77	.80
V217	.64	.65	.67	.62	.64
V221	.61	.59	.61	.63	.63

Table 9
Factor Loading: Advancement/Recognition

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V239	.74	.74	.75	.74	.73
V276	.60	.60	.61	.60	.57
V234	.59	.61	.61	.64	.58
V240	.56	.56	.58	.54	.57
V241	.47	.47	.46	(.41)	.48

Table 10
Factor Loading: Work Support

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V207	.80	.80	.78	.80	.78
V277	.76	.76	.75	.76	.76
V208	.65	.63	.60	.66	.61

Table 11
Factor Loading: Work Interferences

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V278	.82	.81	.83	.81	.80
V206	.80	.78	.81	.79	.78
V279	.44	.48	.40	.41	.41
V218	(.33)	.39	(.32)	(.30)	.46

Table 12
Factor Loading: Repetition

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V226	.78	.79	.75	.76	.74
V227	.77	.78	.76	.74	.72

Table 13

Factor Loading: Desired Repetitive Easy Tasks

<u>Variable Number</u>	<u>Fraction 1</u>	<u>Fraction 2</u>	<u>Fraction 3</u>	<u>Fraction 4</u>	<u>Fraction 5</u>
V258	.82	.83	.81	.80	.82
V255	.80	.82	.80	.80	.79

Table 14
Factor Loadings: Supervision

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V412	.84	.83
V424	.83	.81
V435	.83	.84
V445	.81	.78
V413	.80	.74
V416	.80	.79
V426	.80	.78
V404	.79	.78
V428	.77	.78
V431	.77	.80
V411	.77	.79
V436	.76	.72
V437	.75	.80
V410	.75	.81
V433	.73	.80
V442	.73	.77
V405	.71	.72
V439	.71	.71
V711	.40	(.36)
V216	.33	.44

Table 15
Factor Loadings: Organizational Climate

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V309	.77	.73
V302	.76	.74
V305	.75	.78
V306	.75	.79
V318	.74	.72
V316	.72	.74
V313	.70	.61
V304	.70	.75
V303	.69	.61
V310	.68	.70
V314	.68	.70
V307	.68	.77
V301	.66	.75
V317	.65	.72
V315	.61	.71
V300	.59	.67
V311	.55	.59
V308	.54	.59
V312	.52	.51
V214	.47	.48
V238	.42	(.27)
V705	.37	(.38)
V723	(.43)	.59
V712	(.30)	.52
V711	(.35)	.48
V719	(.32)	.48
V718	(.30)	.47

Table 16
Factor Loadings: Task Autonomy

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V217	.78	.75
V213	.77	.66
V270	.68	.71
V214	.66	.63
V272	.51	.47
V212	.49	(.21)
V201	.47	(.23)
V209	.42	.50
V275	.38	(.24)

Table 17
Factor Loadings: Work Group Effectiveness

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V259	.71	.60
V265	.71	.65
V260	.68	.68
V264	.62	.57
V261	.62	.69
V709	.38	.55
V238	(.38)	.51

Table 18
Factor Loadings: Need For Enrichment

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V251	.88	.90
V252	.87	.89
V250	.85	.88
V253	.80	.82
V249	.78	.81

Table 19
Factor Loadings: Job Performance Goals

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V273	.77	.75
V274	.73	.75
V217	.55	.54
V221	.49	.38
V211	(.15)	.37

Table 20
Factor Loadings: Advancement/Recognition

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V239	.62	.68
V240	.57	.45
V276	.54	.53
V234	.44	.67

Table 21
Factor Loadings: Task Characteristics

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V203	.71	.72
V210	.57	.58
V202	.50	.62
V211	.39	(.33)
V215	.39	.56
V201	(.44)	.70
V212	(.33)	.70
V275	(.32)	.58
V705	(.23)	.44

Table 22
Factor Loadings: Job Role Pride & Satisfaction

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V718	.63	(.25)
V719	.55	(.43)
V710	.50	.53
V717	.50	(.26)
V723	(.45)	(.30)
V712	.43	(.46)

Table 23
Factor Loadings: Work Support

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V207	.73	.69
V277	.68	.58
V208	.67	.63

Table 24
Factor Loadings: Work Interference

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V278	.76	.73
V206	.75	.78
V218	.54	(.26)
V279	.50	(.32)

Table 25
Factor Loadings: Work Repetition

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V226	-.76	.73
V227	-.76	.79
V279	(-.17)	.37

Table 26
Factor Loadings: Desired Repetitive Easy Tasks

<u>Variable Number</u>	<u>Time 1</u>	<u>Time 2</u>
V258	.79	.77
V255	.67	.65

Appendix E
Coefficients of Congruence

TABLE 1

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 1 AND FRACTION 2
USING COEFFICIENTS OF CONGRUENCE

		FACTORS FOR FRACTION 2												
FRACTION 1		1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.60	.34	.50	.13	.45	.33	.40	.45	.28	-.17	-.13	.06	
2	.60	.99	.43	.55	.17	.63	.45	.44	.49	.41	-.28	-.22	.04	
3	.50	.56	.45	.99	.22	.49	.34	.40	.37	.30	-.12	-.12	.03	
4	.31	.39	.99	.43	.35	.52	.47	.44	.42	.24	.08	-.16	.02	
5	.46	.64	.60	.50	.24	.99	.45	.45	.49	.31	-.20	-.24	.04	
6	.13	.16	.35	.22	.99	.23	.27	.23	.21	.17	.03	-.03	-.25	
7	.33	.46	.50	.35	.27	.45	.99	.35	.35	.33	-.17	-.24	-.02	
8	.40	.45	.52	.41	.24	.44	.38	.99	.40	.39	-.22	.04	.05	
9	.45	.50	.43	.36	.20	.49	.35	.37	.99	.28	-.06	-.11	.04	
10	.28	.42	.29	.31	.17	.31	.31	.40	.28	.99	-.25	-.05	.02	
11	-.17	-.27	.02	-.13	.01	-.19	-.16	-.18	-.07	-.24	.99	.11	.03	
12	-.12	-.20	-.10	-.10	-.01	-.23	-.23	.07	-.11	-.02	.11	.99	.16	
13	.06	.05	-.01	.03	-.25	.03	-.01	.07	.05	.01	.04	.14	.99	

TABLE 2

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 1 AND FRACTION 3
USING COEFFICIENTS OF CONGRUENCE

		FACTORS FOR FRACTION 3												
FRACTION 1		1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.60	.32	.49	.12	.46	.32	.40	.44	.29	-.15	-.12	.04	
2	.60	.99	.40	.54	.16	.64	.44	.44	.49	.40	-.24	-.20	.02	
3	.50	.55	.43	.99	.21	.50	.33	.40	.36	.31	-.10	-.10	.01	
4	.30	.38	.99	.42	.33	.53	.47	.48	.42	.24	.09	-.14	-.02	
5	.46	.62	.59	.47	.23	.99	.44	.45	.50	.29	-.15	-.21	.01	
6	.12	.16	.34	.22	.99	.23	.28	.23	.20	.18	.01	-.03	-.26	
7	.33	.44	.46	.33	.27	.46	.99	.36	.34	.34	-.14	-.24	-.02	
8	.40	.45	.50	.40	.23	.45	.36	.99	.39	.40	-.17	.06	.05	
9	.44	.49	.41	.36	.19	.49	.35	.38	.99	.28	-.04	-.12	.03	
10	.29	.40	.27	.31	.17	.31	.31	.40	.28	.98	-.23	-.01	.01	
11	-.17	-.26	.07	-.13	.01	-.18	-.15	-.19	-.06	-.27	.98	.11	.01	
12	-.12	-.20	-.12	-.10	-.02	-.22	-.23	.08	-.10	-.01	.11	.98	.19	
13	.06	.04	.00	.01	-.26	.03	-.03	.07	.04	.01	.04	.15	.98	

TABLE 3

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 1 AND FRACTION 4
USING COEFFICIENTS OF CONGRUENCE

FACTORS FOR FRACTION 4

FRACTION 1	1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.61	.51	.46	.14	.30	.35	.41	.43	.28	-.15	-.11	.04
2	.60	.99	.54	.63	.18	.36	.45	.44	.47	.39	-.26	-.19	.02
3	.51	.55	.99	.49	.22	.39	.34	.41	.35	.28	-.12	-.08	.00
4	.31	.38	.40	.55	.35	.99	.49	.48	.44	.21	.07	-.09	-.04
5	.47	.63	.47	.99	.25	.53	.46	.47	.48	.29	-.18	-.20	.01
6	.14	.16	.22	.24	.99	.34	.29	.24	.22	.15	.01	-.02	-.27
7	.35	.45	.33	.47	.28	.43	.99	.37	.36	.29	-.18	-.21	-.03
8	.41	.44	.40	.46	.24	.47	.41	.99	.39	.37	-.17	.09	.03
9	.45	.49	.36	.50	.21	.41	.39	.38	.99	.27	-.04	-.10	.01
10	.30	.40	.30	.31	.17	.23	.30	.39	.27	.99	-.26	.00	.02
11	-.17	-.28	-.13	-.19	.01	.06	-.15	-.18	-.04	-.25	.97	.09	.04
12	-.13	-.21	-.09	-.22	-.02	-.10	-.19	.05	-.12	-.02	.12	.98	.17
13	.06	.05	.01	.02	-.27	.00	-.02	.07	.05	.02	.03	.16	.98

TABLE 4

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 1 AND FRACTION 5
USING COEFFICIENTS OF CONGRUENCE

		FACTORS FOR FRACTION 5												
FRACTION 1	1	2	3	4	5	6	7	8	9	10	11	12	13	
1	.99	.59	.50	.30	.14	.45	.32	.40	.44	.27	-.14	-.13	.04	
2	.58	.99	.53	.37	.18	.62	.44	.43	.49	.41	-.24	-.21	.03	
3	.50	.55	.99	.41	.22	.48	.33	.39	.35	.30	-.10	-.09	.02	
4	.30	.38	.40	.99	.36	.54	.47	.45	.42	.23	.15	-.15	-.01	
5	.45	.62	.48	.55	.26	.99	.45	.44	.48	.32	-.16	-.22	.03	
6	.12	.16	.22	.34	.99	.24	.29	.23	.21	.18	.04	-.04	-.25	
7	.33	.45	.33	.45	.29	.46	.99	.35	.34	.34	-.12	-.24	-.01	
8	.40	.45	.41	.51	.25	.44	.37	.99	.39	.35	-.19	.07	.06	
9	.44	.49	.35	.39	.22	.50	.36	.38	.99	.28	-.02	-.13	.02	
10	.28	.41	.31	.27	.19	.31	.30	.38	.27	.98	-.24	-.04	.03	
11	-.17	-.27	-.14	.04	.00	-.16	-.14	-.17	-.07	-.25	.97	.13	.00	
12	-.13	-.20	-.09	-.04	-.02	-.24	-.22	.06	-.11	-.03	.05	.98	.19	
13	.06	.05	.02	.00	-.24	.02	-.03	.07	.04	.03	.05	.14	.97	

TABLE 5

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 2 AND FRACTION 3
USING COEFFICIENTS OF CONGRUENCE

		FACTORS FOR FRACTION 3												
FRACTION 2		1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.60	.32	.49	.12	.46	.31	.40	.45	.28	-.14	-.11	.05	
2	.59	.99	.41	.55	.16	.64	.44	.43	.50	.41	-.23	-.20	.03	
3	.33	.42	.99	.44	.35	.57	.52	.51	.43	.28	.05	-.13	-.03	
4	.50	.55	.44	.99	.22	.50	.34	.39	.35	.31	-.09	-.11	.00	
5	.13	.16	.36	.23	.99	.25	.28	.23	.20	.19	.01	-.03	-.27	
6	.45	.62	.55	.47	.23	.99	.45	.42	.49	.29	-.15	-.24	.00	
7	.32	.44	.49	.34	.27	.46	.99	.35	.34	.33	-.13	-.26	-.03	
8	.39	.42	.45	.37	.22	.43	.33	.99	.36	.40	-.16	.08	.06	
9	.44	.50	.41	.36	.19	.48	.35	.39	.99	.27	-.05	-.13	.03	
10	.28	.40	.26	.29	.18	.31	.32	.38	.28	.98	-.24	-.02	-.01	
11	-.17	-.28	.09	-.12	.03	-.19	-.15	-.22	-.07	-.27	.98	.11	.03	
12	-.13	-.21	-.18	-.13	-.04	-.25	-.27	.07	-.11	-.05	.11	.98	.18	
13	.06	.04	.01	.01	-.27	.03	-.04	.06	.04	.00	.04	.17	.98	

TABLE 6

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 2 AND FRACTION 4
USING COEFFICIENTS OF CONGRUENCE

FACTORS FOR FRACTION 4

FRACTION 2	FACTORS FOR FRACTION 4												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.60	.51	.46	.14	.31	.34	.41	.44	.27	-.14	-.10	.04
2	.60	.99	.54	.64	.18	.37	.45	.44	.48	.39	-.26	-.19	.03
3	.34	.42	.43	.60	.37	.98	.54	.52	.44	.24	.04	-.09	-.05
4	.51	.55	.99	.49	.23	.40	.35	.40	.35	.27	-.12	-.09	-.01
5	.14	.17	.22	.26	.99	.36	.30	.24	.22	.15	.01	-.01	-.28
6	.46	.63	.46	.99	.25	.49	.47	.43	.47	.30	-.19	-.22	.01
7	.34	.45	.33	.47	.29	.45	.99	.37	.36	.28	-.17	-.23	-.03
8	.40	.42	.38	.43	.23	.43	.38	.99	.37	.36	-.16	.10	.05
9	.45	.49	.36	.50	.21	.40	.38	.39	.99	.26	-.04	-.10	.01
10	.29	.40	.28	.30	.17	.22	.31	.37	.27	.98	-.27	-.01	.00
11	-.17	-.29	-.12	-.20	.02	.08	-.16	-.21	-.04	-.26	.96	.09	.06
12	-.13	-.22	-.12	-.25	-.04	-.16	-.23	.03	-.13	-.05	.12	.97	.17
13	.06	.05	.01	.02	-.28	.01	-.03	.07	.04	.00	.03	.17	.97

TABLE 7

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 2 AND FRACTION 5
USING COEFFICIENTS OF CONGRUENCE

FACTORS FOR FRACTION 5

FRACTION 2	1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.58	.50	.30	.13	.45	.31	.39	.45	.26	-.14	-.12	.05
2	.58	.99	.54	.38	.18	.63	.44	.42	.49	.42	-.23	-.21	.04
3	.33	.42	.43	.98	.38	.58	.51	.48	.43	.26	.10	-.15	-.02
4	.49	.55	.99	.42	.23	.48	.34	.38	.35	.29	-.10	-.10	.02
5	.13	.17	.23	.36	.99	.26	.29	.24	.21	.18	.04	-.04	-.26
6	.44	.62	.47	.50	.26	.99	.46	.41	.47	.32	-.16	-.24	.02
7	.31	.45	.33	.46	.29	.46	.99	.35	.34	.34	-.11	-.26	-.03
8	.39	.43	.38	.47	.24	.42	.33	.99	.36	.35	-.18	.08	.06
9	.44	.50	.35	.39	.23	.49	.35	.38	.99	.28	-.03	-.13	.01
10	.27	.40	.29	.25	.19	.31	.31	.36	.27	.98	-.24	-.04	.01
11	-.17	-.28	-.13	.06	.02	-.17	-.15	-.19	-.08	-.25	.98	.12	.02
12	-.13	-.21	-.11	-.11	-.05	-.27	-.26	.05	-.12	-.07	.06	.97	.18
13	.06	.05	.01	.02	-.25	.02	-.04	.06	.03	.01	.05	.16	.98

TABLE 8

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 3 AND FRACTION 4
USING COEFFICIENTS OF CONGRUENCE

FACTORS FOR FRACTION 4

FRACTION 3	1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.60	.51	.46	.14	.30	.34	.41	.43	.27	-.15	-.10	.04
2	.60	.99	.54	.62	.17	.36	.43	.43	.47	.38	-.25	-.19	.02
3	.32	.39	.41	.58	.36	.98	.51	.49	.43	.21	.07	-.10	-.04
4	.50	.54	.99	.47	.23	.39	.34	.38	.35	.28	-.12	-.09	-.02
5	.13	.16	.22	.25	.99	.34	.29	.23	.20	.16	.00	-.02	-.29
6	.47	.64	.47	.99	.26	.50	.48	.45	.47	.29	-.18	-.22	.01
7	.33	.43	.32	.47	.29	.45	.99	.35	.36	.28	-.16	-.23	-.06
8	.41	.43	.38	.44	.23	.46	.39	.99	.38	.36	-.16	.11	.05
9	.45	.49	.34	.50	.20	.40	.37	.37	.99	.26	-.04	-.10	.01
10	.29	.40	.29	.28	.19	.22	.32	.38	.27	.98	-.29	-.01	.01
11	-.14	-.25	-.10	-.15	.01	.08	-.13	-.16	-.03	-.24	.97	.08	.06
12	-.12	-.21	-.10	-.22	-.04	-.13	-.23	.05	-.14	-.02	.12	.98	.17
13	.04	.03	-.01	-.01	-.29	-.02	-.03	.07	.03	.00	.02	.18	.98

TABLE 9

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 3 AND FRACTION 5
USING COEFFICIENTS OF CONGRUENCE

FACTORS FOR FRACTION 5

FRACTION 3	1	2	3	4	5	6	7	8	9	10	11	12	13
1	.99	.59	.50	.29	.13	.45	.31	.39	.44	.27	-.14	-.12	.05
2	.58	.99	.53	.37	.17	.61	.42	.42	.49	.40	-.23	-.20	.03
3	.31	.40	.41	.98	.37	.57	.48	.45	.41	.24	.15	-.16	-.01
4	.49	.54	.99	.40	.23	.46	.33	.37	.34	.29	-.10	-.10	.00
5	.11	.16	.22	.34	.99	.24	.29	.22	.20	.19	.04	-.05	-.27
6	.45	.63	.48	.52	.26	.99	.46	.42	.46	.31	-.15	-.23	.02
7	.31	.43	.32	.47	.30	.46	.99	.33	.34	.33	-.10	-.26	-.05
8	.40	.43	.39	.50	.24	.42	.34	.99	.38	.34	-.19	.09	.07
9	.44	.49	.34	.39	.22	.50	.34	.37	.99	.28	-.03	-.12	.01
10	.27	.40	.31	.25	.21	.28	.32	.37	.26	.98	-.26	-.05	.02
11	-.14	-.23	-.10	.06	.00	-.12	-.12	-.15	-.06	-.24	.97	.13	.03
12	-.12	-.20	-.10	-.07	-.04	-.25	-.26	.07	-.13	-.04	.05	.98	.19
13	.04	.03	.00	-.02	-.27	-.01	-.05	.07	.02	.01	.04	.17	.98

TABLE 10

COMPARISON OF FACTOR STRUCTURES FOR
FRACTION 4 AND FRACTION 5
USING COEFFICIENTS OF CONGRUENCE

		FACTORS FOR FRACTION 5												
FRACTION 4	1	2	3	4	5	6	7	8	9	10	11	12	13	
1	.99	.59	.51	.31	.14	.46	.33	.40	.45	.28	-.14	-.13	.05	
2	.59	.99	.53	.36	.18	.62	.43	.41	.49	.41	-.24	-.21	.04	
3	.50	.53	.99	.39	.23	.46	.32	.37	.34	.28	-.10	-.09	.00	
4	.45	.62	.48	.54	.27	.99	.48	.42	.48	.30	-.16	-.22	.00	
5	.14	.18	.23	.36	.99	.27	.31	.23	.21	.19	.03	-.05	-.28	
6	.30	.35	.37	.98	.36	.51	.45	.43	.41	.21	.14	-.14	-.01	
7	.33	.45	.33	.49	.31	.47	.99	.38	.38	.32	-.11	-.22	-.03	
8	.41	.43	.39	.50	.25	.44	.36	.99	.38	.33	-.18	.05	.07	
9	.43	.47	.34	.41	.24	.48	.36	.38	.98	.28	.01	-.15	.01	
10	.26	.38	.28	.21	.17	.29	.28	.34	.25	.98	-.25	-.04	.02	
11	-.15	-.26	-.13	.05	-.01	-.16	-.15	-.16	-.04	-.28	.95	.15	.01	
12	-.10	-.19	-.07	-.03	-.02	-.23	-.23	.09	-.10	-.03	.03	.98	.19	
13	.04	.03	-.01	-.05	-.27	.00	-.05	.05	.00	.02	.06	.15	.98	

TABLE 11

COMPARISON OF FACTOR STRUCTURES FOR
TIME 1 AND TIME 2
USING COEFFICIENTS OF CONGRUENCE

		FACTORS FOR TIME 2												
TIME 1	1	2	3	4	5	6	7	8	9	10	11	12	13	
1	.98	.64	.49	.29	.55	.46	.43	.46	.32	-.07	-.11	.41	.04	
2	.65	.98	.56	.29	.63	.58	.47	.55	.50	-.19	-.23	.47	.01	
3	.51	.64	.80	.36	.52	.94	.47	.50	.40	-.24	-.06	.45	.05	
4	.56	.59	.60	.39	.93	.52	.50	.41	.38	-.02	.00	.41	-.10	
5	.25	.27	.36	.94	.35	.29	.31	.21	.19	.03	.02	.15	-.30	
6	.46	.52	.59	.36	.50	.46	.84	.49	.48	.13	-.10	.45	-.04	
7	.52	.62	.62	.30	.53	.53	.53	.83	.36	-.20	-.11	.48	.06	
8	.43	.46	.85	.36	.48	.53	.54	.39	.32	-.02	.01	.20	-.07	
9	.47	.67	.59	.27	.51	.48	.38	.46	.35	-.21	-.25	.81	.17	
10	.32	.48	.34	.21	.35	.39	.47	.37	.82	-.03	-.24	.21	.05	
11	-.06	-.17	.26	.12	.09	.00	-.04	.00	-.11	.25	.80	.01	-.04	
12	.16	.31	.33	.04	.17	.30	-.01	.14	.16	-.79	-.14	.28	-.15	
13	.04	.05	.02	-.27	-.06	.03	.04	.01	-.04	.13	.01	.03	.79	
14	.28	.24	.26	.18	.35	.14	.21	.20	.08	-.01	.00	.25	-.12	
15	.04	.11	.24	.02	.01	.05	.02	-.05	-.12	-.13	-.02	.12	-.04	

Appendix F
Significance Levels for Congruence Coefficients

Table 1

Significance Levels for Congruence Coefficients

<u>D</u>	<u>\bar{X}_z</u>	<u>$\bar{\sigma}_z$</u>	<u>\varnothing_z</u>	<u>$\varnothing: P(CC > \varnothing) < 0.01$</u>
1	1.20	.07	1.38	.88
2	1.07	.06	1.23	.84
3	.98	.06	1.14	.81
4	.88	.06	1.04	.78
5	.81	.05	.94	.74
6	.73	.05	.86	.70
7	.65	.04	.75	.64
8	.59	.03	.67	.58
9	.54	.03	.62	.55
10	.49	.04	.59	.53
11	.44	.03	.52	.48
12	.40	.02	.39	.37
13	.34	.02	.39	.37
14	.28	.03	.36	.31
15	.24	.03	.32	.31
16	.20	.03	.28	.27

- Note: (1) D is the order of factor matching, \bar{X}_z is the Fisher z transformation of the mean congruence coefficient, and $\bar{\sigma}_z$ the Fisher z transformation of the standard deviation. Values of D, \bar{X}_z and $\bar{\sigma}_z$ are from Korth and Tucker (1975).
- (2) \varnothing_z is the Fisher z transformation of \varnothing , the critical value of the congruence coefficient (CC)
- (3) Degrees of freedom = number of items - number of factors = 93-16=77.
 $t_{.01,120} = 2.617$
- (4) \varnothing decreases with increasing numbers of variables, so that using table for 80 variables instead of 93 is conservative.
- (5) \varnothing decreases with decreasing number of factors, so using table for 20 factors is conservative.

