Report of :

Adherence to theory discovered when the Personality Pattern Inventory (tm) was administered to subjects twice

Data Analysis & Interpretation
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Purpose and Overview of the Study:

This study was commissioned by Kahler Communications, Inc., Little Rock, AR for the purpose of reviewing what support, if any, there was to be found of Dr. Kahler's theory with respect to Phase progression/regression/statics and, additionally, examine the consistency of described personality profiles of individuals. These objectives were to be accomplished via the comparison of test scores of a number of persons who had taken the "inventory" at least twice. "Inventory", in this study refers to the Personality Pattern Inventory (hereafter PPI) developed, copyrighted, trademarked and distributed by Dr. Taibi Kahler and Kahler Communications, Inc. The cases (individual's PPI results) used in this study were drawn from Kahler Communications files in a search for all individuals who had submitted valid PPI "answer sheets" on at least two occasions within the six (6) year period ending February, 1990. Restated, the objectives of this study were:

- o Determine if there was evidence in support of Dr. Kahler's theory with respect to Phase change;
- o and, examine the consistency of the test instrument (the PPI) in specification of "personality patterns".

The procedure adopted to address these two objectives was to specify a number of statements (so called "null hypothesis") and then to test the numerical case evidence for the purpose of accepting or rejecting these "hypotheses". Some of the major hypotheses were:

- o Any differences found between Phase Type and Kahler's theory are due to random fluctuations from sampling.
- o Time interval between "testing" sessions is not a predictor of current indicated Phase Type.
- o "Questionable Validity" alerts (printed statements on the Results Form) are not predictors of current indicated Phase Type.
- o Changes in the specific order of sub-measures do not indicate variance from Phase Theory.
- o Raw sub-measure (test) scores are consistent.

There will be detailed discussion of the tests and findings related to each of the above hypothesis in the "Discussion of Findings". In this current section only a statement of the major results will be presented.

85.2% of the 204 cases examined (408 test sessions) were found to conform to Dr. Kahler's theory - these results are accurate +/- 3% at one (1) Standard Error or +/- 6% at two (2) Standard Error. In other words, 66.7% of the time we can be confident that the true results are within +/-3% of 85.2% or 95% of the time, within +/-6% of 85.2%. Hence considerable confidence can be placed

upon Kahler's theory in its ability to predict changes in behavior. Corollary to the previous proof is the evidence that "time interval" is not predictive of Phase. This paper is not a discussion of psychological theory, if for no other reason, the writer is not qualified or educated sufficiently to discuss such; however, within the realm of the statistical tests performed and, also, within the realm of logic, if time were a major predictor then Kahler's theory would have weakened foundations. That is, if time was a valid predictor it would discredit the theory which states that, Phase change is based upon "need", long-term distress and/or short-term eustress, as explained to the writer by Dr. Kahler (and this is as close to psychological theory as the writer is comfortable with) Put another way, if Phase could be explained by time it would negate the effects of life experiences; this is to say, if the passage of time is a controling vaiable, then all subjects would exhibit correlated and similar changes in a given time span. This introduces a dicholomy, either the PPI measures changes in Phase types which are dependent upon the expiration of time or the Inventory measures changes in Phase types which are influenced by other factors. Therefore, it was entirely possible for the writer to test the theory without either knowledge or understanding of the theory. Time explained changes in Phase Type – or not. Specifically, Kahler's Phase types were treated as classifying dependent variables and the time interval between tests was treated as an independent variable. A model encompassing these attributes was analyzed using a multivariate least squares computer program (MGLH of the SYSTAT System copyright (c) 1986 SYSTAT, Inc.). Coefficients of the time variable ranged between -0.007 and 0.006; none of which could be considered significant, regardless of the respective F-Statistics or probabilities.

"Questionable Validity" alerts relate to psychological interpretation by definition. These were quickly dismissed as having any Phase type predictive capability. Changes in the specific order of sub-measures indicates volatile "personalities" – which is to say that certain cases exhibited re-orderings in the "pattern" of Phases. Explanation of these alterations calls for a psychological statement: such statements can only, and properly, be issued by Dr. Kahler. This re-ordering did not significantly reduce the "hits" of predicted phase type. Theory is upheld. The last examination performed was the consistency of sub-measure scores. This test was included as an additional look at the test instrument as a measuring device. Some variation was expected – but such variation was anticipated to be of limited range. In fact, sub-measure scores were found to be very consistent – 5 of 6 sub-measures correlated at the 68.6% or higher level; 4 of 6 sub-measures correlated at 80.8% or higher.

Therefore, the PPI:

- 1) effectively measures change,
- 2) is consistent in description of personality patterns;
- 3) is not controlled by time;

and

- 4) is essentially accurate in predicting behavior patterns.

Methodology:

The methodology employed in this study was reasonably straight forward:

1) files were reviewed to identify test subjects which had taken the PPI, at least twice, in a controlled environment;

2) the identified cases were further screened to insure that each test taken was of the same "version" or revision;

3) cases, screened as per the above, were extracted to paper and identified with a case number;

4) selected data from these paper records were input to a computer data base (Please see Appendix A for details of data elements in the data base);

5) several statistical tests and other data analysis were specified;

6) computer instructions were issued to extract data elements in the various forms required by the several tests;

7) actual statistical tests and other analysis were performed;

and

8) results are reported in this paper.

Specific statistical tests and other analysis are reported in the section titled "Discussion of Findings".

Unless otherwise noted, all included statistics and analysis utilized "raw scores". This current study did not have as one of its objectives the analysis of test result reporting format; nor is it within the expertise of the writer to analyze psychological interpretations contained in result reports. This does not imply that there is/are any question(s) regarding either of these two (2) subjects – rather, what should be clearly stated is that these areas were not examined. Therefore, it was determined that the use of "raw scores" would preclude any influences from these areas Not only was this the simplest operational procedure – but it also eliminated a number of exogenous variables. Readers, with a legitimate need to know, may contact Kahler Communications to determine access to raw scores.

Adequacy of Sample:

While there have been more than 40,000 PPI tests administered in the United States, this number does not represent the Universe of concern. Rather, this study is focused upon those subjects that were tested in a controlled environment and, which also, took the test, in this same environment, at least twice. These requirements define the Universe of interest to be populated by 5 - 6,000 cases. Additional screening for complete data in conjunction with authorization to use private test results resulted in a sample size of 313 cases gross. Data edits for encoding errors, incomplete data and questionable validity "flags" further reduced the sample to 204 cases. This sized sample was judged to be more than adequate - in fact, actual statistical test scores are accurate at the level of +/- 3% at one (1) Standard Error, and +/-6% at two (2) Standard Error.

Discussion of Findings:

The development and implementation of a psychological testing instrument is a daunting task. Untold hours of work are required to develop a theory, identify requisite sub-test, verify predictive capability, structure the instrument for ease and accuracy of administration, create administration and interpretation materials, and to recruit subjects. Regardless of the value, or apparent accuracy, the development work is only half done at this point. The second half of the work needed is the determination of repeatability of test results and adherence to the original theory. This second step can be performed only after a period of time has elapsed; in the case of this study, more than six (6) chronological years. Consequently, given the investment in time and effort, there is little doubt that studies such as this are undertaken exercising the greatest amount of care and caution, lest the investment be wasted.

Before entering the main discussion a few statements are in order. It is beyond the scope of this paper to deliver an exposition of Dr. Kahler's theory; the only references to this theory, in this paper, will be such statements as describe the procedures used for classification. There will be no explanation of the logic of these procedures – if the reader is interested in the psychological underpinnings of the procedures, then he/she is referred to Dr. Kahler or any of his many writings.

All analysis conducted in the development of data and results for this paper were conducted using actual sub-test scores ("raw" scores). This procedures was employed to minimize bias and possible effects resulting from test result reporting forms and interpretations thereof. Readers with a legitimate interest in obtaining raw scores should contact Kahler Communications.

Finally, the reader is reminded that statistical tests can not prove the truth of anything; the most that a statistical test can do is to, given stated assumptions (hypothesis), indicate the likelihood of the accuracy of a result. Housekeeping out of the way, following begins the main discussion of results of this study.

This study was commissioned to examine the ability of the PPI to consistently, and with predictability, describe either comparable (identical) profiles for subjects or, in the case where the profile indicated a change, adherence of the subsequent profile with theory across the two testing sessions. These two test sessions were conducted at varying interval of time. See below:

Display of Time Intervals Between Testing Sessions

Period	Count	Percent
0.0 - 0.5 yrs	3	1.47%
0.5 - 1.0	18	8.82
1.0 - 1.5	42	20.59
1.5 - 2.0	32	15.69
2.0 - 2.5	30	14.71
2.5 - 3.0	27	13.23
3.0 - 3.5	20	9.80
3.5 - 4.0	16	7.84
4.0 - 4.5	9	4.41
4.5 - 5.0	3	1.47
5.0 - 5.5	2	0.98
5.5 - 6.0	2	0.98
Total	204	99.90%

Minimum	62 days (0.17 years)
Maximum	2164 days (5.93 years)
Mean	819.343 days (2.24 years)
S.D.	409.118 days (1.12 years)

The above demonstrates that typical cases were subject to a time interval between test sessions of greater than one (1) years (2.24 years minus one (1) S.D. of 1.12 years yields a minimum standard interval of 1.12 years). In fact, 89.71% of the sample were tested at intervals greater than one (1) year. Specific testing of "memory" was not conducted. Nonetheless, given the complexity of the PPI and the typical interval between testing exceeding one (1) year, a great deal of confidence is placed in the belief that recall of the test questions is not a factor that will harm the following results in any manner.

Discussion which follows will correspond to the order of the stated null hypothesis as presented in the "Purpose and Overview of the Study" section. Therefore, the next topic of discussion is:

- Any differences found between Phase Type and Kahler's theory are due to random fluctuation from sampling.

It is necessary to make a brief statement - this paper is not a discussion of psychological theory. Dr. Kahler provided a "set" of criteria which were used to "classify" test results. Specifically:

Classification Criteria

1) If Phase Type remained the same, classify as "Match Theory".
2) If Phase Type changed to a Type which was superior, in position, on both tests, classify as "Match Theory".
3) If Phase Type changed to be the same as the "Base Type" on the subsequent test, classify as "Match Theory".
4) If Phase Type changed to a Type which was subordinate on either or both tests, classify as "Failed Theory".

From the above "criteria" is should be clear to the reader, that statistical analysis could be performed with no expert knowledge of the psychological import of the statements. Examples will make the application of the above clear.

First, in the case where Phase Type remains the same: Kahler uses six (6) classifications for his "Base" and "Phase" categorizations (Persister, Workaholic, Reactor, Rebel, Dreamer and Promoter). If a case result was a profile of the order of:

Persister
Workaholic
Reactor
Rebel
Dreamer
Promoter

Then both of the following "profiles" would satisfy Criteria #1 or 2:

Persister	Persister
Workaholic	Reactor
Reactor	Workaholic
Rebel	Rebel
Dreamer	Dreamer
Promoter	Promoter

Underlined print indicates the current "Phase Type". In a case where "Phase Type", on the subsequent test, was Persister, then Criteria #3 would be met. If indicated Phase Type was Workaholic or Reactor than Criteria #4 would apply.

Thus the first test of the cases submitted was to determine the percent adherence to theory as defined by the Criteria above.

Display of Results of
Adherence to Theory
of Phase Change

Description	Count	Percent
Match Theory	174	85.2%
Fail Theory	30	14.7
Total	204	99.9%

Results as strong as these indicate a high degree of likelihood of the predictive capability of the PPI. While the above results are impressive - this analysis has not gone fare enough. One needs to remember that there are six (6) subtests which comprise a "personality pattern" per the PPI. The case data must be examined for the possibility of random coincidence; specifically, raw scores need to be examined to determine that pattern ordering is not accidental.

Sub-test rank and magnitude was tested through the use of a statistical computer program, MGLH (Multivariate General Linear Hypothesis as distributed by SYSTAT, Inc. (c) (tm)). Within this program a data model was constructed and mulitvariate analysis of variance (MANOVA) performed upon this model. This "model" used the following variables as "dependent variables":

Persister sub-test raw score
Workaholic sub-test raw score
Reactor sub-test raw score
Rebel sub-test raw score
Dreamer sub-test raw score
Promoter sub-test raw score

and independent variables were.

Constant (offset from the "x" axis)
Test session (1 or 2)
Base Confidence score
Phase Confidence score
False Claiming type (excluding FBU)

Base Type
Phase Type

The outcome of the MANOVA indicated that the hypothesis could not be rejected for any of the variables: specifically (Please see Appendix B for details).

Results of MANOVA

Variable	Dgrs of Frdm	F	Prblty
Persister	5/391	70.637	0 0
Workaholic	5/391	65 062	0 0
Reactor	5/391	93 036	0.0
Rebel	5/391	22.636	0.0
Dreamer	5/391	6.870	0 0
Promoter	5/391	4 203	0.0
Wilks' Lambda	30/1546	26.654	0.0
Pillai Trace	30/1950	20.241	0.0
Hotelling-Lawley Trace	30/1922	33.407	0 0

These same test were performed with the variables reversed between dependent and independent - no substantial difference was found in any of the "F" statistics. These results are interpreted as support of the hypothesis. In other words, any fluctuations in raw scores or ordering of types is due to sampling, within the assumptions of the model and the tests.

- Time interval between "testing" sessions is not a predictor of current indicated Phase Type.

Results of testing this hypothesis indicate that there is no "learning" influence; nor is there any time affect. Time affect is a crucial topic - if time proved to be a significant variable in predicting Phase Type Kahler's theory could be challenged. That is, theory holds that psychological needs and factors affect Phase, not time. A general linear model similar to the above was constructed and tested to determine the contribution to prediction of Phase arising from "time interval between tests". No significant contribution was found related to the time variable.

Time Variable Contribution to Prediction of Phase Type

Type	Coefficient
Persister	0 002
Workaholic	0.002
Reactor	-0 007
Rebel	0.006
Dreamer	-0 003
Promoter	0.004

It is obvious that none of these coefficients are significant; therefore, learning and time can be discounted as having any affect on PPI scores. This is appropriate to Kahler's general theory.

- "Questionable Validity" alerts (printed statements on the Results Form) are not predictors of current indicated Phase Type.

This hypothesis was completely upheld. These flags may well have very significant psychological interpretation value; however, these alerts demonstrated no Phase prediction capability whatsoever. There was no real concern that this hypothesis would be rejected - this was examined only for the purpose of ruling out all trivial possibilities As the numerical results are, also, trivial, such numbers are not reduced to a table - suffice it to say that all probabilities were 0.000 at three decimal places of accuracy.

- Changes in the specific order of sub-measures do not indicate variance from Phase Theory.

This is a double-edged sword: if correlations of scores are high and patterns (rankings) consistent, than one might be describing a personality pattern that was static. *Is it reasonable to expect some 200+ people, randomly chosen, to exhibit unchanging patterns of personality?*- probably not. So the analysis of this hypothesis lies more with expectations than it does with statistical tests...until such point as data of paired-tests is gathered from 2-3,000 subjects (in other words, a very substantial quantity). Of the 85.2% of subject results which matched theory, below is an examination by distribution between: 1) pattern ordering exactly the same between the two test; and 2) theory satisfied, but some reordering of Phase patterns.

Contrast of Stable vs Altered Phase Patterns from Among Cases which Satisfied Kahler's Theory

Type	Stable	Altered	Total
Persister	18.9%	63.1%	82.0%
Workaholic	13.0	73.9	86.9
Reactor	17.6	70.3	87.9
Rebel	12.5	75.0	87.5
Dreamer	50.0	50.0	100
Promoter	-	100	100
Total	17.6	67.6	85.2

Patterns, to a large extent, did show alteration - but, alterations which were within Kahler's theory. What can be said about this table? Intuitively it appears reasonable (that is, based upon a naive interpretation of psychological data). Statistically, it will take many years of data gathering and analysis, such as this current study, before a statistical hypothesis (norm) can be approached. What should be said...is that the general Theory is upheld: whether the patterns are stable or altered. Time and data will provide greater insight on this topic.

- Raw sub-measure (test) scores are consistent.

The MANOV analysis above has already shed some light on this hypothesis; however, it was felt that at least one more look at the sub-test data was warranted. In the current case, it was determined that an examination of the correlations of the various sub-test scores would be useful as a test of the consistency of measurement of the instrument. Does the PPI yield results for subjects which are approximately of similar magnitudes between multiple testing sessions? Yes, it does.

Raw Score Correlations by Kahler Personality Types

Type	Correlation	Z-Score	Level of Sgnfcnc
Persister	0.98688	2.5126	0.0030
Workaholic	0.98335	2.3921	0.0042
Reactor	0.8076	1.1260	0.0557
Rebel	0.6858	0.8378	0.1002
Dreamer	0.0200	0.0180	0.2160
Promoter	0.0397	1.2183	0.0556

It would be conclusive if all of the above correlations were very high (greater than, say, 0.80) – there is some suspicion that this would be an overly optimistic expectation. There is one type of slight concern – Rebel, at 0.6858; another type, Dreamer, is of greater concern, at 0.0200. Note – neither of these two scores represents a proven shortcoming of the PPI; rather, given the exhaustive multi-judge work performed in the development of the PPI (see Validity Study), there is reason to believe that the current sample is not indicative for these two types (low numbers of these two Phase Types in sample). In the main, 4 out of 6 high correlations and 5 out of 6 moderate to high correlations does indicate reliable consistency in the results as reported by the PPI. There is no doubt that the Dreamer type correlation will be subject of future study.

Summary:

The PPI is not the "perfect" test, at least as defined within the hypothesis to be tested in this study; however, it is certainly in the grade "A" category. No grounds were found to cause rejection of the PPI - in fact, considerable evidence was discovered which supports the PPI.

This is not a definitive study, rather, it is the initiation of a long series of examinations. Nonetheless, it is very encouraging to find that there is no evidence, to date, which would call for rejection of the PPI. This is not always the case! More importantly, the consistency of scoring on sub-tests and the 85.2% adherence to Phase Theory provide significant support of the viability of the PPI as a predictive instrument of behavioral change.

Every effort has been made to examine and dismiss trite and trivial explanations of results. The PPI clearly demonstrates an ability to discriminate with reliability. Statistically, the sub-measures are valid within definitions and assumptions. Psychological value will have to be determined by those qualified; however, these professionals can, now, go about their analysis without being concerned with the adherence to theory of results...or the consistency of results.

Appendix A:

Data Base Structure

Field	Field Name	Type	Length	Decimals
1	Case	Char	3	
2	Base1	Char	2	
3	Phase1	Char	2	
4	Base2	Char	2	
5	Phase2	Char	2	
6	IC	Num	2	
7	EPhase	Char	2	
8	Days	Num	4	
9	BC1	Num	2	
10	PC1	Num	2	
11	BC2	Num	2	
12	PC2	Num	2	
13	FC1	Char	3	
14	FC2	Char	3	
15	Score1	Num	5	2
16	Score1	Num	5	2
17	Typa1	Char	2	
18	Scra1	Num	3	
19	Typb1	Char	2	
20	Scrb1	Num	3	
21	Typc1	Char	2	
22	Scrc1	Num	3	
23	Typd1	Char	2	
24	Scrd1	Num	3	
25	Type1	Char	2	
26	Scre1	Num	3	
27	Typf1	Char	2	
28	Scrf1	Num	3	
29	Typa2	Char	2	
30	Scra2	Num	3	
31	Typb2	Char	2	
32	Scrb2	Num	3	
33	Typc2	Char	2	
34	Scrc2	Num	3	
35	Typd2	Char	2	
36	Scrd2	Num	3	
37	Type2	Char	2	
38	Scre2	Num	3	
39	Typf2	Char	2	
40	Scrf2	Num	3	
41	Abase1	Char	2	
42	Apahse1	Char	2	
43	Abase2	Char	2	
44	Aphase2	Char	2	
45	Per1	Num	2	
46	Wkr1	Num	2	
47	Rcr1	Num	2	
48	Rbr1	Num	2	
49	Drr1	Num	2	
50	Prr1	Num	2	
51	Per2	Num	2	
52	Wkr2	Num	2	
53	Rcr2	Num	2	
54	Rbr2	Num	2	
55	Drr2	Num	2	
56	Prr2	Num	2	
" Total "			136	

Appendix B:

Multivariate General Linear Hypothesis Tests

Legend -

PER	Persister raw score
WKR	Workaholic raw score
RCR	Reactor raw score
RBR	Rebel raw score
DRR	Dreamer raw score
PRR	Promoter raw score
T	Time (in days)
BC	Base Confidence score
PC	Phase Confidence score
FC	"False Claiming" type (Questionable Validity flags)
Base	Base type classification
Phase	Phase type classification

DEPENDENT VARIABLE MEANS

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
	77.860	77.343	66.282	42.686	29.833	34.703

ESTIMATES OF EFFECTS $B = (X'X)^{-1} X'Y$

		PER1	WKR1	RCR1	RBR1	DRR1	PRR1
CONSTANT		25.011	26.652	39.493	39.421	52.505	19.560
T1	1	-0.890	-0.773	-0.126	-0.199	0.118	0.537
BC1		0.516	0.518	0.376	0.103	-0.041	-0.002
PC1		0.030	0.023	-0.165	0.101	-0.132	0.380
FC1	1	2.828	2.378	0.297	-4.786	-4.708	-0.608
FC1	2	0.409	-0.507	-0.610	1.152	-3.333	2.366
FC1	3	5.936	7.419	8.368	4.873	9.226	8.698
Basel	1	15.532	12.140	-13.576	-14.125	-10.939	-4.457
Basel	2	16.636	20.261	-7.130	-8.345	-3.986	-4.516
Basel	3	-6.406	-7.340	30.704	-1.655	-4.086	-7.983
Basel	4	-11.816	-12.464	4.362	36.375	-9.794	3.781
Basel	5	-3.747	-1.968	-6.816	-16.752	40.652	-6.476
Phasel	1	-0.537	-1.728	0.529	-0.363	-5.614	-0.841
Phasel	2	-2.476	-3.451	3.913	-4.645	0.787	-5.897
Phasel	3	3.489	4.570	-3.297	-7.439	-3.201	-6.791
Phasel	4	-1.913	-1.362	-0.014	8.060	-2.165	-0.237
Phasel	5	-1.176	-1.620	2.790	-0.096	14.908	-4.288

STANDARDIZED ESTIMATES OF EFFECTS

		PER1	WKR1	RCR1	RBR1	DRR1	PRR1
CONSTANT		0.000	0.000	0.000	0.000	0.000	0.000
T1	1	-0.042	-0.037	-0.005	-0.009	0.006	0.030
BC1		0.525	0.525	0.290	0.097	-0.042	-0.003
PC1		0.022	0.017	-0.090	0.067	-0.095	0.317
FC1	1	0.056	0.047	0.004	-0.087	-0.093	-0.014
FC1	2	0.007	-0.008	-0.008	0.018	-0.055	0.045
FC1	3	0.069	0.086	0.074	0.052	0.107	0.117
Basel	1	0.384	0.299	-0.254	-0.323	-0.271	-0.128
Basel	2	0.266	0.323	-0.086	-0.123	-0.064	-0.084
Basel	3	-0.152	-0.174	0.553	-0.036	-0.097	-0.220
Basel	4	-0.124	-0.130	0.035	0.352	-0.103	0.046
Basel	5	-0.025	-0.013	-0.035	-0.104	0.273	-0.050
Phase1	1	-0.016	-0.053	0.012	-0.010	-0.173	-0.030
Phase1	2	-0.074	-0.103	0.089	-0.128	0.024	-0.204
Phase1	3	0.101	0.131	-0.072	-0.198	-0.093	-0.227
Phase1	4	-0.054	-0.039	-0.000	0.211	-0.062	-0.008
Phase1	5	-0.029	-0.040	0.052	-0.002	0.367	-0.122

TOTAL SUM OF PRODUCT MATRIX

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	178869.037					
WKR1	174539.559	179875.961				
RCR1	-65445.934	-63151.461	311632.586			
RBR1	-47862.882	-40835.078	87993.078	209333.843		
DRR1	-23747.500	-23871.667	43101.167	-2395.333	177754.667	
PRR1	11890.096	17578.520	-33912.895	48915.039	-11042.167	133201.115

RESIDUAL SUM OF PRODUCT MATRIX E'E = Y'Y-Y'XB

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	51311.470					
WKR1	48907.854	53900.823				
RCR1	-3121.329	-5731.904	130415.971			
RBR1	-21203.132	-18062.426	31050.183	141632.336		
DRR1	-6449.753	-9518.924	13779.916	-8050.266	144322.480	
PRR1	-5801.541	-1477.659	-15323.327	31028.848	-572.963	88345.436

RESIDUAL COVARIANCE MATRIX S
Y.X

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	131.231					
WKR1	125.084	137.854				
RCR1	-7.983	-14.660	333.545			
RBR1	-54.228	-46.195	79.412	362.231		
DRR1	-16.496	-24.345	35.243	-20.589	369.111	
PRR1	-14.838	-3.779	-39.190	79.358	-1.465	225.947

RESIDUAL CORRELATION MATRIX R
Y.X

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	1.000					
WKR1	0.930	1.000				
RCR1	-0.038	-0.068	1.000			
RBR1	-0.249	-0.207	0.228	1.000		
DRR1	-0.075	-0.108	0.100	-0.056	1.000	
PRR1	-0.086	-0.021	-0.143	0.277	-0.005	1.000

SQUARED MULTIPLE CORRELATIONS

PER1	WKR1	RCR1	RBR1	DRR1	PRR1
0.713	0.700	0.582	0.323	0.188	0.337

TEST FOR EFFECT CALLED:
CONSTANT

NULL HYPOTHESIS CONTRAST AB

PER1	WKR1	RCR1	RBR1	DRR1	PRR1
25.011	26.652	39.493	39.421	52.505	19.560

-1
INVERSE CONTRAST $A(X'X)\ A'$

0.115

$-1 \quad -1$
HYPOTHESIS SUM OF PRODUCT MATRIX RCR1= $B'A'(A(X'X)\ A')\ AB$

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	5428.772					
WKR1	5784.839	6164.259				
RCR1	8571.908	9134.130	13534.850			
RBR1	8556.281	9117.477	13510.174	13485.544		
DRR1	11396.279	12143.747	17994.467	17961.661	23923.491	
PRR1	4245.446	4523.900	6703.463	6691.242	8912.197	3320.053

ERROR SUM OF PRODUCT MATRIX WKR1= E'E

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	51311.470					
WKR1	48907.854	53900.823				
RCR1	-3121.329	-5731.904	130415.971			
RBR1	-21203.132	-18062.426	31050.183	141632.336		
DRR1	-6449.753	-9518.924	13779.916	-8050.266	144322.480	
PRR1	-5801.541	-1477.659	-15323.327	31028.848	-572.963	88345.436

UNIVARIATE PER1 TESTS

VARIABLE	SS	DF	MS	PER1	P
PER1	5428.772	1	5428.772	41.368	0.000
ERROR	51311.470	391	131.231		
WKR1	6164.259	1	6164.259	44.716	0.000
ERROR	53900.823	391	137.854		
RCR1	13534.850	1	13534.850	40.579	0.000
ERROR	130415.971	391	333.545		
RBR1	13485.544	1	13485.544	37.229	0.000
ERROR	141632.336	391	362.231		
DRR1	23923.491	1	23923.491	64.814	0.000
ERROR	144322.480	391	369.111		
PRR1	3320.053	1	3320.053	14.694	0.000
ERROR	88345.436	391	225.947		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA =	0.640				
F-STATISTIC =	36.208	DF =	6, 386	PROB =	0.000
PILLAI TRACE =	0.360				
F-STATISTIC =	36.208	DF =	6, 386	PROB =	0.000
HOTELLING-LAWLEY TRACE =	0.563				
F-STATISTIC =	36.208	DF =	6, 386	PROB =	0.000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1					
CHI-SQUARE STATISTIC =	179.936	DF =	6	PROB =	0.000

CANONICAL CORRELATIONS

0.600

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

PER1	0.224
WKR1	0.428
RCR1	0.333
RBR1	0.454
DRR1	0.599
PRR1	0.211

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

PER1	0.434
WKR1	0.451
RCR1	0.429
RBR1	0.411
DRR1	0.543
PRR1	0.258

TEST FOR EFFECT CALLED:
T1

NULL HYPOTHESIS CONTRAST AB

PER1	WKR1	RCR1	RBR1	DRR1	PRR1
-0.890	-0.773	-0.126	-0.199	0.118	0.537

INVERSE CONTRAST $A(X'X)^{-1} A'$

0.003

HYPOTHESIS SUM OF PRODUCT MATRIX RCR1= $B'A'(A(X'X)^{-1} A')^{-1} AB$

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	297.265					
WKR1	258.178	224.231				
RCR1	42.100	36.564	5.962			
RBR1	66.515	57.769	9.420	14.883		
DRR1	-39.279	-34.114	-5.563	-8.789	5.190	
PRR1	-179.444	-155.849	-25.414	-40.152	23.711	108.321

ERROR SUM OF PRODUCT MATRIX WKR1 = E'E

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	51311.470					
WKR1	48907.854	53900.823				
RCR1	-3121.329	-5731.904	130415.971			
RBR1	-21203.132	-18062.426	31050.183	141632.336		
DRR1	-6449.753	-9518.924	13779.916	-8050.266	144322.480	
PRR1	-5801.541	-1477.659	-15323.327	31028.848	-572.963	88345.436

UNIVARIATE PER1 TESTS

VARIABLE	SS	DF	MS	PER1	P
PER1	297.265	1	297.265	2.265	0.133
ERROR	51311.470	391	131.231		
WKR1	224.231	1	224.231	1.627	0.203
ERROR	53900.823	391	137.854		
RCR1	5.962	1	5.962	0.018	0.894
ERROR	130415.971	391	333.545		
RBR1	14.883	1	14.883	0.041	0.839
ERROR	141632.336	391	362.231		
DRR1	5.190	1	5.190	0.014	0.906
ERROR	144322.480	391	369.111		
PRR1	108.321	1	108.321	0.479	0.489
ERROR	88345.436	391	225.947		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA =	0.992				
F-STATISTIC =	0.539	DF =	6, 386	PROB =	0.779
PILLAI TRACE =	0.008				
F-STATISTIC =	0.539	DF =	6, 386	PROB =	0.779
HOTELLING-LAWLEY TRACE =	0.008				
F-STATISTIC =	0.539	DF =	6, 386	PROB =	0.779

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1					
CHI-SQUARE STATISTIC =	3.361	DF =	6	PROB =	0.762

CANONICAL CORRELATIONS

0.091

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

PER1	-1.311
WKR1	0.426
RCR1	0.079
RBR1	-0.487
DRR1	-0.020
PRR1	0.425

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

PER1	-0.832
WKR1	-0.705
RCR1	-0.074
RBR1	-0.112
DRR1	0.066
PRR1	0.383

TEST FOR EFFECT CALLED:
BC1

NULL HYPOTHESIS CONTRAST AB

PER1	WKR1	RCR1	RBR1	DRR1	PRR1
0.516	0.518	0.376	0.103	-0.041	-0.002

INVERSE CONTRAST $A(X'X)^{-1} A'$

0.000

HYPOTHESIS SUM OF PRODUCT MATRIX RCR1= $B'A'(A(X'X)^{-1} A')^{-1} AB$

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	37511.954					
WKR1	37633.993	37756.430				
RCR1	27334.440	27423.369	19918.227			
RBR1	7481.288	7505.628	5451.511	1492.049		
DRR1	-2958.887	-2968.514	-2156.100	-590.113	233.393	
PRR1	-162.647	-163.176	-118.518	-32.438	12.829	0.705

ERROR SUM OF PRODUCT MATRIX WKR1 = $E'E$

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	51311.470					
WKR1	48907.854	53900.823				
RCR1	-3121.329	-5731.904	130415.971			
RBR1	-21203.132	-18062.426	31050.183	141632.336		
DRR1	-6449.753	-9518.924	13779.916	-8050.266	144322.480	
PRR1	-5801.541	-1477.659	-15323.327	31028.848	-572.963	88345.436

UNIVARIATE PER1 TESTS

VARIABLE	SS	DF	MS	PER1	P
PER1	37511.954	1	37511.954	285.846	0.000
ERROR	51311.470	391	131.231		
WKR1	37756.430	1	37756.430	273.888	0.000
ERROR	53900.823	391	137.854		
RCR1	19918.227	1	19918.227	59.717	0.000
ERROR	130415.971	391	333.545		
RBR1	1492.049	1	1492.049	4.119	0.043
ERROR	141632.336	391	362.231		
DRR1	233.393	1	233.393	0.632	0.427
ERROR	144322.480	391	369.111		
PRR1	0.705	1	0.705	0.003	0.955
ERROR	88345.436	391	225.947		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA =	0.504				
F-STATISTIC =	63.433	DF =	6, 386	PROB =	0.000
PILLAI TRACE =	0.496				
F-STATISTIC =	63.433	DF =	6, 386	PROB =	0.000
HOTELLING-LAWLEY TRACE =	0.986				
F-STATISTIC =	63.433	DF =	6, 386	PROB =	0.000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1

CHI-SQUARE STATISTIC =	276.508	DF =	6	PROB =	0.000

CANONICAL CORRELATIONS

0.705

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

PER1	0.613
WKR1	0.349
RCR1	0.395
RBR1	0.224
DRR1	0.016
PRR1	0.052

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

PER1	0.861
WKR1	0.843
RCR1	0.394
RBR1	0.103
DRR1	-0.040
PRR1	-0.003

TEST FOR EFFECT CALLED:
PC1

NULL HYPOTHESIS CONTRAST AB

PER1	WKR1	RCR1	RBR1	DRR1	PRR1
0.030	0.023	-0.165	0.101	-0.132	0.380

INVERSE CONTRAST $A(X'X)^{-1} A'$

0.000

HYPOTHESIS SUM OF PRODUCT MATRIX RCR1= $B'A'(A(X'X)^{-1} A')^{-1} AB$

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	68.107					
WKR1	52.238	40.066				
RCR1	-374.185	-286.998	2055.800			
RBR1	228.813	175.499	-1257.117	768.724		
DRR1	-299.782	-229.931	1647.025	-1007.152	1319.531	
PRR1	863.486	662.289	-4744.056	2900.980	-3800.749	10947.595

ERROR SUM OF PRODUCT MATRIX WKR1 = $E'E$

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	51311.470					
WKR1	48907.854	53900.823				
RCR1	-3121.329	-5731.904	130415.971			
RBR1	-21203.132	-18062.426	31050.183	141632.336		
DRR1	-6449.753	-9518.924	13779.916	-8050.266	144322.480	
PRR1	-5801.541	-1477.659	-15323.327	31028.848	-572.963	88345.436

UNIVARIATE PER1 TESTS

VARIABLE	SS	DF	MS	PER1	P
PER1	68.107	1	68.107	0.519	0.472
ERROR	51311.470	391	131.231		
WKR1	40.066	1	40.066	0.291	0.590
ERROR	53900.823	391	137.854		
RCR1	2055.800	1	2055.800	6.163	0.013
ERROR	130415.971	391	333.545		
RBR1	768.724	1	768.724	2.122	0.146
ERROR	141632.336	391	362.231		
DRR1	1319.531	1	1319.531	3.575	0.059
ERROR	144322.480	391	369.111		
PRR1	10947.595	1	10947.595	48.452	0.000
ERROR	88345.436	391	225.947		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA =	0.871				
F-STATISTIC =	9.558	DF =	6, 386	PROB =	0.000
PILLAI TRACE =	0.129				
F-STATISTIC =	9.558	DF =	6, 386	PROB =	0.000
HOTELLING-LAWLEY TRACE =	0.149				
F-STATISTIC =	9.558	DF =	6, 386	PROB =	0.000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1

CHI-SQUARE STATISTIC =	55.820	DF =	6	PROB =	0.000

CANONICAL CORRELATIONS

0.360

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

PER1	0.756
WKR1	-0.648
RCR1	-0.188
RBR1	0.016
DRR1	-0.237
PRR1	0.932

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

PER1	0.095
WKR1	0.071
RCR1	-0.326
RBR1	0.191
DRR1	-0.248
PRR1	0.913

TEST FOR EFFECT CALLED:
FC1

NULL HYPOTHESIS CONTRAST AB

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
1	2.828	2.378	0.297	-4.786	-4.708	-0.608
2	0.409	-0.507	-0.610	1.152	-3.333	2.366
3	5.936	7.419	8.368	4.873	9.226	8.698

INVERSE CONTRAST $A(X'X)^{-1}A'$

	1	2	3
1	0.029		
2	0.022	0.040	
3	0.016	0.013	0.054

HYPOTHESIS SUM OF PRODUCT MATRIX RCR1= B'A'(A(X'X)$^{-1}$ A')$^{-1}$ AB

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	854.569					
WKR1	1030.547	1297.105				
RCR1	915.581	1256.475	1554.683			
RBR1	-110.462	128.778	1119.181	3003.367		
DRR1	700.654	1231.409	2121.702	2759.189	3886.889	
PRR1	608.873	896.994	1531.787	2157.969	2486.547	2142.816

ERROR SUM OF PRODUCT MATRIX WKR1 = E'E

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	51311.470					
WKR1	48907.854	53900.823				
RCR1	-3121.329	-5731.904	130415.971			
RBR1	-21203.132	-18062.426	31050.183	141632.336		
DRR1	-6449.753	-9518.924	13779.916	-8050.266	144322.480	
PRR1	-5801.541	-1477.659	-15323.327	31028.848	-572.963	88345.436

UNIVARIATE PER1 TESTS

VARIABLE	SS	DF	MS	PER1	P
PER1	854.569	3	284.856	2.171	0.091
ERROR	51311.470	391	131.231		
WKR1	1297.105	3	432.368	3.136	0.025
ERROR	53900.823	391	137.854		
RCR1	1554.683	3	518.228	1.554	0.200
ERROR	130415.971	391	333.545		
RBR1	3003.367	3	1001.122	2.764	0.042
ERROR	141632.336	391	362.231		
DRR1	3886.889	3	1295.630	3.510	0.015
ERROR	144322.480	391	369.111		
PRR1	2142.816	3	714.272	3.161	0.025
ERROR	88345.436	391	225.947		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA =	0.894				
F-STATISTIC =	2.460	DF =	18,1092	PROB =	0.001
PILLAI TRACE =	0.109				
F-STATISTIC =	2.433	DF =	18,1164	PROB =	0.001
HOTELLING-LAWLEY TRACE =	0.116				
F-STATISTIC =	2.485	DF =	18,1154	PROB =	0.001

THETA = 0.080 S = 3,Basel= 1.0,Phasel=192.0 PROB = 0.000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 3
CHI-SQUARE STATISTIC = 45.193 DF = 18 PROB = 0.000

ROOTS 2 THROUGH 3

CHI-SQUARE STATISTIC =	11.631	DF =	10	PROB =	0.311

ROOTS 3 THROUGH 3

CHI-SQUARE STATISTIC =	2.909	DF =	4	PROB =	0.573

CANONICAL CORRELATIONS

1	2	3
0.283	0.146	0.085

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

	1	2	3
PER1	-0.518	0.244	1.941
WKR1	1.024	-0.781	-1.734
RCR1	0.354	-0.406	0.118
RBR1	0.261	0.692	0.042
DRR1	0.582	0.260	-0.466
PRR1	0.444	0.011	0.695

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

	1	2	3
PER1	0.273	-0.660	0.289
WKR1	0.391	-0.698	0.090
RCR1	0.359	-0.179	0.026
RBR1	0.349	0.688	0.163
DRR1	0.529	0.246	-0.419
PRR1	0.486	0.255	0.562

TEST FOR EFFECT CALLED:
Basel

NULL HYPOTHESIS CONTRAST AB

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
1	15.532	12.140	-13.576	-14.125	-10.939	-4.457
2	16.636	20.261	-7.130	-8.345	-3.986	-4.516
3	-6.406	-7.340	30.704	-1.655	-4.086	-7.983
4	-11.816	-12.464	4.362	36.375	-9.794	3.781
5	-3.747	-1.968	-6.816	-16.752	40.652	-6.476

INVERSE CONTRAST $A(X'X)^{-1}A'$

	1	2	3	4	5
1	0.023				
2	0.013	0.032			
3	0.016	0.012	0.022		
4	0.006	0.003	0.006	0.061	
5	-0.028	-0.028	-0.027	-0.035	0.190

HYPOTHESIS SUM OF PRODUCT MATRIX RCR1= $B'A'(A(X'X)^{-1}A')^{-1}AB$

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	46348.879					
WKR1	44708.288	44845.539				
RCR1	-76282.913	-71678.282	155157.823			
RBR1	-32006.012	-29586.199	39354.830	40997.783		
DRR1	-9805.469	-7338.210	18121.248	1732.963	12678.930	
PRR1	2585.053	2418.350	-14269.372	4073.414	-2718.827	4748.587

ERROR SUM OF PRODUCT MATRIX WKR1 = E'E

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
PER1	51311.470					
WKR1	48907.854	53900.823				
RCR1	-3121.329	-5731.904	130415.971			
RBR1	-21203.132	-18062.426	31050.183	141632.336		
DRR1	-6449.753	-9518.924	13779.916	-8050.266	144322.480	
PRR1	-5801.541	-1477.659	-15323.327	31028.848	-572.963	88345.436

UNIVARIATE PER1 TESTS

VARIABLE	SS	DF	MS	PER1	P
PER1	46348.879	5	9269.776	70.637	0.000
ERROR	51311.470	391	131.231		
WKR1	44845.539	5	8969.108	65.062	0.000
ERROR	53900.823	391	137.854		
RCR1	155157.823	5	31031.565	93.036	0.000
ERROR	130415.971	391	333.545		
RBR1	40997.783	5	8199.557	22.636	0.000
ERROR	141632.336	391	362.231		
DRR1	12678.930	5	2535.786	6.870	0.000
ERROR	144322.480	391	369.111		
PRR1	4748.587	5	949.717	4.203	0.001
ERROR	88345.436	391	225.947		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA =	0.189				
F-STATISTIC =	26.654	DF =	30,1546	PROB =	0.000
PILLAI TRACE =	1.187				
F-STATISTIC =	20.241	DF =	30,1950	PROB =	0.000
HOTELLING-LAWLEY TRACE =	2.607				
F-STATISTIC =	33.407	DF =	30,1922	PROB =	0.000

THETA = 0.662 S = 5,Basel= .0,Phasel=192.0 PROB = 0.000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 5					
CHI-SQUARE STATISTIC =	668.671	DF =	30	PROB =	0.000
ROOTS 2 THROUGH 5					
CHI-SQUARE STATISTIC =	234.285	DF =	20	PROB =	0.000
ROOTS 3 THROUGH 5					
CHI-SQUARE STATISTIC =	126.209	DF =	12	PROB =	0.000
ROOTS 4 THROUGH 5					
CHI-SQUARE STATISTIC =	37.920	DF =	6	PROB =	0.000
ROOTS 5 THROUGH 5					
CHI-SQUARE STATISTIC =	10.196	DF =	2	PROB =	0.006

CANONICAL CORRELATIONS

1	2	3	4	5
0.813	0.486	0.445	0.258	0.158

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

	1	2	3	4	5
PER1	0.870	1.889	-1.169	0.140	-0.844
WKR1	-0.233	-2.346	1.100	0.304	0.620
RCR1	-0.788	-0.258	-0.410	0.345	0.042
RBR1	0.128	0.276	0.862	0.313	-0.519
DRR1	0.035	-0.344	0.188	-0.759	-0.359
PRR1	-0.010	0.165	-0.088	-0.100	0.864

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

	1	2	3	4	5
PER1	0.650	-0.339	-0.351	0.397	-0.187
WKR1	0.600	-0.594	-0.156	0.430	-0.040
RCR1	-0.771	-0.165	-0.213	0.328	-0.247
RBR1	-0.224	0.297	0.796	0.309	-0.168
DRR1	-0.092	-0.275	0.067	-0.785	-0.334
PRR1	0.068	0.168	0.285	-0.077	0.775

TEST FOR EFFECT CALLED:
Phase1

NULL HYPOTHESIS CONTRAST AB

	PER1	WKR1	RCR1	RBR1	DRR1	PRR1
1	-0.537	-1.728	0.529	-0.363	-5.614	-0.841
2	-2.476	-3.451	3.913	-4.645	0.787	-5.897
3	3.489	4.570	-3.297	-7.439	-3.201	-6.791
4	-1.913	-1.362	-0.014	8.060	-2.165	-0.237
5	-1.176	-1.620	2.790	-0.096	14.908	-4.288

INVERSE CONTRAST $A(X'X)^{-1}A'$

	1	2	3	4	5
1	0.012				
2	-0.001	0.013			
3	-0.002	-0.001	0.014		
4	-0.002	-0.003	-0.003	0.014	
5	-0.004	-0.006	-0.006	-0.005	0.025