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AN INVESTIGATION OF SELECTED MISSING DATA APPROXIMATION TECHNIQUES AS UTILIZED IN PA2 VARIMAX FACTOR ANALYSIS.

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An Investigation of

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as Utilized in

PA2 Varimax Factor Analysis

by

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Chapter 1

Statement of the Problem

Chapter 1 presents an overview and explanation of the research problem. Initially, a general discussion of factor analysis definitions and practical uses is developed. Following this, specific problems, both mathematical and pragmatic, regarding missing data within the factor analysis technique are presented.

Introduction

A major problem throughout all univariate, bivariate, and multivariate statistical techniques is that of missing data. More specifically, the problem involves a determination of what is the optimal method for handling missing information in data sets. This problem becomes most critical particularly within multivariate techniques, where the occurrence of missing data cannot only produce errant results, but can actually make it impossible for results to be obtained.

Over the past 10 to 15 years, expansion in the use of multivariate techniques in the behavioral sciences has created an even greater need for a scientific investigation into the problem of missing data and its relation to multivariate methods. As researchers continue to explore underlying complexities of behavior, the utility of multivariate statistics may be even further realized and, consequently, associated problems within these statistical methods must also be effectively handled.

Factor Analysis

Within the entire realm of multivariate statistical methods, factor analysis is perhaps one of the best known and most useful. As Kerlinger (1973) well stated:

> Because of its power and elegance, factor analysis can be called the queen of analytic methods....factor analysis is an extremely powerful and useful approach to behavioral data, one that can help solve heretofore intractable research problems. (p. 659)

In defining factor analysis, Bennett and Bowers (1976) concisely explained:

> The object of factor analysis is fairly simple in principle. Suppose we carry out a set of measurements on a sample of people or objects, then a description of any subject in the sample involves stipulating its score on each of the measures we employ. If we employ ten measurements, then ten scores are required to specify a description of the individual. However, since some of the measures may correlate with (i.e. be predictable from) others then this description is probably uneconomical, since it is possible that the individual may be adequately specified by using a

smaller set of variables. The main aim may therefore be said to be parsimony of description. (p. 8)

Kim (1975) further defined factor analysis and outlined its uses in the following description:

> The single most distinctive characteristic of factor analysis is its data-reduction capability. Given an array of correlation coefficients for a set of variables, factor-analytic techniques enable us to see whether some underlying pattern of relationships exists such that the data may be 'rearranged' or 'reduced' to a smaller set of factors or components that may be taken as source variables accounting for the observed interrelations in the data.
>
> Possible uses of the capability are many and varied. Nevertheless, the most common applications of the method may be classified into one of the following categories: (1) exploratory uses--the exploration and detection of patterning of variables with a view to the discovery of new concepts and a possible reduction of data; (2) confirmatory uses--the testing of hypotheses about the structuring of variables in terms of the expected number of significant factors and factor loadings; and (3) uses as a measuring device--the construction of in-

> dices to be used as new variables in later analysis ...it should be noted also that although all factor-analytic applications are ultimately based on the data-summarizing capability of the method, the specific applications to various research problems are bounded only by the user's imagination. (p. 469)

Missing Data

Researchers have long been plagued by problems of missing data in univariate, bivariate, or multivariate situations and research designs. As a pioneer in modern-day research, Fisher (1935) discussed the problems of missing data specifically within the context of experiments and associated block designs:

> It sometimes happens, in an experiment in which some cause of disturbance has been carefully equalized, as are the rows and columns in a Latin square that, by some unforeseen accident, one of the experimental values is missing. This may happen through the death of an individual, injury to a portion of a growing crop, a gross error in recording, or to any such cause. Without the missing value equalization is no longer complete, and it is sometimes thought that the whole experiment has been wasted. Indeed, the possibility of such mishaps has been held to be a reason for

> avoiding all experiments having intricate or complex structures. (p. 173)

More recently, Cohen and Cohen (1975) broadly discussed the occurrence of missing data in multivariate behavioral research with the following:

> There are a host of circumstances which result in missing data. In survey research, for example, whether carried out by face to face or telephone interviewing, or by questionnaire, some subjects may refuse or simply fail to respond to some items while responding to others. In laboratory experiments, equipment failure, animal mortality, a dropped tray of test tubes, or dropped-out subjects may create some blanks in some columns of the data sheets. In research in school settings, absences or transfer of pupils or teachers may result in incomplete data. And so on. It is only a slight exaggeration to paraphrase Murphy's Law for Behavior Science Research to read, 'If there are any ways in which data can be lost, they will be.' (p. 265)
>
> We thus view missing data as a pragmatic fact that may be investigated, rather than as a disaster to be mitigated. (p. 288)

Again regarding multivariate analysis, and specifically linear regression, McNeil, Kelly, and McNeil (1975) presented accurate insights into the problems caused by missing data when multiple variables are involved in research. They state, "The possibility of any one subject missing a score is geometrically increased when one considers each additional predictor variable....researchers should be cautioned, though, that forcing complete data oftentimes generates bad data" (p. 454). Such a statement demonstrates the concept that, in certain instances, the accurate approximation of missing data could be, in effect, an improvement over actual data collected under unnatural circumstances.

Regarding specifically problems of missing data within the factor analysis procedure, Remer and Burton (1971) explicitly indicated:

> Rarely in practical situations is it possible to obtain complete data on all subjects, particularly when the study is done on a large scale. These gaps can sometimes be overlooked or accommodated when certain statistics are employed. When large quantities of information are missing, problems arise concerning the best method of handling the situation. It becomes infeasible to overlook or discard the subject for which incomplete information has been obtained--such procedures can, at times, produce very misleading results.

> In any factor analytic technique, missing data can do more than produce errant results. They can make it impossible for any results to be obtained. The original correlation matrix can easily be ill-conditioned and hence, not invertable, stopping any extraction procedure. The question thus becomes one of what to do about large quantities of missing data. Little has been written concerning this problem. (p. 2)

Specifically regarding factor analysis, Rummel (1970) discussed missing data problems from the mathematical standpoint:

> The consequences of missing data is to allow some of the principal minors of the correlation or covariance matrix to be less than zero, and this results in negative eigenvalues. Since the square root of the eigenvalue is used in scaling the eigenvectors, a negative eigenvalue results in an imaginary number.
> On the basis of this preliminary discussion, several points about the effect of missing data can be made.
>
> 1. Missing data may result in negative eigenvalues.
>
> 2. When eigenvalues are ordered by size (i.e. eigenvalues listed in order of variance extracted), negative eigenvalues will be the last ones extracted

from the data.

3. An eigenvalue measures the amount of variance accounted for by an eigenvector. Negative eigenvalues measure imaginary variance (i.e. square root of a negative value).

4. The more missing data there are in the data matrix, the more imaginary variance there is.

5. Since the total variance of a variable is unity if correlations are factored, the total amount of variance extracted from a data matrix cannot exceed the number of variables. That is, when there is imaginary variance due to missing data, the positive plus imaginary variance must sum to the number of variables.

6. With missing data, the positive variance extracted (the positive eigenvalues and their eigenvectors) will be inflated to compensate for imaginary variance, since both positive and imaginary variance added together must equal the number of variables.

7. With the inflation of the positive variance--presuming that the number of factors extracted is limited to those with positive eigenvalues--the loadings on these factors will be larger than they should be and the communality for the variables may exceed 1.00.

8. Those variables with the most missing data appear to have the most inflated loadings and communalities. (pp. 260-261).

From the pragmatic standpoint, missing data in factor analysis are usually handled by computer packages in one of the following means:

1. Listwise deletion: the default or normal means of handling missing data within factor analysis which causes a case (subject) to be entirely omitted from the calculation if that case contains a missing value on any single variable.

2. Pairwise deletion: a case is omitted from the computation of a given bivariate correlation coefficient if the value of either of the variables under consideration is missing. A case is therefore included in the computation of all simple correlation coefficients for which it has complete data. From the correlation matrix, in the usual manner, the factor matrix is developed normally.

Both of these common methods for handling missing data contain serious disadvantages. In the first case, listwise deletion, while resulting in a mathematically pure correlation matrix, could cause serious biases in the factor structure. Since only cases for which complete data are obtained may be utilized in the analysis, it is quite possible for large masses of cases to be lost due to the exclusion of perhaps only one value on any given variable per case.

Particularly within psychological, social, or educational research efforts this may be a crucial problem, since the number of variables can often be very large.

Pairwise deletion, while yielding a greater number of usable cases, still introduces possible biases into the factor structure. In this case, the initial correlation matrix is built from coefficients resulting from different n sizes. Which particular cases that constitute each correlation coefficient could conceivably bias the coefficients markedly.

Overview of Research Design

The interface between problems of missing data and its relationship specifically to factor analysis deserves further serious consideration. Since properly executed factor analysis necessitates a full data set for theoretical and practical accuracy, primary interest rests in studying the methods of missing data approximation as related to the factor analysis procedure.

Specifically, this paper will analyze four methods of approximating missing data as related to principal component PA2 factor analysis, utilizing varimax rotation. A total of two separate data sets will be used, with an investigation of each of 26 factor structures as they relate to the various missing data approximation methods. The study will involve two data sets, four techniques of approximating missing data, and three varying levels of missing data amounts.

The two complete data sets will be individually factor analyzed. The varimax rotated factor matrix solutions will then serve as the factor structure criteria for later comparative purposes.

In each of the data sets, varying percentages of data will be randomly removed from 1/2 of the variables. This procedure is comparable to methods used by Burton and Remer (1971) in a similar study using principal component analysis but without rotation. The initial amount of data removed from 1/2 of the variables will be 10%, followed by 25%, and finally 50%. For each amount of missing data, four least-squares approximation techniques will be used. Thus, 26 factor structures (two data sets multiplied by four methods of missing data approximation multiplied by three levels of missing data amounts plus two full data set criteria factor structures) will be comparatively analyzed.

The four missing data approximation methods will be as follows:

1. Mean Substitution

Calculated from the remaining data, a replacement for each missing value with the mean for that variable.

2. Pearson Correlation (Bivariate Regression)

Calculated from the remaining data, an estimation of the missing values based upon a bivariate linear regression from the highest correlating predictor.

3. Stepwise Multiple Regression

Calculated from the remaining data, an estimation of the missing values based upon a regression formula using only 1/3 of all independent variables (the variables contributing the most to explained variance).

4. Full Multiple Regression

Calculated from the remaining data, an estimation of the missing values based upon a regression formula using all independent variables.

In each of the 26 solutions, a varimax rotated factor matrix will be completed and studied. Comparisons between the 24 experimental factor structures and two respective criteria factor structures will be the focal point of the study.

Via this type of analysis, the optimum least-squares method for each data set for each level of missing data amount can be ascertained. The two data sets are purposely of different sizes and contain different distributional characteristics for the variables.

Within this design, general initial guidelines for handling missing data in factor analysis may be developed for specific situations in which the percentage of missing data and ratios between numbers of cases, variables, and factors are known. Commencing the development of such guidelines represents a meaningful step forward for all individuals actively involved in multivariate behavioral research.

The overall purpose of the current study is to provide an additional step toward the development of a scientific system by which missing data approximation in factor analysis can be effectively performed by a least-squares method, thus easily usable by applied statisticians.

The alternate (research) hypotheses were developed after a careful review of related previous literature. They represent original hypotheses, never before formally presented. In the hypotheses, the two individual data sets under study were referred to as sets D1 and D2. Explanations regarding these acronyms and others used in this paper are presented in greater detail within Chapter III.

Alternate (Research) Hypotheses

$H_{(A)1}$: In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 10% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be greater than a .05 probability level.

$H_{(A)2}$: In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 25% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be greater than a .05 probability level.

$H_{(A)3}$: In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 50% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be greater than a .05 probability level.

$H_{(A)4}$: In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 10% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be greater than a .05 probability level.

$H_{(A)5}$: In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 25% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be greater than a .05 probability level.

$H_{(A)6}$: In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 50% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be greater than a .05 probability level.

Chapter 2

Review of Literature

Chapter II consists of a review of previous literature concerning least-squares missing data approximation techniques as found throughout research, both in theory and in practical applications. A small number of previous studies have contributed significant insights into the problem and have yielded worthwhile recommendations for use in the current work. Such previous research is studied and evaluated in this chapter.

Rummel (1970) presents a series of interesting suggestions concerning the handling of missing data specifically in factor analysis. Two least-square methods are presented, both of which are utilized in the current paper; they are mean substitution and multiple regression.

Regarding mean substitution, Rummel claimed:

> Mean substitution may well be the most popular approach. Unfortunately, the simplicity of the technique must be weighed against the effect it has on the analysis. Inserting the average will lower the correlations or covariances of the variable. The more averages inserted in the matrix, the more the overall correlations or covariances will underestimate the true values. The effect on the factors extracted will be to attenuate

> their loadings and, moreover, the analysis may stop short of identifying all the meaningful factors existing in the data. That is, the effect of inserting averages is to deflate the ... variance. (p. 263)

Concerning the multiple regression approach, Rummel further stated:

> As long as many of the variables in the data matrix are highly intercorrelated, regression estimation appears to be an efficient and fairly reliable approach. If, however, the correlations between all the variables are low or zero, then the estimates for the missing data may be quite unreliable ... (p. 264)

Thus, Rummel clearly and concisely outlined the advantages and disadvantages of two least-squares methods of data approximation. In addition, computational examples were presented.

Judging by Rummel's statements, it appears possible that no one optimum method may exist. Rather, a particular method may be optimum based upon a function of the inter-correlations of the variables or other statistical characteristics of the data. It is this partiular concept that will be further investigated as a part of this research.

McNeil, Kelly, and McNeil (1975) presented a number of remedies in handling missing data in general multivariate research situations. First, a possible solution to the missing data problem is to simply exclude those subjects for which data is missing. However, the authors cautioned, "Eliminating subjects because of missing data most likely redefines the population from which one has sampled, and hence to which one can generalize" (p. 455).

Secondly, the researchers suggested that another solution to the problem was to insert the mean value of a variable for any missing value on that variable. As is stated in their text, however, "Insertion of a mean value assumes that the person with missing data is like the average subject with data. Another problem with inserting mean values is the reduction of the variance" (p. 455). The method of mean substitution is used as one of the four approximation methods utilized in the current study.

In order to deemphasize the reduction in variance brought about by the mean substitution method, a random score from a pool of possible variable values may be substituted. Although a somewhat popular approach, the authors contended, "If the persons who are [or have] missing data are different from those with data, then the procedure of inserting random scores is, on the average, decreasing the relationship between that variable and any other variable" (p. 456).

Finally, a multiple regression design is suggested in which the missing value is predicted from other known values. As is explained and cautioned by McNeil, et al:

> [One may] use as a criterion the predictor variable of concern and include only those subjects who have complete data on all predictor variables, then find the weighting coefficients for the functional relationship between the criterion (predictor variable of concern) and the remaining predictor variables. These weighting coefficients can then be applied to the subjects who have missing data on that particular variable. This last procedure seems to be of benefit when there are a large number of variables relative to the (small) number of subjects. This procedure, though, does lead to a more systematic relationship between the predictors and the criterion than might really exist. (p. 456)

Frane (1976) discussed various least-squares methods for handling missing data in all types of multivariate analysis. In regard to simple linear regression in the bivariate case, an estimate of the missing datum value can be made from the highest correlating variable. As Frane suggested, "The amount of computation needed is quite small, especially if the variable of highest correlation and its regression coefficient are computed for each variable before estimation begins....while remaining very economical, this method avoids much of the serious bias that can result from merely using the mean as an estimate" (p. 410). Frane, obviously, does not endorse mean substitution as a particularly viable approximation method.

Secondly, Frane discussed two predictors in stepwise regression as another method of handling missing data in multivariate analysis, but warned:

> The first two methods [simple linear regression and two predictor stepwise regression] can be criticized for the same basic reason that estimation by sample means is unacceptable: An estimate may be incompatible with the value of another variable which has not been used in the estimation. To avoid this problem, the number of variables used to estimate a missing value cannot be limited to one or two. The first two methods are recommended for slow, small computers and preliminary analyses only. (p. 411)

Finally, Frane suggested stepwise regression using more than two predictors or full multiple regression using all remaining variables as predictors as the most powerful least-squares methods. In reference to the multivariate stepwise regression procedure, he stated, "This method is most highly recommended from a theoretical point of view since it attempts to use the maximum amount of information in the available variables in estimating the missing values without overfitting" (p. 411).

Regarding the full multiple regression model, Frane suggested that, "Use of [this method] is advised whenever the number of subjects is large or the number of variables is not very large" (p. 411).

With the current study, all three of the above least-squares methods discussed by Frane will be utilized. In addition, mean substitution will also be investigated.

Guertin (1968) recognized missing data as a serious reality in large-scale data collection stimulated by the onset of computer analysis. In his work, Guertin estimated achievement test scores for five student groups of n sizes: 463, 320, 62, 30, and 51.

Three methods of missing data approximation techniques were used: omission, mean substitution and multiple regression estimate. There were a total of ten variables (achievement test scores) used in the analysis with varying levels of missing data amounts artificially removed on each variable. The missing data amounts ranged from 2% to 55% randomly across all variables and groups.

Unfortunately, findings yielded inconclusive results. In some cases, variables were best estimated by omission or mean substitution. In other cases, multiple regression estimates proved optimum. Guertin concluded that in the majority of cases, with his particular data set, obtaining multiple regression estimates was generally not worthwhile even for a variable with 40% missing scores and sample sizes as low as 50.

Rubin and Krus (1976) investigated missing data approximation techniques in multivariate discriminant analysis. In a sample of 531 children measured on 79 variables, artificially eliminated missing data was approximated by mean substitution and random replacement methods. Results indicated that although each approximation method had advantages and disadvantages, random replacement from the available pool of study data, "resulted in the least reduction in the multiple correlation while still maintaining a suitable sample size" (p. 3).

Thus, Rubin and Krus demonstrated that, for this specific sample, mean substitution was not an optimum method of missing data approximation. As Rubin and Krus concluded:

> While there is no completely satisfactory resolution of the problem inherent in the analysis of data with missing observations....the systematic comparison of the outcomes of procedures applied in the present study [artificial removal of existing data and criteria comparisons] provides information to other investigators which can serve as a basis for decision making in situations in-

volving incomplete data matrices" (p. 9).

The Rubin and Krus work provides an excellent research model for the current paper. Their study provided a viable research methodology by artificially removing data from a full data set, substituting missing values using select methods, and comparing the multivariate discriminant analysis classification results to the full data set classification results. Although their analysis was performed upon a type of multivariate analysis other than factor analysis, the conceptual framework of their study's design is closely paralleled in the current research.

In an innovative work, very similar to this current study, Remer and Burton (1971) presented a comparison of four least-squares approximation techniques as applied specifically to factor analysis. In their work, presented at the American Educational Research Association's 1971 Annual Meeting, the authors compared and explained the findings from four least-squares missing data approximation methods.

Artificial data with known characteristics was extracted from Cattell and Jasper's Plasmode: 30-10-5-2 (1967). From the extracted data, one-third of the data on one-half of the variables was systematically eliminated. The study involved 300 cases measured on ten variables. The missing data were then approximated by mean substitution, simple regression (i.e. bivariate correlation), stepwise regression, and full multiple regression, thus resulting in four different data sets to be mathematically compared to the full data set.

A principal components factor analysis, without rotation, was performed on each of the four experimental (missing data approximated) data sets. Each resultant factor structure was compared to the criteria factor structure resulting from the original full data set.

Goodness-of-fit was established by cross-correlations of each factor structure solution with the solution from the complete data, criterion factor structure.

The statistical analysis for this work involved cross-correlations of the resulting factor score matrices. The analysis indicated that, for all thirty factors, the following methods resulted in the respective correlation coefficients: multiple regression (.79), stepwise regression (.76), simple regression (.74), and mean substitution (.72). As the authors stated, "All of these statistics show a trend in the anticipated direction" (p. 10). Further, Rubin and Krus explained:

> The present study showed that all four methods of data-estimation compared fairly well with the criterion: average absolute cross-correlations ranged between .72 and .79 for all 30 components....the average correlations improved from the method of data-estimation employing least concomitant information (mean substi-

tution) to that employing most (multiple regression). (p. 11)

In conclusion, Rubin and Krus stated:

This study is only a first step in determining the best method for estimating missing data in factor analytic studies. Research should be done with other data; and using various methods of rotation. Other criteria of goodness-of-fit may be explored. (p. 11)

Chapter III

Methods and Procedures

Chapter III details the methods and procedures utilized in the study. A description of the initial full data files is presented followed by an explanation regarding the development of the 24 experimental data files in which missing data approximations were made to varying degrees by different methods. Next, a detailed discussion of how missing values were introduced into the data is presented. Also explained is the nomenclature used throughout the study to identify various data files. Following this, data preparation procedures are discussed in detail. Next, an explanation of factor analysis procedures integral to the study is presented including, in order, descriptions of the PA2 factoring method, varimax rotation, factor loadings, communalities, eigenvalues, and a method of significant factor determination. The computer programs and statistical methods used in the study are then presented. Lastly, a formal statement of the statistical (null) hypothesis is made.

Explanation of Data Files

Two separate data files from two unrelated sources were used in this study. The first data file consisted of data collected from the Northwestern Guidance Clinic, located in Garden City, Michigan. The data file was comprised of 60 subjects with 10 variables chosen to be studied upon each. The variables measured attitudinal characteristics of foster parents partaking in a local foster care program at the clinic. Data were collected personally by the author with available instrumentation.

The second data file was purposely chosen to be dissimilar to the first so that the potential results of the study could be more broadly generalizable and meaningful. This second file consisted of a 10% subsample of the 1975 National Opinion Research Center (NORC) poll of the United States. From the original data containing 1,490 cases and 237 variables, a computer generated random sample of 150 cases was selected. Ten variables, conducive to factor analysis, were selected for use. The following acknowledgment of assistance must be presented regarding the National Opinion Research Center data:

> The National Opinion Research Center data utilized in this study were made available (in part) by the Inter-university Consortium for Political Research. The data for the spring 1975 General Social Survey, National Data Program for the Social Sciences, were originally collected by James A. Davis of the National Opinion Research Center, University of Chicago, and were distributed by Roper Public Opinion Research Center, Williams College. Neither the original collector of the data nor the consortium bear any responsibility for the analyses

or interpretations presented in the present study.

Validity and reliability characteristics of the instrumentation are provided in Appendix B.

From each data file, 12 additional experimental data files were generated. Each one of the 12 additional files represented a data set in which one of three missing data amounts were present and one of four missing data approximation techniques was used to approximate the missing values. Thus, 24 experimental data files were artificially created from the two initial data files, yielding a total of 26 unique data files used in the study.

All data files consisted of 10 whole number variables, either of one or two digits. Missing data amounts, expressed as percentages of the complete cases, were applied on one-half of the variables in each data set. In the first data file (D1), data were artificially and randomly removed from variable numbers 3, 4, 5, 7, and 8 (V3, V4, V5, V7, and V8). Within the second data set (D2), data were artificially and randomly removed from variable numbers 1, 3, 5, 6, and 9 (V1, V3, V5, V6, and V9). Complete distributional information for each of the two full data sets is provided in Appendices C and D. Actual data bases appear in Appendices K and L.

Each of the 26 unique data files are represented in Table 1. Within the respective cell of the matrix appears the acronym used in this study to label each particular file. As an example, the data set "D1M25SWR" indicates the first data set (D1), with 25%

missing data on 1/2 the variables (M25), approximated by stepwise regression (SWR). Similarly, "D2M50ME" represents the second set (D2), with 50% missing data on 1/2 the variables (M50), approximated by mean substitution (ME).

Table 1

Data Files and Associated Acronyms

Missing Data Amount	Missing Data Approximation Method	(D1) Data Set 1	(D2) Data Set 2
0% Missing	None	D1FULL	D2FULL
10% of Data on One-Half the Variables Missing (M10)	Mean (ME)	D1M10ME	D2M10ME
	Pearson Correlation (PC) (Bivariate Regression)	D1M10PC	D2M10PC
	Stepwise Multivariate Regression (SWR)	D1M10SWR	D2M10SWR
	Full Multiple Regression (FMR)	D1M10FMR	D2M10FMR
25% of Data on One-Half the Variables Missing (M25)	Mean (ME)	D1M25ME	D2M25ME
	Pearson Correlation (PC) (Bivariate Regression)	D1M25PC	D2M25PC
	Stepwise Multivariate Regression (SWR)	D1M25SWR	D2M25SWR
	Full Multiple Regression (FMR)	D1M25FMR	D2M25FMR
50% of Data on One-Half the Variables Missing (M50)	Mean (ME)	D1M50ME	D2M50ME
	Pearson Correlation (PC) (Bivariate Regression)	D1M50PC	D2M50PC
	Stepwise Multivariate Regression (SWR)	D1M50SWR	D2M50SWR
	Full Multiple Regression (FMR)	D1M50FMR	D2M50FMR

Data Preparation Procedures

Data for the first data set (D1) were collected by the author, on site, at the Northwestern Guidance Clinic, Garden City, Michigan during the summer of 1977. Attitudinal responses to an evaluation questionnaire given to all foster parents partaking in a foster care program were coded from the questionnaires onto the Hollereith standard 80-space coding sheet. Cases with missing data were eliminated.

From the coding sheets, standard 80-space Hollereith computer cards were punched, with one card (record) used per case. An IBM card punch and verifier were used to generate an additional back-up data deck. Data were formated "F4.2,2X" allowing for the maximum four digit value with two spaces between each value for legibility. Experimental data files generated from this data set maintained this same input data format, thus allowing for all approximated values to be carried to two decimal places.

Data for the second data set (D2) were available on tape from the Inter-University Consortium for Political Research (ICPR), P.O. Box 1248, Ann Arbor, Michigan 48106. The data file, dictionary, and codebook were available at Wayne State University on tape number 7525, positions 16, 17, and 18 (tape blocking of 3480,290). From this massive national survey data file, 10 variables appropriate to factor analysis were selected and 150 cases without missing data were selected randomly by computer, via the Statistical Package for the Social Sciences (SPSS), Version 6.02 (1975).

From each 10 variable data file, data were randomly eliminated in varying amounts on a predetermined set of five variables. This was done manually via computer terminal.

Following the creation of the six data files containing the three appropriate levels of missing data (three files per data set), the missing data approximation values or formulae were calculated for each variable needing estimation from only the complete data cases in each file. Using such a research design yields a more practical approach to the problem of missing data. In this method, not only will each one of the four approximation techniques possibly yield different scores for the same missing value, but the same method of approximation may yield a different score for the missing value, depending upon the amount of complete cases the approximation value or formula is calculated from.

Using the Statistical Package for the Social Sciences (SPSS) (1975), means and regression equations used for approximating the missing values in the 24 experimental data sets were calculated. Next, by lengthy manipulation of data files, and by the use of computing commands available with the SPSS computer package, the missing data values were computed and placed into the data files in their proper position. The assembly of the resultant 24 experimental data sets was accomplished by hand at a computer terminal. Lastly, all data files were stored on tape in appropriate blocking formats. Specific information regarding the approximation formulae used in each of the 24 data files is presented in detail in Tables 2 through 7.

Table 2

Approximation Formulae (Unstandardized) Used in

Data Files D1 with 10% Missing Values

(D1M10---)

Full Multiple Regression (D1M10FMR):

$$V3 = .17(V1) + .45(V2) + .07(V6) - .10(V9) - .05(V10) + 4.87$$
$$V4 = .45(V1) + .13(V2) + .13(V6) - .01(V9) - .03(V10) - 0.27$$
$$V5 = -.01(V1) - .11(V2) + .06(V6) + .10(V9) - .05(V10) + 2.17$$
$$V7 = -.16(V1) + .16(V2) - .25(V6) - .04(V9) + .20(V10) + 6.95$$
$$V8 = .14(V1) + .13(V2) - .14(V6) - .17(V9) + .12(V10) + 7.17$$

Stepwise Regression (D1M10SWR):

$$V3 = .47(V2) + .20(V1) - .08(V9) + 4.62$$
$$V4 = .47(V1) + .10(V6) + .14(V2) - 0.44$$
$$V5 = .11(V9) - .12(V2) + .03(V6) + 2.14$$
$$V7 = -.29(V1) - .24(V6) + .19(V10) + 8.32$$
$$V8 = -.18(V9) + .06(V2) - .04(V6) + 8.21$$

Bivariate Regression; Pearson Correlation (D1M10PC):

$$V3 = .31(V2) + 6.04$$
$$V4 = .34(V1) + 1.26$$
$$V5 = .11(V9) + 1.34$$
$$V7 = -.38(V1) + 8.45$$
$$V8 = -.20(V9) + 8.53$$

Mean Substitution (D1M10ME):

$$V3 = 8.32$$
$$V4 = 2.06$$
$$V5 = 1.69$$
$$V7 = 7.57$$
$$V8 = 7.91$$

Table 3

Approximation Formulae (Unstandardized) Used in

Data Files D1 with 25% Missing Values

(D1M25---)

Full Multiple Regression (D1M25FMR):

V3 = .05(V1) + .51(V2) + .13(V6) - .10(V9) - .07(V10) + 4.53
V4 = .69(V1) + .08(V2) + .04(V6) + .06(V9) + .02(V10) - 0.49
V5 = .09(V1) - .13(V2) + .04(V6) + .11(V9) - .04(V10) + 2.23
V7 = -.43(V1) + .21(V2) - .18(V6) - .07(V9) + .13(V10) + 7.20
V8 = .06(V1) + .09(V2) - .12(V6) - .18(V9) + .14(V10) + 7.37

Stepwise Regression (D1M25SWR):

V3 = .55(V2) + .13(V1) - .05(V9) + 4.05
V4 = .63(V1) + .07(V6) + .05(V9) + 0.21
V5 = -.12(V2) + .12(V9) + .12(V1) + 2.02
V7 = -.53(V1) - .13(V9) + .16(V2) + 7.91
V8 = -.19(V9) - .10(V6) + .14(V10) + 8.13

Bivariate Regression; Pearson Correlation (D1M25PC):

V3 = .47(V2) + 4.78
V4 = .63(V1) + 0.64
V5 = -.20(V2) + 3.28
V7 = -.64(V1) + 8.94
V8 = -.21(V9) + 8.44

Mean Substitution (D1M25ME):

V3 = 8.25
V4 = 2.05
V5 = 1.80
V7 = 7.50
V8 = 7.75

Table 4

Approximation Formulae (Unstandardized) Used in

Data Files D1 with 50% Missing Values

(D1M50---)

Full Multiple Regression (D1M50FMR):

V3 = -.16(V1) + .56(V2) - .02(V6) - .10(V9) - .01(V10) + 4.65
V4 = -.24(V1) - .21(V2) - .01(V6) + 01(V9) - .05(V10) + 3.52
V5 = -.23(V1) - .24(V2) + .29(V6) + .04(V9) - .33(V10) + 4.10
V7 = .47(V1) + .51(V2) - .26(V6) - .13(V9) + .31(V10) + 3.18
V8 = .34(V1) + .11(V2) - .36(V6) - .25(V9) + .45(V10) + 6.45

Stepwise Regression (D1M50SWR):

V3 = .55(V2) - .11(V9) - .15(V1) + 4.61
V4 = .13(V9) - .06(V6) - .07(V2) + 1.93
V5 = -.28(V10) + .26(V6) - .13(V2) + 2.84
V7 = .22(V2) - .19(V9) + .08(V10) + 6.53
V8 = -.25(V9) + .35(V10) - .29(V6) + 8.17

Bivariate Regression; Pearson Correlation (D1M50PC):

V3 = .66(V2) + 3.14
V4 = .12(V9) + 1.21
V5 = -.11(V10) + 2.13
V7 = .30(V2) + 5.72
V8 = -.31(V9) + 8.77

Mean Substitution (D1M50ME):

V3 = 8.13
V4 = 1.57
V5 = 1.63
V7 = 7.97
V8 = 7.83

Table 5

Approximation Formulae (Unstandardized) Used in

Data Files D2 with 10% Missing Values

(D2M10---)

Full Multiple Regression (D2M10FMR):

V1 = .07(V2) + .25(V4) + .88(V7) + .09(V8) - .26(V10) + 22.64
V3 = .01(V2) + .04(V4) + .01(V7) + .02(V8) + .07(V10) + 19.17
V5 = -.06(V2) + .95(V4) + .18(V7) + .23(V8) + .11(V10) + 3.39
V6 = -.08(V2) + .05(V4) + .58(V7) + .16(V8) - .01(V10) - 0.46
V9 = .65(V2) + .07(V4) - .51(V7) - .64(V8) - .44(V10) + 53.64

Stepwise Regression (D2M10SWR):

V1 = .25(V4) + .88(V7) - .22(V10) + 23.61
V3 = .04(V4) + .03(V8) + .07(V10) + 19.17
V5 = .01(V4) + .28(V8) + .20(V7) + 3.22
V6 = .60(V7) + .05(V4) + .17(V8) - 1.34
V9 = -.71(V8) + .63(V2) - .46(V7) + 53.02

Bivariate Regression; Pearson Correlation (D2M10PC):

V1 = .34(V4) + 26.66
V3 = .05(V4) + 19.81
V5 = .15(V4) + 6.51
V6 = .75(V7) + 1.38
V9 = 1.14(V8) + 56.48

Mean Substitution (D2M10ME):

V1 = 40.37
V3 = 21.65
V5 = 12.47
V6 = 8.67
V9 = 42.63

Table 6

Approximation Formulae (Unstandardized) Used in

Data Files D2 with 25% Missing Values

(D2M25---)

Full Multiple Regression (D2M25FMR):

V1 = -.01(V2) + .18(V4) + 1.16(V7) - .28(V8) + .15(V10) + 24.32
V3 = .10(V2) + .03(V4) + .09(V7) + .01(V8) + .13(V10) + 17.72
V5 = -.06(V2) + .09(V4) + .17(V7) + .23(V8) + .09(V10) + 3.81
V6 = -.11(V2) + .03(V4) + .57(V7) + .14(V8) - .02(V10) + 1.00
V9 = .49(V2 + .11(V4) - .72(V7) - .84(V8) - .15(V10) + 53.64

Stepwise Regression (D2M25SWR):

V1 = 1.17(V7) + .19(V4) - .23(V8) + 24.74
V3 = .04(V4) + .16(V10) + .07(V2) + 18.34
V5 = .09(V4) + .28(V8) + .19(V7) + 3.49
V6 = .61(V7) + .15(V8) + .04(V4) - 0.28
V9 = -.81(V8) - .57(V7) + .46(V2) + 55.09

Bivariate Regression; Pearson Correlation (D2M25PC):

V1 = 1.43(V7) + 26.88
V3 = .04(V4) + 19.85
V5 = .14(V4) + 6.82
V6 = .73(V7) + 1.80
V9 -1.25(V8) + 56.71

Mean Substitution (D2M25ME):

V1 = 41.05
V3 = 21.66
V5 = 12.65
V6 = 9.05
V9 = 41.43

Table 7

Approximation Formulae (Unstandardized) Used in

Data Files D2 with 50% Missing Values

(D2M50---)

Full Multiple Regression (D2M50FMR):

V1 = -.40(V2) + .34(V4) + 1.00(V7) - .82(V8) + .02(V10) + 29.30
V3 = .14(V2) + .03(V4) + .09(V7) - .01(V8) + .19(V10) + 17.59
V5 = -.10(V2) + .09(V4) + .15(V7) - .22(V8) + .16(V10) + 3.79
V6 = -.08(V2) - .04(V4) + .58(V7) + .17(V8) - .06(V10) + 0.44
V9 = .36(V2) + .10(V4) - .75(V7) - .62(V8) - .46(V10) + 54.50

Stepwise Regression (D2M50SWR):

V1 = .34(V4) + 1.13(V7) - .71(V8) + 25.27
V3 = .04(V4) + .19(V10) + .11(V2) + 17.95
V5 = .10(V4) + .30(V8) + .19(V7) + 3.32
V6 = .60(V7) + .18(V8) + .04(V4) - 0.61
V9 = -.59(V7) - .68(V8) + .38(V2) + 53.48

Bivariate Regression; Pearson Correlation (D2M50PC):

V1 = .45(V4) + 23.46
V3 = .05(V4) + 19.92
V5 = .15(V4) + 6.78
V6 = .75(V7) + 1.75
V9 = -.98(V7) + 50.30

Mean Substitution (D2M50ME):

V1 = 41.53
V3 = 21.85
V5 = 12.81
V6 = 9.33
V9 = 40.43

After the establishment of the 24 experimental data structures, the data files, in addition to the two full data files, were all factor analyzed. The principal components method PA2 with varimax rotation was used since it represented the most traditional approach popularized by applied statisticians and behavioral researchers.

The statistical information in each factor analysis provided the following data:

1. Correlation matrix
2. Initial communality estimates
3. Number of iterations required
4. Initial factor matrix
5. Final communalities
6. Eigenvalues for each factor
7. Percentages of variance accounted for by each factor
8. Cumulative percentages of variance accounted for by each factor
9. Varimax rotated factor matrix
10. Transformation matrix

Values regarding the above are shown in Appendices E, F, G, and H.

A brief discussion of the relevant methods and data outputs integral to factor analysis as found in this study is presented below.

PA2 Factor Analysis

The PA2 method of factor analysis employed in this study is characterized by a number of qualities. First, PA2 replaces the main diagonal elements of the correlation matrix with communality estimates. The initial communality estimates are yielded by the squared multiple correlation between a given variable and the remainder of the variables in the given matrix.

After the initial communality values are in the correlation matrix, PA2 uses an iteration procedure for improving the initial estimates of these communality values. PA2 and iteration is further explained by Kim (1975):

> First, the program [SPSS] determines the number of factors to be extracted from the original or unreduced correlation matrix. The program then replaces the main diagonal elements of the correlation matrix with initial estimates of communalities, the R^2 estimates. Next, it extracts the same number of factors from this reduced matrix, and the variances accounted for by these factors become new communality estimates. The diagonal elements are then replaced with these new communalities. This process

continues until the differences between the two successive communality estimates are negligible.

It may be noted that PA2 can handle most of the initial factoring needs of the user. At present, this is the most widely accepted factoring method. (p. 480)

Varimax Rotation

After the initial factor structure is obtained, a rotation of axis is usually recommended and performed. In most instances, the rotational method is orthogonal (i.e. axis kept at 90°). The perhaps most popular method of orthogonal rotation, varimax, was used in the current study. A purely mathematical explanation is offered by Harmon (1967):

> The varimax method centers upon simplifying the factors (or columns) within the factor matrix. In other words, varimax rotation tends to keep factors clearer by maximizing the variance of the squared loadings in each column of the factor matrix. (p. 305) Varimax is now generally accepted as the best analytic orthogonal rotation technique. (p. 311).

As Kim (1975) indicated, "This method of rotation [varimax] is the most widely used...." (p. 485). Additionally, Rummel (1970) indicated:

> Almost all published factor analysis studies doing analytic orthogonal simple structure rotation now employ varimax and the criterion is the basis of all the orthogonal rotation computer programs of which I am aware. (p. 392)

Factor Loadings and Communalities

A factor loading may be thought as a correlation coefficient measuring the association between a variable and a given factor. The factor loadings were used in this study extensively in terms of the hypotheses testing. Correlations between factor loadings from the appropriate experimental factor matrices and the associated criterion factor matrix were used as goodness-of-fit measures in determining optimum missing data approximation methods. As Bennett and Bowers (1976) indicated:

> The square of a factor loading is the amount of variance of a variable attributable to or explicable by that factor. Thus the sum of squared first factor loadings is the amount of the total variance attributable to that factor. The higher the factor loadings, therefore, the greater the amount of variance explained. (p. 17)

Regarding loadings and the calculations of communalities, the communality value (h^2) is computed by means of the following formula:

$$h_1^2 = a_{11}^2 + a_{12}^2 = a_{13}^2 \; .... \; + a_{ij}$$

where h_1^2 = communality for variable 1

and a_{ij}^2 = factor loading squared for variable i on factor j

Thus, the variance of a variable accounted for by all of the factors is given by the sum of the squares of the respective factor loadings, for an orthogonal solution. In the above equation, assuming three factors are present, the communality (h^2) represents the proportion of variance in variable 1 accounted for by common factors. As Kim (1975) stated:

> The total variance of a variable accounted for by the combination of all common factors, designed h_j^2, is usually referred to as the communality of the variable. This value indicates the amount of the variance of a variable that is shared by at least one other variable in the set....the importance of a given factor for a given variable can be exactly expressed in terms of the variance in the variable that can be accounted for by the factor. (p. 475)

Bennett and Bowers (1976) further indicated the following regarding communalities and factor loadings, stated in non-mathematical terms:

> The total variance associated with each variable may be thought of as having two components: that variance which it shares with other variables (known as the "common variance"), and the variance specific to itself (known as the "unique variance"), although the latter also contains an amount of error variance. The fact that such common variance exists means that those variables which share common variance in part measure the same things, i.e. common factors. The extent to which a variable possesses unique variance is an indication that this variable measures something which none of the other variables in the set measure....communality is the measure of common variance. (p. 14)

<u>Eigenvalues and the Extraction of Significant Factors for Analysis</u>

As communalities measure common variance in a <u>variable</u> by squaring and adding all loadings of a variable across factors, eigenvalues indirectly are used to express the percentage of total variance explained by particular <u>factors</u>. Eigenvalues (also known as latent roots) are calculated similarly to communalities by the following equation:

$$\lambda = a_{11}^2 + a_{12}^2 + a_{13}^2 \ldots + a_{jk}^2$$

where λ = eigenvalue for factor 1

a_{jk}^2 = square of factor loading a on factor j for variable k

Thus, the sum of squares of the loadings on each factor is known as the eigenvalue for that factor.

The relationship between eigenvalues and communalities for a given factor matrix is:

$$\sum_{j=1}^{n} \sum_{k=1}^{n} \lambda = \sum_{j=1}^{n} \sum_{k=1}^{n} h^2$$

Hence, the sum of all eigenvalues across factors is equal to the sum of all communalities across variables.

Eigenvalues represent an important concept in the factor analysis procedure as they may be used to determine the number of significant factors to extract from a given factor matrix.

Generally, the most popular method of factor extraction employs this use of eigenvalues as expressed by Child (1970):

> A technique in considerable use at present is <u>Kaiser's Criterion</u> suggested by Guttman and adapted by Kaiser. The rule is very simple to apply. Only the factors having latent roots [eigenvalues] greater than one [1.0] are considered as common factors [and are extracted]. (p. 43)

The above criteria's credibility is also supported by its use as the default option within the SPSS computer package used in the current study's analysis.

Other factor extraction criteria are available, notably the scree test suggested by Cattell (1967, pp. 174-243); however, this method was arbitrarily not chosen for use in the current paper.

As explained from the variance standpoint, Kim (1975) explained:

> In the principal-component matrix, the eigenvalues associated with each component represent the amount of total variance accounted for by the factor. Therefore, the importance of a component [factor] may be evaluated by examining the proportion of the total variance accounted for.
>
> $$\text{Proportion of total variance accounted for by component } i = \frac{\lambda_i}{n}$$
>
> Where λ_i represents the eigenvalue of the i th component and n represents the number of variables in the set....the program retains and prints only components with eigenvalues greater than or equal to 1.0. This criterion [Kaiser's criterion] ensures that only components accounting for at least the amount of the total variance of a single variable will be treated as significant. (p. 479)

In this study, Kaiser's criterion (a minimum eigenvalue of 1.0 needed for factor extraction) was generally applied, with modification. In the many resulting factor analyses, eigenvalues of 1.0 or higher generally were found for only three factors, thus resulting in the final factor matrix of a size ten by three (i.e.

ten variables by three factors). In some instances, however, strictly applying Kaiser's guidelines resulted in the extraction of two or four factors, hence creating unequally sized factor matrices. For this reason, three factors were always extracted for each factor analysis, regardless of the eigenvalues associated with those factors. In no case, however, were eigenvalues of extracted factors found to be less than 0.90. Appendices E, F, G, and H display specific data information regarding the eigenvalues.

Initial Factor Matrix

This matrix represents the original factor matrix solution before rotation. Although generally not used for interpretation, this matrix often illustrates valuable information about the structure of the variables.

Transformation Matrix

The transformation matrix produced for each factor analysis depicts the matrix used in converting the initial factor matrix to the terminal varimax rotated matrix.

Plot of Varimax Rotated Factors

The varimax rotated final factor matrix for each analysis was plotted in two dimensional space for all possible pairs of factor axes. Since each factor analysis resulted in three factors, for example, A, B, and C, there resulted three two dimensional plots, namely, A/B, A/C, and B/C, constituting the vertical/horizontal axes, respectively. All 10 variables are plotted in their positions relative to the factor axes for each plot and are available upon request from the author c/o Wayne State University, Detroit, Michigan.

Factor Score Coefficient Matrix

Factor scores, representing composite scales that depict the theoretical bounds related to the respective factors, may be calculated by means of the factor score coefficient matrix.

As an example, the factor score for an individual case is calculated from the equation:

$$f_j = az_1 + bz_2 + cz_3 - dz_4$$

where f_j = an individual's factor score on factor j

a, b, c = coefficient values from the factor score matrix

z_n = standardized values of variable n on factor j (i.e. value of variable n minus mean of variable n, quantity divided by standard deviation of variable n)

A factor score coefficient matrix was generated for each factor analysis performed and is included in the factor analyses output. See Appendices E, F, G, and H.

Computer Programs

Extensive use of the computer was essential in a study of this type and scope. The Michigan Terminal System (MTS) at Wayne State University was used exclusively both in batch and terminal modes for the preparation of the many data files. Within MTS, great use was made of the Statistical Package for the Social Sciences (SPSS), Versions 6.02 (1975), and 7.0 (1977). In total, over 80 hours of terminal connection time was needed to create all missing data approximated data files and conduct the necessary statistical operations.

Statistical Analysis

The statistical analysis will be comprised of an assessment of Pearson product-moment linear correlation coefficients found between factor loadings of experimental matrices and their respective criterion factor matrix. Thus, for each experimental factor matrix, loadings from extracted factors will be linearly correlated with the factor loadings from the criterion factor matrix of the respective data file. Twelve correlation coefficients for data set D1 result as depicted in Table 8. A similar matrix of 12 correlation coefficients would be established for data set D2.

This method of correlation among loadings was accomplished by creating a separate data file composed entirely of loadings on significant factors from the various factor matrices and applying a Pearson correlation to the data.

The higher the resulting correlation coefficient between an experimental factor matrix's loadings and those of the respective criterion factor matrix, for all three extracted factors, the "closer fit" a particular experimental matrix is to its criterion matrix and, hence, the more accurate the missing data approximation method which generated that experimental matrix.

Table 8

Matrix Model of Correlations Between Experimental and Criterion Loadings for a Data Group

Approximation Method	Missing Data Amount		
	10%	25%	50%
Full Multiple Regression	r_{11}	r_{12}	r_{13}
Stepwise Multiple Regression	r_{21}	r_{22}	r_{23}
Bivariate Regression (Pearson Correlation)	r_{31}	r_{32}	r_{33}
Mean Substitution	r_{41}	r_{42}	r_{43}

This type of tabular presentation will facilitate comparisons of goodness-of-fit within and across missing level amounts and between approximation methods.

Null Hypotheses

$H_{(0)1}$: In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 10% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

$H_{(0)2}$: In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 25% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

$H_{(0)3}$: In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 50% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

$H_{(0)4}$: In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 10% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

$H_{(0)5}$: In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 25% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

$H_{(0)6}$: In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 50% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

Chapter IV

Findings

Chapter IV presents the findings of the study. Pearson linear correlation coefficients were calculated, as described in Chapter III, between all loadings on the three significant factors from any given experimental factor matrix and its respective criterion factor matrix.

Findings are shown in order of the six respective hypotheses. For each given level of missing data amount (i.e. 10% missing, 25% missing, and 50% missing), and for each data group, separate tables depict the findings. Next, one large correlation matrix per data group illustrates the Pearson correlations between all factor matrices.

Scattergram plots of the correlations between experimental and respective criterion matrices are illustrated in Appendices I and J.

Criterion factor matrices and related data are presented in Appendices E and F. Experimental factor matrices and related data are presented in Appendices G and H, for data groups D1 and D2 respectively.

Hypothesized Findings

Hypothesis $H_{(0)1}$:

In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 10% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

Table 9 indicates that Hypothesis $H_{(0)1}$ was retained. There was less than a .05 probability level difference between the highest and lowest factor loading correlations regardless of which missing data approximation method was utilized. Alternative Hypothesis $H_{(A)1}$ was thereby not accepted.

An examination of the findings indicated that within data group D1, with 10% missing values, any of the least-squares approximation methods apparently work effectively. Each of the four correlations between the experimental and criterion factor loadings were significant at p = .001. The difference between the highest and lowest correlation coefficients was negligible. Nonetheless, the lowering of the correlation coefficients was in the anticipated direction, in decreasing order of correlation coefficient magnitude as follows: full multiple regression, stepwise regression, Pearson correlation, and mean substitution approximation methods.

In summary, with only 10% of the data approximated in this data set, any least-squares approximation method appears suitable.

Table 9

Correlation Coefficients Between Experimental and Criterion Factor Matrices for Data Group D1 with 10% Missing Values

Experimental Factor Matrices	Criterion Factor Matrix D1 Full	
D1M10FMR (Full Multiple Regression)	+.9901 (30) p=.001	(Correlation) (Cases; 10 loadings on each of 3 factors) (Significance level of correlation)
D1M10SWR (Stepwise Regression)	+.9872 (30) p=.001	
D1M10PC (Pearson Correlation)	+.9833 (30) p=.001	
D1M10ME (Mean Substitution)	+.9763 (30) p=.001	

Hypothesis $H_{(0)2}$:

In data group D1, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 25% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

Table 10 indicates that Hypothesis $H_{(0)2}$ was rejected. Thus, there was a .05 or greater probability level difference between the highest and lowest factor loading correlations when different data approximation methods were utilized. Alternative Hypothesis $H_{(A)2}$ was thereby accepted.

Findings indicated substantial differences between the 25% missing data approximated groups and the previous 10% missing data groups. In the case of 25% missing data in data group D1, gross differences between the approximation methods became evident.

Based upon the resulting correlation coefficients, the stepwise regression method yielded the closest loading approximations to the loadings in the criterion factor matrix (r = +.53). No other approximation methods in this particular case proved to be worthwhile. Surprisingly, the full multiple regression method, while being optimal for the 10% missing data situation, correlated only at the p = .10 level, with a coefficient of merely +.24.

The Pearson correlation method and mean substitution method produced rather interesting, although not accurate, loading approximations. In each of these cases, the three significant factors under analysis were extracted in a somewhat different order. Such an occurrence obviously caused a drastic reduction in the correlation of these loadings with the criterion matrix. Nonetheless, since factors were extracted in the order of their amount of explained variance (eigenvalues), the method of comparison of these loadings to the criterion loadings remains valid. In these cases of altered factor order extraction, the approximation method causing this outcome was clearly not desirous.

Table 10

Correlation Coefficients Between Experimental and Criterion Factor Matrices for Data Group D1 with 25% Missing Values

Experimental Factor Matrices	Criterion Factor Matrix D1 Full
D1M25FMR (Full Multiple Regression)	+.2412 (Correlation) (30) (Cases; 10 loadings on each of 3 factors) p=.100 (Significance level of correlation)
D1M25SWR (Stepwise Regression)	+.5285 (30) p=.001
D1M25PC (Pearson Correlation)	-.3468[a] (30) p=.030
D1M25ME (Mean Substitution)	-.2264[a] (30) p=.114

[a] indicates possible difference in factor order extraction

Hypothesis $H_{(0)3}$:

In data group DI, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 50% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

Table 11 indicates that Hypothesis $H_{(0)3}$ was rejected. Thus, there was a .05 or greater probability level difference between the highest and lowest factor loading correlations when different data approximation methods were utilized. Alternative Hypothesis $H_{(A)3}$ was thereby accepted.

Lastly for data group DI, the 50% missing data approximation level was investigated. This highest level of approximated missing data amount yielded widely varied correlation coefficients.

Interestingly and inexplicably, both the full multiple regression and stepwise multiple regression methods demonstrated marked weakness in duplicating the criterion factor matrix. Strangely, the Pearson correlation method, while being a poor method of estimation in the 25% missing data case, became the optimal estimation method in the 50% missing data situation. Mean substitution, however, was a weak approximation method for both the 25% and 50% missing data levels.

Table 11

Correlation Coefficients Between Experimental and Criterion Factor Matrices for Data Group D1 with 50% Missing Values

Experimental Factor Matrices	Criterion Factor Matrix D1 Full
D1M50FMR (Full Multiple Regression)	+.0688 (Correlation) (30) (Cases; 10 loadings on each of 3 factors) p=.359 (Significance level of correlation)
D1M50SWR (Stepwise Regression)	+.0929 (30) p=.313
D1M50PC (Pearson Correlation)	+.5312 (30) p=.001
D1M50ME (Mean Substitution)	-.0331[a] (30) p=.431

[a] indicates possible difference in factor order extraction

Hypothesis $H_{(0)4}$:

In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 10% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

Table 12 indicates that Hypothesis $H_{(0)4}$ was retained. There was less than a .05 probability level difference between the highest and lowest factor loading correlations regardless of which missing data approximation method was utilized. Alternative Hypothesis $H_{(A)4}$ was thereby not accepted.

Somewhat similar to what was found in data group D1 with 10% missing data approximated, data group D2, with the identical amount of missing data approximated, yielded high and closely similar correlation coefficients. Nonetheless, some differences did appear.

In the case of data group D2 with 10% missing data approximated, the stepwise regression method yielded the closest fit to the criterion factor loadings. This method was followed closely by mean substitution, full multiple regression, and Pearson correlation, in that order. All correlations, however, were significant at the $p = .001$ level, as was the case in the similar D1 data group results.

Table 12

Correlation Coefficients Between Experimental
and Criterion Factor Matrices for Data Group D2
with 10% Missing Values

Experimental Factor Matrices	Criterion Factor Matrix D2 Full
D2M10FMR (Full Multiple Regression)	+.9899 (Correlation) (30) (Cases; 10 loadings on each of 3 factors) p=.001 (Significance level of correlation)
D2M10SWR (Stepwise Regression)	+.9931 (30) p=.001
D2M10PC (Pearson Correlation)	+.9776 (30) p=.001
D2M10ME (Mean Substitution)	+.9926 (30) p=.001

Hypothesis $H_{(0)5}$:

In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 25% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

Table 13 indicates that Hypothesis $H_{(0)5}$ was rejected. Thus, there was a .05 or greater probability level difference between the highest and lowest factor loading correlations when different data approximation methods were utilized. Alternative Hypothesis $H_{(A)5}$ was thereby accepted.

As the amount of missing data approximated increased up to 25% in data group D2, mean substitution was found to yield the highest correlation (+.9779) between the experimental and criterion factor loadings. The difference, however, between mean substitution, stepwise regression, and full multiple regression was very slight with only a .0114 difference between the highest and lowest coefficients. The Pearson correlation method of data approximation also yielded a reasonably high correlation (+.7919) but, nonetheless, falls short of the correlations derived from the three other approximation techniques. All correlation coefficients, however, were significant at p = .001.

Table 13

Correlation Coefficients Between Experimental and Criterion Factor Matrices for Data Group D2 with 25% Missing Values

Experimental Factor Matrices	Criterion Factor Matrix D2 Full	
D2M25FMR (Full Multiple Regression)	+.9665 (30) p=.001	(Correlation) (Cases; 10 loadings on each of 3 factors) (Significance level of correlation)
D2M25SWR (Stepwise Regression)	+.9696 (30) p=.001	
D2M25PC (Pearson Correlation)	+.7919 (30) p=.001	
D2M25ME (Mean Substitution)	+.9779 (30) p=.001	

Hypothesis $H_{(0)6}$:

In data group D2, for correlations between criterion factor matrix loadings and those from respective experimental factor matrices with 50% missing data on 1/2 the variables approximated, the difference between the highest r and lowest r significance values will be equal to a .05 probability level or less.

Table 14 indicates that Hypothesis $H_{(0)6}$ was rejected. Thus, there was a .05 or greater probability level difference between the highest and lowest factor loading correlations when different data approximation methods were utilized. Alternative Hypothesis $H_{(A)6}$ was thereby accepted.

In the case of 50% missing data in data group D2, the stepwise regression method of data approximation was found to produce the highest correlation between experimental and criterion factor loadings. Following this method, in order of accuracy, was: mean substitution, full multiple regression, and Pearson correlation. Only stepwise regression, however, yielded a correlation coefficient significant at $p = .001$.

Table 14

Correlation Coefficients Between Experimental and Criterion Factor Matrices for Data Group D2 with 50% Missing Values

Experimental Factor Matrices	Criterion Factor Matrix D2 Full
D2M50FMR (Full Multiple Regression)	+.3832 (Correlation) (30) (Cases; 10 loadings on each of 3 factors) p=.018 (Significance level of correlation)
D2M50SWR (Stepwise Regression)	+.7911 (30) p=.001
D2M50PC (Pearson Correlation)	+.2542 (30) p=.088
D2M50ME (Mean Substitution)	+.5083 (30) p=.002

A correlation matrix for each data set summarizes the previous tables concisely. Table 15 displays are correlations between loadings for D1 data sets, while Table 16 indicates all correlations between D2 data sets.

Table 15
Correlations Between Factor Matrices; Data Group D1

FILE D1 (CREATION DATE = 01-12-78)

- - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - -

	D1M10SWR	D1M25SWR	D1M50SWR	D1M10FMR	D1M25FMR	D1M50FMR	D1M10PC	D1M25PC	D1M50PC	D1M10ME
D1M10SWR	1.0000 (0) S=0.001	0.5151 (30) S=0.002	0.1385 (30) S=0.233	0.9993 (30) S=0.001	0.2480 (30) S=0.093	0.1186 (30) S=0.266	0.9994 (30) S=0.001	-0.2901 (30) S=0.060	0.6102 (30) S=0.001	0.9975 (30) S=0.001
D1M25SWR	0.5151 (30) S=0.002	1.0000 (0) S=0.001	0.3804 (30) S=0.019	0.5201 (30) S=0.002	0.6950 (30) S=0.001	0.3223 (30) S=0.041	0.5110 (30) S=0.002	-0.2238 (30) S=0.117	0.3424 (30) S=0.032	0.5045 (30) S=0.002
D1M50SWR	0.1385 (30) S=0.233	0.3804 (30) S=0.019	1.0000 (0) S=0.001	0.1345 (30) S=0.239	0.3425 (30) S=0.032	0.8755 (30) S=0.001	0.1473 (30) S=0.219	0.1153 (30) S=0.272	0.2906 (30) S=0.060	0.1551 (30) S=0.207
D1M10FMR	0.9993 (30) S=0.001	0.5201 (30) S=0.002	0.1345 (30) S=0.239	1.0000 (0) S=0.001	0.2488 (30) S=0.092	0.1158 (30) S=0.271	0.9980 (30) S=0.001	-0.3009 (30) S=0.053	0.6021 (30) S=0.001	0.9957 (30) S=0.001
D1M25FMR	0.2480 (30) S=0.093	0.6950 (30) S=0.001	0.3425 (30) S=0.032	0.2488 (30) S=0.092	1.0000 (0) S=0.001	0.2549 (30) S=0.087	0.2458 (30) S=0.095	-0.2792 (30) S=0.068	0.3472 (30) S=0.030	0.2571 (30) S=0.085
D1M50FMR	0.1186 (30) S=0.266	0.3223 (30) S=0.041	0.8755 (30) S=0.001	0.1158 (30) S=0.271	0.2549 (30) S=0.087	1.0000 (0) S=0.001	0.1266 (30) S=0.252	0.0914 (30) S=0.316	0.1951 (30) S=0.151	0.1346 (30) S=0.239
D1M10PC	0.9994 (30) S=0.001	0.5110 (30) S=0.002	0.1473 (30) S=0.219	0.9980 (30) S=0.001	0.2458 (30) S=0.095	0.1266 (30) S=0.252	1.0000 (0) S=0.001	-0.2903 (30) S=0.060	0.6213 (30) S=0.001	0.9981 (30) S=0.001
D1M25PC	-0.2901 (30) S=0.060	-0.2238 (30) S=0.117	0.1153 (30) S=0.272	-0.3009 (30) S=0.053	-0.2792 (30) S=0.068	0.0914 (30) S=0.316	-0.2903 (30) S=0.060	1.0000 (0) S=0.001	-0.0308 (30) S=0.436	-0.2782 (30) S=0.068
D1M50PC	0.6102 (30) S=0.001	0.3424 (30) S=0.032	0.2906 (30) S=0.060	0.6021 (30) S=0.001	0.3472 (30) S=0.030	0.1951 (30) S=0.151	0.6213 (30) S=0.001	-0.0308 (30) S=0.436	1.0000 (0) S=0.001	0.6395 (30) S=0.001
D1M10ME	0.9975 (30) S=0.001	0.5045 (30) S=0.002	0.1551 (30) S=0.207	0.9957 (30) S=0.001	0.2571 (30) S=0.085	0.1346 (30) S=0.239	0.9981 (30) S=0.001	-0.2782 (30) S=0.068	0.6395 (30) S=0.001	1.0000 (0) S=0.001
D1M25ME	-0.1727 (30) S=0.181	-0.2126 (30) S=0.130	0.0926 (30) S=0.313	-0.1832 (30) S=0.166	-0.2842 (30) S=0.064	0.0670 (30) S=0.362	-0.1747 (30) S=0.178	0.9755 (30) S=0.001	0.0060 (30) S=0.487	-0.1611 (30) S=0.198

(COEFFICIENT / (CASES) / SIGNIFICANCE)   (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

DI LOADING MATRIX CALCULATIONS

FILE DI (CREATION DATE = 01-12-78)

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - -

	DIM10SWR	DIM25SWR	DIM50SWR	DIM10FMR	DIM25FMR	DIM50FMR	DIM10PC	DIM25PC	DIM50PC	DIM10ME
DIM50ME	0.0407 (30) S=0.415	0.4033 (30) S=0.014	0.3938 (30) S=0.016	0.0286 (30) S=0.440	0.4135 (30) S=0.012	0.2612 (30) S=0.082	0.0541 (30) S=0.388	0.2264 (30) S=0.114	0.2929 (30) S=0.058	0.0771 (30) S=0.343
DIFULL	0.9872 (30) S=0.001	0.5285 (30) S=0.001	0.0929 (30) S=0.313	0.9901 (30) S=0.001	0.2412 (30) S=0.100	0.0688 (30) S=0.359	0.9833 (30) S=0.001	-0.3468 (30) S=0.030	0.5312 (30) S=0.001	0.9763 (30) S=0.001

(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

Table 15 (continued)

DI LOADING MATRIX CALCULATIONS

FILE DI (CREATION DATE = 01-12-78)

- - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - -

	DIM25ME	DIM50ME	DIFULL
DIM10SWR	-0.1727	0.0407	0.9872
	(30)	(30)	(30)
	S=0.181	S=0.415	S=0.001
DIM25SWR	-0.2126	0.4033	0.5285
	(30)	(30)	(30)
	S=0.130	S=0.014	S=0.001
DIM50SWR	0.0926	0.3938	0.0929
	(30)	(30)	(30)
	S=0.313	S=0.016	S=0.313
DIM10FMR	-0.1832	0.0286	0.9901
	(30)	(30)	(30)
	S=0.166	S=0.440	S=0.001
DIM25FMR	-0.2842	0.4135	0.2412
	(30)	(30)	(30)
	S=0.064	S=0.012	S=0.100
DIM50FMR	0.0670	0.2612	0.0688
	(30)	(30)	(30)
	S=0.362	S=0.082	S=0.359
DIM10PC	-0.1747	0.0541	0.9833
	(30)	(30)	(30)
	S=0.178	S=0.388	S=0.001
DIM25PC	0.9755	0.2264	-0.3468
	(30)	(30)	(30)
	S=0.001	S=0.114	S=0.030
DIM50PC	0.0060	0.2929	0.5312
	(30)	(30)	(30)
	S=0.487	S=0.058	S=0.001
DIM10ME	-0.1611	0.0771	0.9763
	(30)	(30)	(30)
	S=0.198	S=0.343	S=0.001
DIM25ME	1.0000	0.1993	-0.2264
	(0)	(30)	(30)
	S=0.001	S=0.145	S=0.114

(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

Table 15 (continued)

D1 LOADING MATRIX CALCULATIONS

FILE D1 (CREATION DATE = 01-12-78)

- - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - -

	D1M25ME	D1M50ME	D1FULL
D1M50ME	0.1993 (30) S=0.145	1.0000 (0) S=0.001	-0.0331 (30) S=0.431
D1FULL	-0.2264 (30) S=0.114	-0.0331 (30) S=0.431	1.0000 (0) S=0.001

(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

Table 16
Correlations Between Factor Matrices; Data Group D2

LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - -

	D2M10SWR	D2M25SWR	D2M50SWR	D2M10FMR	D2M25FMR	D2M50FMR	D2M10PC	D2M25PC	D2M50PC	D2M10ME
D2M10SWR	1.0000 (0) S=0.001	0.9719 (30) S=0.001	0.7936 (30) S=0.001	0.9924 (30) S=0.001	0.9685 (30) S=0.001	0.3797 (30) S=0.019	0.9785 (30) S=0.001	0.7839 (30) S=0.001	0.2489 (30) S=0.092	0.9958 (30) S=0.001
D2M25SWR	0.9719 (30) S=0.001	1.0000 (0) S=0.001	0.8666 (30) S=0.001	0.9899 (30) S=0.001	0.9984 (30) S=0.001	0.4353 (30) S=0.008	0.9919 (30) S=0.001	0.8777 (30) S=0.001	0.2685 (30) S=0.076	0.9807 (30) S=0.001
D2M50SWR	0.7936 (30) S=0.001	0.8666 (30) S=0.001	1.0000 (0) S=0.001	0.8346 (30) S=0.001	0.8503 (30) S=0.001	0.5247 (30) S=0.001	0.8679 (30) S=0.001	0.9679 (30) S=0.001	0.5403 (30) S=0.001	0.8090 (30) S=0.001
D2M10FMR	0.9924 (30) S=0.001	0.9899 (30) S=0.001	0.8346 (30) S=0.001	1.0000 (0) S=0.001	0.9870 (30) S=0.001	0.4165 (30) S=0.011	0.9942 (30) S=0.001	0.8349 (30) S=0.001	0.2684 (30) S=0.076	0.9970 (30) S=0.001
D2M25FMR	0.9685 (30) S=0.001	0.9984 (30) S=0.001	0.8503 (30) S=0.001	0.9870 (30) S=0.001	1.0000 (0) S=0.001	0.4384 (30) S=0.008	0.9885 (30) S=0.001	0.8669 (30) S=0.001	0.2399 (30) S=0.101	0.9773 (30) S=0.001
D2M50FMR	0.3797 (30) S=0.019	0.4353 (30) S=0.008	0.5247 (30) S=0.001	0.4165 (30) S=0.011	0.4384 (30) S=0.008	1.0000 (0) S=0.001	0.4557 (30) S=0.006	0.5224 (30) S=0.002	0.5551 (30) S=0.001	0.3855 (30) S=0.018
D2M10PC	0.9785 (30) S=0.001	0.9919 (30) S=0.001	0.8679 (30) S=0.001	0.9942 (30) S=0.001	0.9885 (30) S=0.001	0.4557 (30) S=0.006	1.0000 (0) S=0.001	0.8728 (30) S=0.001	0.2804 (30) S=0.067	0.9867 (30) S=0.001
D2M25PC	0.7839 (30) S=0.001	0.8777 (30) S=0.001	0.9679 (30) S=0.001	0.8349 (30) S=0.001	0.8669 (30) S=0.001	0.5224 (30) S=0.002	0.8728 (30) S=0.001	1.0000 (0) S=0.001	0.4393 (30) S=0.008	0.8050 (30) S=0.001
D2M50PC	0.2489 (30) S=0.092	0.2685 (30) S=0.076	0.5403 (30) S=0.001	0.2684 (30) S=0.076	0.2399 (30) S=0.101	0.5551 (30) S=0.001	0.2804 (30) S=0.067	0.4393 (30) S=0.008	1.0000 (0) S=0.001	0.2567 (30) S=0.085
D2M10ME	0.9958 (30) S=0.001	0.9807 (30) S=0.001	0.8090 (30) S=0.001	0.9970 (30) S=0.001	0.9773 (30) S=0.001	0.3855 (30) S=0.018	0.9867 (30) S=0.001	0.8050 (30) S=0.001	0.2567 (30) S=0.085	1.0000 (0) S=0.001
D2M25ME	0.9823 (30) S=0.001	0.9844 (30) S=0.001	0.8111 (30) S=0.001	0.9875 (30) S=0.001	0.9823 (30) S=0.001	0.3582 (30) S=0.026	0.9792 (30) S=0.001	0.8128 (30) S=0.001	0.2424 (30) S=0.098	0.9905 (30) S=0.001

(COEFFICIENT / (CASES) / SIGNIFICANCE)   (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

Table 16 (continued)

LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS

- - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - -

	D2M10SWR	D2M25SWR	D2M50SWR	D2M10FMR	D2M25FMR	D2M50FMR	D2M10PC	D2M25PC	D2M50PC	D2M10ME
D2M50ME	0.5046	0.4824	0.3610	0.5047	0.4892	0.8175	0.4964	0.3385	0.4396	0.4920
	(30)	(30)	(30)	(30)	(30)	(30)	(30)	(30)	(30)	(30)
	S=0.002	S=0.003	S=0.025	S=0.002	S=0.003	S=0.001	S=0.003	S=0.034	S=0.008	S=0.003
D2FULL	0.9931	0.9696	0.7911	0.9899	0.9665	0.3832	0.9776	0.7919	0.2542	0.9926
	(30)	(30)	(30)	(30)	(30)	(30)	(30)	(30)	(30)	(30)
	S=0.001	S=0.001	S=0.001	S=0.001	S=0.001	S=0.018	S=0.001	S=0.001	S=0.088	S=0.001

(COEFFICIENT / (CASES) / SIGNIFICANCE)   (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS

- - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - -

	D2M25ME	D2M50ME	D2FULL
D2M10SWR	0.9823 (30) S=0.001	0.5046 (30) S=0.002	0.9931 (30) S=0.001
D2M25SWR	0.9844 (30) S=0.001	0.4824 (30) S=0.003	0.9696 (30) S=0.001
D2M50SWR	0.8111 (30) S=0.001	0.3610 (30) S=0.025	0.7911 (30) S=0.001
D2M10FMR	0.9875 (30) S=0.001	0.5047 (30) S=0.002	0.9899 (30) S=0.001
D2M25FMR	0.9823 (30) S=0.001	0.4892 (30) S=0.003	0.9665 (30) S=0.001
D2M50FMR	0.3582 (30) S=0.026	0.8175 (30) S=0.001	0.3832 (30) S=0.018
D2M10PC	0.9792 (30) S=0.001	0.4964 (30) S=0.003	0.9776 (30) S=0.001
D2M25PC	0.8128 (30) S=0.001	0.3385 (30) S=0.034	0.7919 (30) S=0.001
D2M50PC	0.2424 (30) S=0.098	0.4396 (30) S=0.008	0.2542 (30) S=0.088
D2M10ME	0.9905 (30) S=0.001	0.4920 (30) S=0.003	0.9926 (30) S=0.001
D2M25ME	1.0000 (0) S=0.001	0.4497 (30) S=0.006	0.9779 (30) S=0.001

(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

Table 16 (continued)

LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS

- - - - - - - - - - - - - - P E A R S O N   C O R R E L A T I O N   C O E F F I C I E N T S - - - - - - - - - - - - -

	D2M25ME	D2M50ME	D2FULL
D2M50ME	0.4497 (30) S=0.006	1.0000 (0) S=0.001	0.5083 (30) S=0.002
D2FULL	0.9779 (30) S=0.001	0.5083 (30) S=0.002	1.0000 (0) S=0.001

(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

In addition to the correlation coefficients presented in Tables 9 through 16, supplemental findings, in the form of scattergrams, assist in more graphically depicting the relationships between factor loadings. A total of 24 scattergrams, representing all factor loading correlations shown, were computer produced for inclusion (see Appendices I and J).

Unhypothesized Findings

In addition to the hypothesized findings, unhypothesized findings regarding factor structures of each of the experimental factor matrices were assessed. For each level of missing data amount, a table indicates the significant factors for each experimental factor matrix and the associated criterion matrix.

Upon inspection of each of these tables (Tables 17 through 22), it was found that the factors are generally stable in their variable composition. Even in the cases of extreme missing data (Tables 19 and 22), the general composition of the factors remained relatively stable, although the order of factor extraction may vary somewhat.

Table 17

Significant Factor Loadings[a] from Data Group D1M10

Varimax Rotated Factor Matrices

Data File	Factors 1	2	3
D1Full	V2 (.78) V10(.76) V1 (-.67) V6 (.65)	V4 (.96) V7 (-.86)	V5 (.68) V8 (-.68)
D1M10FMR	V2 (.82) V10(.72) V1 (-.69) V6 (.61)	V4 (.99) V7 (-.84)	V8 (-.62) V5 (.57)
D1M10SWR	V2 (.83) V10(.71) V1 (-.70)	V4 (.99) V7 (-.83)	V5 (.60) V8 (-.60)
D1M10PC	V2 (.84) V1 (-.70) V10(.69)	V4 (.99) V7 (-.84)	V5 (.60) V8 (-.60) V9 (.51)
D1M10ME	V2 (.85) V1 (-.71) V10(.69) V6 (.56)	V4 (.99) V7 (-.83)	V5 (.55) V8 (-.54)

[a] Significant loadings initially assessed as those having absolute values of |.60| or higher. If this criterion was not met by two variables within a factor, the two highest loadings regardless of their values were selected.

Table 18

Significant Factor Loadings[a] from Data Group D1M25

Varimax Rotated Factor Matrices

Data File	Factors 1	2	3
D1Full	V2 (.78) V10(.76) V1 (-.67) V6 (.65)	V4 (.96) V7 (-.86)	V5 (.68) V8 (-.68)
D1M25FMR	V1 (-.90) V2 (.80) V7 (.77) V4 (-.75)	V6 (.93) V10(.77)	V8 (-.86) V5 (.47)
D1M25SWR	V1 (-.91) V2 (.85) V7 (.73) V4 (-.71)	V6 (.95) V10(.76)	V8 (-.84) V5 (.47)
D1M25PC	V7 (-.82) V4 (.81)	V2 (.94) V1 (-.72) V3 (.67)	V6 (.91) V10(.80)
D1M25ME	V4 (.91) V7 (-.90)	V2 (.95) V1 (-.68)	V6 (.91) V10(.77)

[a] Significant loadings initially assessed as those having absolute values of |.60| or higher. If this criterion was not met by two variables within a factor, the two highest loadings regardless of their values were selected.

Table 19

Significant Factor Loadings[a] from Data Group D1M50

Varimax Rotated Factor Matrices

Data File	Factors 1	2	3
D1Full	V2 (.78) V10(.76) V1 (-.67) V6 (.65)	V4 (.96) V7 (-.86)	V5 (.68) V8 (-.68)
D1M50FMR	V2 (.91) V3 (.88) V1 (-.85)	V7 (.84) V8 (.84) V4 (-.69)	V6 (.99) V10(.73)
D1M50SWR	V2 (.90) V1 (-.87) V3 (.84)	V7 (.81) V8 (.78) V4 (-.75)	V6 (.98) V10(.70)
D1M50PC	V2 (.97) V3 (.86) V1 (-.78)	V8 (-.84) V4 (.77) V7 (-.60)	V10(.96) V6 (.76)
D1M50ME	V7 (.90) V4 (-.79) V8 (.69)	V2 (.94) V1 (-.80)	V6 (.97) V10(.73)

[a] Significant loadings initially assessed as those having absolute values of |.60| or higher. If this criterion was not met by two variables within a factor, the two highest loadings regardless of their values were selected.

Table 20

Significant Factor Loadings[a] from Data Group D2M10

Varimax Rotated Factor Matrices

Data File	Factors 1	2	3
D2Full	V5 (.73) V8 (.72)	V6 (.83) V1 (.58)	V9 (.59) V3 (.52)
D2M10FMR	V5 (.72) V8 (.70) V10(.60)	V6 (.87) V1 (.59)	V9 (.58) V3 (.41)
D2M10SWR	V8 (.71) V5 (.69) V10(.61)	V6 (.82) V1 (.62)	V9 (.65) V3 (.49)
D2M10PC	V8 (.70) V5 (.69)	V6 (.90) V1 (.56)	V9 (.49) V3 (.41)
D2M10ME	V8 (.72) V5 (.66) V10(.61)	V6 (.86) V1 (.59)	V9 (.59) V3 (.42)

[a] Significant loadings initially assessed as those having absolute values of |.60| or higher. If this criterion was not met by two variables within a factor, the two highest loadings regardless of their values were selected.

Table 21

Significant Factor Loadings[a] from Data Group D2M25

Varimax Rotated Factor Matrices

Data File	Factors 1	2	3
D2Full	V5 (.73) V8 (.72)	V6 (.83) V1 (.58)	V9 (.59) V3 (.52)
D2M25FMR	V5 (.79) V8 (.71)	V6 (.89) V1 (.65)	V9 (.59) V4 (.31)
D2M25SWR	V5 (.76) V8 (.72)	V6 (.88) V1 (.66)	V9 (.54) V3 (.32)
D2M25PC	V8 (.66) V9 (-.58)	V6 (.87) V1 (.67)	V4 (.64) V5 (.58)
D2M25ME	V8 (.73) V5 (.65)	V6 (.86) V1 (.66)	V9 (.59) V3 (.32)

[a] Significant loadings initially assessed as those having absolute values of $|.60|$ or higher. If this criterion was not met by two variables within a factor, the two highest loadings regardless of their values were selected.

Table 22

Significant Factor Loadings[a] from Data Group D2M50

Varimax Rotated Factor Matrices

Data File	Factors 1	2	3
D2Full	V5 (.73) V8 (.72)	V6 (.83) V1 (.58)	V9 (.59) V3 (.52)
D2M50FMR	V6 (.85) V1 (.78)	V8 (.73) V5 (.59)	V4 (.67) V5 (.58)
D2M50SWR	V8 (.77) V5 (.60)	V6 (.84) V1 (.79)	V4 (.67) V5 (.53)
D2M50PC	V6 (.95) V7 (.67)	V4 (.86) V5 (.71) V1 (.60)	V8 (.72) V10(.55)
D2M50ME	V6 (.92) V1 (.76)	V8 (.77) V10(.58)	V9 (.37) V3 (.30)

[a] Significant loadings initially assessed as those having absolute values of |.60| or higher. If this criterion was not met by two variables within a factor, the two highest loadings regardless of their values were selected.

Chapter V

Conclusions, Limitations, and Recommendations

Chapter V discusses the conclusions, limitations and recommendations of the study. In summary, two complete data sets without missing values were factor analyzed using the PA2 varimax method. The resultant rotated factor matrices, retaining three significant factors each, were treated as the criteria.

For each of three levels of missing data (10%, 25% and 50% missing values across one-half of the variables), missing data were approximated by the four least-squares methods of full multiple regression, stepwise regression, Pearson correlation, and mean substitution. Findings indicated that one particular least-squares approximation technique was not always optimum and that the estimation methods demonstrated different accuracies depending upon primarily the amount of missing data evident and the specific characteristics of the data set.

Conclusions

Much insight regarding missing data approximation methods for use in PA2 varimax factor analysis was gained from this study. Perhaps of primary importance was the finding that the various least-squares methods investigated produced varying results depending largely upon the amount of data approximated. The approximation methods utilized over two different data sets also added an important dimension to the study, in the sense that the identical approximation methods could be used on identical percentage amounts of missing data for two totally different data groups. From this design, more generalizable results were generated.

As mentioned above, findings indicated that the actual percentage amount of missing data requiring approximation was a critically important variable in determining an optimum data estimation method. For both data groups D1 and D2, hypotheses regarding the 10% level of missing data amount were retained, while hypotheses referring to 25% and 50% missing data amounts were all rejected. From this, it was concluded that at the 10% level of missing data, for probably most data sets, any of the four least-squares data approximation methods used will work well, yielding significant correlations between experimental and criterion loadings at $p = .001$. Given this conclusion, the method of mean substitution for small amounts of missing data may be desirable only because it requires less computational time to derive. In any case, PA2 varimax factor matrices in this study seemed relatively stable when only 10% missing data on one-half the variables were approximated.

In the case of 25% missing data on one-half of the variables, no one particular data approximation method was consistently optimum, although stepwise regression appeared most desirable overall.

Within the smaller data group D1 ($n = 60$ cases), stepwise regression, while yielding a correlation coefficient between experimental and criterion factor loadings of only +.5285, was considerably more accurate than the other estimation methods. The stepwise method yielded the only correlation coefficient which was significant at p = .001 for this data group.

In contrast, all approximation methods used on the larger (n = 150 cases) data group D2, with 25% missing data on one-half the variables, yielded significant loading correlations at p = .001. In order of accuracy, mean substitution, stepwise regression, and full multiple regression all produced very strong and similar correlation coefficients. It was worthy to note that in this larger D2 data group, the various methods of 25% missing data of approximation produced more stable results, i.e. less difference between the approximation methods was evident as compared to the results from the smaller (n = 60) D1 data group approximations. Considering both data groups simulataneously, stepwise regression yielded the most consistent accuracy at the 25% missing data level.

Regarding the final and highest level of missing data, 50% missing values on one-half the variables, data group D1 factor loadings were best approximated by Pearson correlation. This resultant correlation was significant at p = .001 and was, by a substantial margin, much stronger than any other correlation yielded by the remaining three estimation methods, including stepwise regression.

In contrast, the more expected result of stepwise regression yielding greatest accuracy was found to be the case within data group D2. Here, the stepwise regression method of approximation did very well, yielding the only significant correlation at p = .001.

Regarding the unhypothesized findings, it was evident that the variable composition of factors remained relatively stable, although factor extraction order tended to vary when larger amounts of data were missing. Of significant importance was the analysis of the D1 (n = 60) results as compared to the D2 (n = 150) results.

It was evident that as the cases to variables ratio increased, the factors demonstrated additional stability, despite missing value amounts. Thus, the D2 factors appeared somewhat more stable in terms of variable composition and factor extraction order, as compared to the D1 matrices. This may assist in explaining the rather unusual findings (partially due to differences in factor extraction order) found in D1M25 and D1M50 factor matrices discussed in hypotheses $H_{(0)2}$ and $H_{(0)3}$.

The following guidelines regarding data approximation strategies are presented as a result of the two data groups studied in this investigation. The guidelines should only be applied to PA2 varimax factor analysis research situations in which the ratio of cases to factors is roughly between 20 to 1 (20:1) through 50 to 1 (50:1), and the variable to factor ratio is roughly 3.33 to 1 (3.33:1).

In hopes of assisting in the structuring of much needed future hypotheses, the following points are cautiously presented:

1. If data exist with a magnitude of roughly 10% missing values on one-half the variables, the data approximation method of mean substitution will yield scientifically accurate results without substantial time, labor, or cost sacrifices. Other least-squares approximation methods will perform admirably and may be utilized, but the added computational time and cost required for their implementation appears unnecessary.

2. If data exist with a magnitude of roughly 25% missing values on one-half the variables, the optimum data approximation method becomes somewhat unclear. Nonetheless, usually the most consistently accurate results are yielded by stepwise regression data approximations, so this method is recommended.

3. If data exist with a magnitude of roughly 50% missing values on one-half the variables, the optimum data approximation method appears to depend upon the number of cases and/or the specific characteristics of the data. In the current study, for case to factor ratios of roughly 10:1, Pearson correlation approximation appeared to work admirably, while for case to factor ratios of roughly 50:1, stepwise regression appeared optimum. Nonetheless, with such large quantities of missing data as this, the researcher should exercise caution and perhaps explore all of the four least-squares approximation methods for the data set under

investigation. In such cases, the interpretation of the resulting factor loadings becomes a critical issue and extreme caution should be exercised by the researcher in evaluating the four resulting factor matrices.

Limitations

The conclusions of this study were limited in a number of important aspects. First, research in the area of missing data approximation in factor analysis is in its primitive stages. Consequently, the conclusions of this study can only safely pertain to data sets having similar overall statistical characteristics to those described in the current work. (See Appendices C and D.)

Also, crucially important to consider are the various ratios of cases to factors and variables to factors when generalizing this study's conclusions to other data. Conclusions from this study should not be generalized to factor analyses displaying substantially different ratios than those described earlier.

A final critical limitation is with regard to the type of factor analysis performed and accompanying rotational method used. This study concerned itself strictly with a traditional PA2 factor analysis method using varimax rotation. The conclusions of the study should not be extended to any other factor analytic methods or rotations, except perhaps as hypotheses.

Recommendations

In reiterating an earlier point, the study of missing data approximation techniques for use in multivariate statistics in general, and factor analysis in particular, is in its very early stage. Much more research is needed in the area, and, with particular attention to factor analysis, studies involving various data sets of varied sizes and statistical characteristics are strongly recommended.

In addition, more research is needed regarding the various types of factor analytic methods and rotations and their possible interactions with approximation techniques.

The method of determining data approximation accuracy is still open to further study. Perhaps methods other than, or in addition to, the linear correlations between experimental and criterion loadings on significant factors should be further investigated.

Lastly, further studies can investigate non-least-squares data approximation techniques to gain greater insight into the entire process of estimating missing values.

Via these recommended channels of future research, more accurate and generalizable procedural guidelines may be developed for missing data approximation in factor analysis. This study has provided a necessary step toward the ultimate attainment of that goal.

Appendices

A Glossary

B Information Related to Instruments

C Distributional Characteristics of Data Group D1, Complete Data File

D Distributional Characteristics of Data Group D2, Complete Data File

E Criteria Factor Matrices and Related Statistics for Data Group D1

F Criteria Factor Matrices and Related Statistics for Data Group D2

G Experimental Factor Matrices and Related Statistics for Data Group D1

H Experimental Factor Matrices and Related Statistics for Data Group D2

I Scattergrams and Related Statistics for Data Group D1

J Scattergrams and Related Statistics for Data Group D2

K Raw Data for Data Group D1

L Raw Data for Data Group D2

Appendix A

Glossary

Bivariate Correlation (Pearson Correlation) - measure of linear association between two variables.

Communality - measure of common variance between factors on any given variable.

Correlation Coefficient - a statistical measure of association between two or more variables.

Correlation Matrix - a tabular array of rows and columns comprised of correlation coefficients between a given number of variables.

Degrees of Freedom - amount of an entity free to vary. In Bivariate Correlation, number of variables with paired data minus two.

Eigenvalues (Latent Roots) - sum of squared loadings on a variable within a factor matrix.

Factors - underlying statistical constructs for a set of variables.

Factor Analysis - Multivariate statistical technique generally used to reduce a number of variables into a smaller number of constructs or factors.

Factor Loading - a correlation coefficient between a variable and a factor.

Factor Matrix - a tabular array of rows and columns comprised of factor loadings.

Kaiser's Criterion - a criterion for factor extraction which deems significant factors for extraction if the factor eigenvalue is 1.0 or greater.

Kurtosis - the peakedness or flatness of a frequency distribution curve.

Least-Squares - methods of analysis regarding the sum of squared linear distances between variables.

Mean - sum of values divided by number of values; average.

Median - point at which one-half of values are above and one-half of values are below in a frequency distribution.

Missing Data - in this study, data which was purposely and randomly removed from an existing full data file.

Mode - value(s) occurring most often in a frequency distribution.

Multivariate Analysis - statistical analysis of multiple measures or variables.

Orthogonal Rotation - factor rotations of axis with 90^{o} angles between such axis.

Pearson Product Moment Correlation - (see Bivariate Correlation)

Quartimax Rotation - a method of factor rotation which generally simplifies variables in a factor matrix.

Regression Analysis - study of the relationships between variables in terms of one variable's regression or explained variance due to another variable.

Reliability - the consistency with which an instrument measures whatever it measures.

Rotation - a process of turning axis to selected positions in factor analysis.

Scree Test - a method developed by Cattell used to contract factors in factor analysis.

Skewness - measure of the symmetry of a frequency distribution.

Standard Error of Mean - a measure of error or confidence associated with a mean from a distribution.

Standard Deviation - a measure of dispersion about the mean in a frequency distribution.

Validity - the accuracy with which an instrument measures what it is supposed to measure.

Variable - an entity upon which data may be collected, e.g. age, race, test scores, etc.

Variance - the theoretical measure of data dispersion in statistics.

Varimax Rotation - a method of factor rotation which generally simplifies factors in a factor matrix.

For additional explanations see:

Rummel (1970)

Child (1970)

Bennett and Bowers (1976)

Appendix B

Information Related to Instruments

Data Group D1

Instrumentation used to generate data for D1 data files was prepared by the author for use in attitudinal assessment of a foster care program at a Metropolitan Detroit area guidance clinic.

The instrument was initially created via professional group criterion and possessed content validity. Construct validity, determined by a factor analytic technique, established the underlying psychological constructs of the items. A test-retest reliability of .90 was measured over 50 subjects.

The instrument was self-enumerated voluntarily and confidentially by adult participants (foster parents) partaking in the clinic's program.

The SEEKER computer program, available from the Macomb Intermediate School District, Mount Clemens, Michigan, indicated a reading difficulty of 7.7 grade level equivalent.

Ten variables, selected from this instrument, were selected randomly to form the data group D1 for the current study. Sample size was 60. All items were answerable by means of a nine-point, Likert-type scale.

Data Group D2

Instrumentation used to generate data for D2 data files was developed by the National Opinion Research Center (NORC), Chicago, Illinois. The instrumentation was developed for social survey use across the United States during 1975. No validity or reliability measures are reported, but the instrument has been evaluated continuously since NORC's early introduction of the yearly surveys. A selected group of 10 continuous data variables were selected for use in this study. Sample size for use in this study was 150, or roughly 10% of the original NORC sample of 1,491 respondents. The random sampling was computer generated by the Statistical Package for the Social Sciences (SPSS), Version 7.0.

Appendix C

Distributional Characteristics

of Data Group D1,

Complete Data File

FILE - D1 - CREATED 01-05-78

V1

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	31	51.7	51.7	51.7
2.	8	13.3	13.3	65.0
3.	12	20.0	20.0	85.0
4.	4	6.7	6.7	91.7
5.	2	3.3	3.3	95.0
7.	1	1.7	1.7	96.7
8.	1	1.7	1.7	98.3
9.	1	1.7	1.7	100.0
TOTAL	60	100.0	100.0	

MEAN	2.217	STD ERR	0.228	MEDIAN	1.468
MODE	1.000	STD DEV	1.767	VARIANCE	3.122
KURTOSIS	4.528	SKEWNESS	2.005	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V2

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
2.	2	3.3	3.3	3.3
3.	1	1.7	1.7	5.0
4.	1	1.7	1.7	6.7
5.	5	8.3	8.3	15.0
6.	5	8.3	8.3	23.3
7.	9	15.0	15.0	38.3
8.	11	18.3	18.3	56.7
9.	26	43.3	43.3	100.0
TOTAL	60	100.0	100.0	

MEAN	7.517	STD ERR	0.237	MEDIAN	8.136
MODE	9.000	STD DEV	1.836	VARIANCE	3.373
KURTOSIS	1.420	SKEWNESS	-1.369	RANGE	7.000
MINIMUM	2.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V3

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
3.	1	1.7	1.7	1.7
5.	1	1.7	1.7	3.3
6.	2	3.3	3.3	6.7
7.	4	6.7	6.7	13.3
8.	13	21.7	21.7	35.0
9.	39	65.0	65.0	100.0
TOTAL	60	100.0	100.0	

MEAN	8.383	STD ERR	0.147	MEDIAN	8.731
MODE	9.000	STD DEV	1.136	VARIANCE	1.291
KURTOSIS	8.725	SKEWNESS	-2.677	RANGE	6.000
MINIMUM	3.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V4

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	34	56.7	56.7	56.7
2.	10	16.7	16.7	73.3
3.	5	8.3	8.3	81.7
4.	4	6.7	6.7	88.3
5.	6	10.0	10.0	98.3
9.	1	1.7	1.7	100.0
TOTAL	60	100.0	100.0	

MEAN	2.067	STD ERR	0.211	MEDIAN	1.382
MODE	1.000	STD DEV	1.635	VARIANCE	2.673
KURTOSIS	4.346	SKEWNESS	1.911	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V5

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	34	56.7	56.7	56.7
2.	16	26.7	26.7	83.3
3.	8	13.3	13.3	96.7
4.	1	1.7	1.7	98.3
5.	1	1.7	1.7	100.0
TOTAL	60	100.0	100.0	

MEAN	1.650	STD ERR	0.116	MEDIAN	1.382
MODE	1.000	STD DEV	0.899	VARIANCE	0.808
KURTOSIS	2.288	SKEWNESS	1.488	RANGE	4.000
MINIMUM	1.000	MAXIMUM	5.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V6

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	11	18.3	18.3	18.3
2.	7	11.7	11.7	30.0
3.	7	11.7	11.7	41.7
4.	8	13.3	13.3	55.0
5.	10	16.7	16.7	71.7
6.	4	6.7	6.7	78.3
7.	4	6.7	6.7	85.0
8.	4	6.7	6.7	91.7
9.	5	8.3	8.3	100.0
TOTAL	60	100.0	100.0	

MEAN	4.283	STD ERR	0.328	MEDIAN	4.125
MODE	1.000	STD DEV	2.538	VARIANCE	6.444
KURTOSIS	-0.908	SKEWNESS	0.371	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V7

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	1	1.7	1.7	1.7
3.	1	1.7	1.7	3.3
4.	2	3.3	3.3	6.7
5.	5	8.3	8.3	15.0
6.	4	6.7	6.7	21.7
7.	10	16.7	16.7	38.3
8.	9	15.0	15.0	53.3
9.	28	46.7	46.7	100.0
TOTAL	60	100.0	100.0	

MEAN	7.583	STD ERR	0.234	MEDIAN	8.278
MODE	9.000	STD DEV	1.816	VARIANCE	3.298
KURTOSIS	2.036	SKEWNESS	-1.456	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

01-05-78 FILE - D1 - CREATED 01-05-78

V8

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	1	1.7	1.7	1.7
5.	1	1.7	1.7	3.3
6.	3	5.0	5.0	8.3
7.	16	26.7	26.7	35.0
8.	10	16.7	16.7	51.7
9.	29	48.3	48.3	100.0
TOTAL	60	100.0	100.0	

MEAN	7.950	STD ERR	0.180	MEDIAN	8.400
MODE	9.000	STD DEV	1.395	VARIANCE	1.947
KURTOSIS	9.223	SKEWNESS	-2.348	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V9

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	15	25.0	25.0	25.0
2.	13	21.7	21.7	46.7
3.	12	20.0	20.0	66.7
4.	4	6.7	6.7	73.3
5.	7	11.7	11.7	85.0
6.	3	5.0	5.0	90.0
7.	2	3.3	3.3	93.3
8.	2	3.3	3.3	96.7
9.	2	3.3	3.3	100.0
TOTAL	60	100.0	100.0	

MEAN	3.233	STD ERR	0.283	MEDIAN	2.667
MODE	1.000	STD DEV	2.189	VARIANCE	4.792
KURTOSIS	0.351	SKEWNESS	1.035	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

FILE - D1 - CREATED 01-05-78

V10

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	7	11.7	11.7	11.7
2.	8	13.3	13.3	25.0
3.	7	11.7	11.7	36.7
4.	8	13.3	13.3	50.0
5.	9	15.0	15.0	65.0
6.	2	3.3	3.3	68.3
7.	7	11.7	11.7	80.0
8.	1	1.7	1.7	81.7
9.	11	18.3	18.3	100.0
TOTAL	60	100.0	100.0	

MEAN	4.817	STD ERR	0.350	MEDIAN	4.500
MODE	9.000	STD DEV	2.709	VARIANCE	7.339
KURTOSIS	-1.172	SKEWNESS	0.264	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		

VALID CASES 60 MISSING CASES 0

Appendix D

Distributional Characteristics

of Data Group D2,

Complete Data File

V1

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
16.	1	0.7	0.7	0.7
17.	6	4.0	4.0	4.7
19.	2	1.3	1.3	6.0
20.	1	0.7	0.7	6.7
22.	1	0.7	0.7	7.3
25.	1	0.7	0.7	8.0
26.	10	6.7	6.7	14.7
27.	4	2.7	2.7	17.3
28.	1	0.7	0.7	18.0
29.	2	1.3	1.3	19.3
30.	1	0.7	0.7	20.0
31.	2	1.3	1.3	21.3
32.	10	6.7	6.7	28.0
33.	5	3.3	3.3	31.3
34.	2	1.3	1.3	32.7
35.	4	2.7	2.7	35.3
36.	3	2.0	2.0	37.3
37.	4	2.7	2.7	40.0
39.	1	0.7	0.7	40.7
40.	5	3.3	3.3	44.0
41.	35	23.3	23.3	67.3
42.	1	0.7	0.7	68.0
43.	1	0.7	0.7	68.7

44.	3	2.0	2.0	70.7
45.	5	3.3	3.3	74.0
46.	1	0.7	0.7	74.7
47.	1	0.7	0.7	75.3
48.	7	4.7	4.7	80.0
50.	13	8.7	8.7	88.7
54.	1	0.7	0.7	89.3
57.	2	1.3	1.3	90.7
60.	4	2.7	2.7	93.3
62.	3	2.0	2.0	95.3
63.	1	0.7	0.7	96.0
71.	3	2.0	2.0	98.0
82.	3	2.0	2.0	100.0
TOTAL	150	100.0	100.0	

MEAN	40.193	STD ERR	1.049	MEDIAN	40.757
MODE	41.000	STD DEV	12.845	VARIANCE	165.002
KURTOSIS	1.369	SKEWNESS	0.739	RANGE	66.000
MINIMUM	16.000	MAXIMUM	82.000		

VALID CASES 150 MISSING CASES 0

V2

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
0.	8	5.3	5.3	5.3
1.	26	17.3	17.3	22.7
2.	22	14.7	14.7	37.3
3.	25	16.7	16.7	54.0
4.	14	9.3	9.3	63.3
5.	13	8.7	8.7	72.0
6.	10	6.7	6.7	78.7
7.	11	7.3	7.3	86.0
8.	1	0.7	0.7	86.7
9.	7	4.7	4.7	91.3
10.	4	2.7	2.7	94.0
11.	3	2.0	2.0	96.0
13.	3	2.0	2.0	98.0
15.	1	0.7	0.7	98.7
16.	1	0.7	0.7	99.3
18.	1	0.7	0.7	100.0
TOTAL	150	100.0	100.0	

MEAN	4.233	STD ERR	0.284	MEDIAN	3.260
MODE	1.000	STD DEV	3.480	VARIANCE	12.113
KURTOSIS	2.060	SKEWNESS	1.377	RANGE	18.000
MINIMUM	0.0	MAXIMUM	18.000		

VALID CASES 150 MISSING CASES 0

V3

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
16.	6	4.0	4.0	4.0
17.	9	6.0	6.0	10.0
18.	11	7.3	7.3	17.3
19.	13	8.7	8.7	26.0
20.	22	14.7	14.7	40.7
21.	21	14.0	14.0	54.7
22.	14	9.3	9.3	64.0
23.	18	12.0	12.0	76.0
24.	13	8.7	8.7	84.7
25.	9	6.0	6.0	90.7
26.	1	0.7	0.7	91.3
27.	3	2.0	2.0	93.3
28.	1	0.7	0.7	94.0
29.	3	2.0	2.0	96.0
30.	2	1.3	1.3	97.3
32.	2	1.3	1.3	98.7
37.	1	0.7	0.7	99.3
38.	1	0.7	0.7	100.0
TOTAL	150	100.0	100.0	

MEAN	21.700	STD ERR	0.304	MEDIAN	21.167
MODE	20.000	STD DEV	3.721	VARIANCE	13.849
KURTOSIS	3.691	SKEWNESS	1.416	RANGE	22.000
MINIMUM	16.000	MAXIMUM	38.000		

VALID CASES 150 MISSING CASES 0

V4

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
12.	1	0.7	0.7	0.7
15.	1	0.7	0.7	1.3
18.	3	2.0	2.0	3.3
19.	2	1.3	1.3	4.7
20.	8	5.3	5.3	10.0
23.	2	1.3	1.3	11.3
25.	5	3.3	3.3	14.7
26.	2	1.3	1.3	16.0
27.	2	1.3	1.3	17.3
28.	2	1.3	1.3	18.7
29.	2	1.3	1.3	20.0
30.	1	0.7	0.7	20.7
31.	4	2.7	2.7	23.3
32.	2	1.3	1.3	24.7
33.	3	2.0	2.0	26.7
34.	4	2.7	2.7	29.3
35.	2	1.3	1.3	30.7
36.	17	11.3	11.3	42.0
37.	3	2.0	2.0	44.0
38.	1	0.7	0.7	44.7
39.	6	4.0	4.0	48.7
40.	10	6.7	6.7	55.3
41.	1	0.7	0.7	56.0

42.	3	2.0	2.0	58.0
43.	7	4.7	4.7	62.7
45.	5	3.3	3.3	66.0
46.	10	6.7	6.7	72.7
47.	7	4.7	4.7	77.3
48.	3	2.0	2.0	79.3
50.	11	7.3	7.3	86.7
51.	4	2.7	2.7	89.3
60.	4	2.7	2.7	92.0
61.	4	2.7	2.7	94.7
63.	2	1.3	1.3	96.0
67.	1	0.7	0.7	96.7
69.	2	1.3	1.3	98.0
78.	3	2.0	2.0	100.0
TOTAL	150	100.0	100.0	

MEAN	40.113	STD ERR	1.057	MEDIAN	39.700
MODE	36.000	STD DEV	12.940	VARIANCE	167.456
KURTOSIS	0.525	SKEWNESS	0.434	RANGE	66.000
MINIMUM	12.000	MAXIMUM	78.000		

VALID CASES 150 MISSING CASES 0

V5

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
5.	1	0.7	0.7	0.7
7.	2	1.3	1.3	2.0
8.	11	7.3	7.3	9.3
9.	8	5.3	5.3	14.7
10.	6	4.0	4.0	18.7
11.	16	10.7	10.7	29.3
12.	55	36.7	36.7	66.0
13.	5	3.3	3.3	69.3
14.	14	9.3	9.3	78.7
15.	7	4.7	4.7	83.3
16.	13	8.7	8.7	92.0
17.	4	2.7	2.7	94.7
18.	4	2.7	2.7	97.3
20.	4	2.7	2.7	100.0
TOTAL	150	100.0	100.0	

MEAN	12.460	STD ERR	0.230	MEDIAN	12.064
MODE	12.000	STD DEV	2.823	VARIANCE	7.968
KURTOSIS	0.403	SKEWNESS	0.399	RANGE	15.000
MINIMUM	5.000	MAXIMUM	20.000		

VALID CASES 150 MISSING CASES 0

V6

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	5	3.3	3.3	3.3
2.	4	2.7	2.7	6.0
3.	5	3.3	3.3	9.3
4.	9	6.0	6.0	15.3
5.	9	6.0	6.0	21.3
6.	12	8.0	8.0	29.3
7.	6	4.0	4.0	33.3
8.	35	23.3	23.3	56.7
9.	6	4.0	4.0	60.7
10.	14	9.3	9.3	70.0
11.	4	2.7	2.7	72.7
12.	26	17.3	17.3	90.0
13.	3	2.0	2.0	92.0
14.	2	1.3	1.3	93.3
16.	3	2.0	2.0	95.3
17.	3	2.0	2.0	97.3
18.	1	0.7	0.7	98.0
20.	3	2.0	2.0	100.0
TOTAL	150	100.0	100.0	

MEAN	8.647	STD ERR	0.325	MEDIAN	8.214
MODE	8.000	STD DEV	3.978	VARIANCE	15.827
KURTOSIS	0.382	SKEWNESS	0.417	RANGE	19.000
MINIMUM	1.000	MAXIMUM	20.000		

VALID CASES 150 MISSING CASES 0

V7

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1.	3	2.0	2.0	2.0
3.	5	3.3	3.3	5.3
4.	3	2.0	2.0	7.3
5.	7	4.7	4.7	12.0
6.	6	4.0	4.0	16.0
7.	9	6.0	6.0	22.0
8.	35	23.3	23.3	45.3
9.	6	4.0	4.0	49.3
10.	11	7.3	7.3	56.7
11.	9	6.0	6.0	62.7
12.	40	26.7	26.7	89.3
13.	3	2.0	2.0	91.3
14.	4	2.7	2.7	94.0
16.	7	4.7	4.7	98.7
18.	1	0.7	0.7	99.3
19.	1	0.7	0.7	100.0
TOTAL	150	100.0	100.0	

MEAN	9.540	STD ERR	0.277	MEDIAN	9.591
MODE	12.000	STD DEV	3.397	VARIANCE	11.539
KURTOSIS	0.154	SKEWNESS	-0.092	RANGE	18.000
MINIMUM	1.000	MAXIMUM	19.000		

VALID CASES 150 MISSING CASES 0

V8

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
4.	1	0.7	0.7	0.7
6.	1	0.7	0.7	1.3
7.	6	4.0	4.0	5.3
8.	17	11.3	11.3	16.7
9.	2	1.3	1.3	18.0
10.	12	8.0	8.0	26.0
11.	6	4.0	4.0	30.0
12.	57	38.0	38.0	68.0
13.	10	6.7	6.7	74.7
14.	9	6.0	6.0	80.7
15.	4	2.7	2.7	83.3
16.	15	10.0	10.0	93.3
17.	1	0.7	0.7	94.0
18.	4	2.7	2.7	96.7
19.	3	2.0	2.0	98.7
20.	2	1.3	1.3	100.0
TOTAL	150	100.0	100.0	

MEAN	12.120	STD ERR	0.246	MEDIAN	12.026
MODE	12.000	STD DEV	3.019	VARIANCE	9.113
KURTOSIS	0.202	SKEWNESS	0.243	RANGE	16.000
MINIMUM	4.000	MAXIMUM	20.000		

VALID CASES 150 MISSING CASES 0

V9

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
20.	2	1.3	1.3	1.3
21.	2	1.3	1.3	2.7
22.	1	0.7	0.7	3.3
23.	3	2.0	2.0	5.3
24.	4	2.7	2.7	8.0
25.	4	2.7	2.7	10.7
26.	2	1.3	1.3	12.0
27.	6	4.0	4.0	16.0
28.	3	2.0	2.0	18.0
29.	8	5.3	5.3	23.3
30.	6	4.0	4.0	27.3
31.	2	1.3	1.3	28.7
32.	6	4.0	4.0	32.7
33.	4	2.7	2.7	35.3
34.	7	4.7	4.7	40.0
35.	1	0.7	0.7	40.7
36.	1	0.7	0.7	41.3
37.	4	2.7	2.7	44.0
38.	2	1.3	1.3	45.3
39.	4	2.7	2.7	48.0
40.	7	4.7	4.7	52.7
41.	5	3.3	3.3	56.0
42.	2	1.3	1.3	57.3

43.	4	2.7	2.7	60.0
44.	2	1.3	1.3	61.3
45.	1	0.7	0.7	62.0
46.	5	3.3	3.3	65.3
47.	3	2.0	2.0	67.3
48.	1	0.7	0.7	68.0
49.	4	2.7	2.7	70.7
50.	2	1.3	1.3	72.0
51.	2	1.3	1.3	73.3
52.	4	2.7	2.7	76.0
53.	2	1.3	1.3	77.3
56.	1	0.7	0.7	78.0
57.	6	4.0	4.0	82.0
58.	3	2.0	2.0	84.0
59.	2	1.3	1.3	85.3
60.	2	1.3	1.3	86.7
61.	1	0.7	0.7	87.3
62.	2	1.3	1.3	88.7
64.	2	1.3	1.3	90.0
65.	2	1.3	1.3	91.3
66.	3	2.0	2.0	93.3
67.	3	2.0	2.0	95.3
68.	2	1.3	1.3	96.7
70.	1	0.7	0.7	97.3
76.	1	0.7	0.7	98.0
77.	1	0.7	0.7	98.7
79.	1	0.7	0.7	99.3

80.	1	0.7	0.7	100.0
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TOTAL	150	100.0	100.0	

MEAN	42.193	STD ERR	1.184	MEDIAN	39.929
MODE	29.000	STD DEV	14.504	VARIANCE	210.371
KURTOSIS	-0.535	SKEWNESS	0.578	RANGE	60.000
MINIMUM	20.000	MAXIMUM	80.000		

VALID CASES 150 MISSING CASES 0

V10

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
2.	1	0.7	0.7	0.7
3.	4	2.7	2.7	3.3
4.	7	4.7	4.7	8.0
5.	6	4.0	4.0	12.0
6.	6	4.0	4.0	16.0
7.	8	5.3	5.3	21.3
8.	12	8.0	8.0	29.3
9.	45	30.0	30.0	59.3
10.	27	18.0	18.0	77.3
11.	17	11.3	11.3	88.7
12.	17	11.3	11.3	100.0
	------	------	------	
TOTAL	150	100.0	100.0	

MEAN	8.840	STD ERR	0.190	MEDIAN	9.189
MODE	9.000	STD DEV	2.326	VARIANCE	5.410
KURTOSIS	0.421	SKEWNESS	-0.916	RANGE	10.000
MINIMUM	2.000	MAXIMUM	12.000		

VALID CASES 150 MISSING CASES 0

Appendix E

Criteria Factor Matrix

and Related Statistics for

Data Group D1

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.29533	0.34107	0.20868	-0.19153	-0.35171	-0.02991	-0.04397	-0.47315
V2	-0.79772	1.00000	0.51263	-0.19794	-0.23774	0.30983	0.30450	0.06979	0.07491	0.44181
V3	-0.29533	0.51263	1.00000	0.03163	-0.09875	0.19087	0.09514	0.09782	-0.09789	0.17738
V4	0.34107	-0.19794	0.03163	1.00000	0.11996	0.13421	-0.86952	-0.22140	0.01926	-0.03929
V5	0.20868	-0.23774	-0.09875	0.11996	1.00000	-0.00037	-0.18434	-0.54138	0.24899	-0.13819
V6	-0.19153	0.30983	0.19087	0.13421	-0.00037	1.00000	-0.08426	-0.04379	0.29901	0.75696
V7	-0.35171	0.30450	0.09514	-0.86952	-0.18434	-0.08426	1.00000	0.31273	-0.09024	0.13580
V8	-0.02991	0.06979	0.09782	-0.22140	-0.54138	-0.04379	0.31273	1.00000	-0.29578	0.08274
V9	-0.04397	0.07491	-0.09789	0.01926	0.24899	0.29901	-0.09024	-0.29578	1.00000	0.13595
V10	-0.47315	0.44181	0.17738	-0.03929	-0.13819	0.75696	0.13580	0.08274	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0050467(0.50467141E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.75422	1	3.06378	30.6	30.6
V2	0.76241	2	2.15088	21.5	52.1
V3	0.34379	3	1.45534	14.6	66.7
V4	0.80159	4	1.12189	11.2	77.9
V5	0.35911	5	0.71951	7.2	85.1
V6	0.69459	6	0.67149	6.7	91.8
V7	0.80833	7	0.37707	3.8	95.6
V8	0.39727	8	0.20465	2.0	97.6
V9	0.23097	9	0.15314	1.5	99.2
V10	0.72511	10	0.08214	0.8	100.0

CONVERGENCE REQUIRED 22 ITERATIONS

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.73858	-0.18243	-0.07218
V2	0.76292	0.29905	-0.03368
V3	0.35094	0.19022	-0.15513
V4	-0.59711	0.62678	-0.41820
V5	-0.37167	0.19551	0.57961
V6	0.32468	0.62526	0.02841
V7	0.66244	-0.54454	0.24576
V8	0.31120	-0.35222	-0.52395
V9	-0.01123	0.31604	0.37352
V10	0.55834	0.51609	-0.02192

VARIABLE	COMMUNALITY
V1	0.58399
V2	0.67261
V3	0.18341
V4	0.92429
V5	0.51231
V6	0.49717
V7	0.79575
V8	0.49542
V9	0.23952
V10	0.57858

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.69834	49.2	49.2
2	1.76774	32.2	81.5
3	1.01697	18.5	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.67199	0.36068	0.04822
V2	0.77543	-0.24922	-0.09595
V3	0.40371	-0.01261	-0.14238
V4	-0.01175	0.95942	0.06043
V5	-0.21160	0.06091	0.68104
V6	0.64601	0.18869	0.21033
V7	0.13054	-0.86151	-0.19107
V8	0.05966	-0.15154	-0.68476
V9	0.15934	0.02349	0.46215
V10	0.75826	0.00473	0.05996

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.76032	-0.59692	-0.25611
FACTOR 2	0.64266	0.63407	0.43004
FACTOR 3	-0.09431	-0.49156	0.86572

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.14197	-0.02659	0.01833
V2	0.44894	-0.11222	-0.00904
V3	0.02531	-0.00825	-0.04287
V4	0.14516	0.85542	-0.27115
V5	-0.03975	-0.05328	0.41558
V6	0.20380	0.08455	0.11906
V7	0.03209	-0.11410	-0.19509
V8	0.01340	0.05667	-0.40108
V9	0.03085	0.00579	0.17953
V10	0.32453	0.01546	0.07216

Appendix F

Criteria Factor Matrix

and Related Statistics for

Data Group D2

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.11811	0.07158	0.33390	0.30053	0.51485	0.32767	0.17888	-0.02516	0.10482
V2	-0.11811	1.00000	-0.11529	-0.26986	-0.37716	-0.33573	-0.36497	-0.33805	0.17473	-0.25733
V3	0.07158	-0.11529	1.00000	0.16629	0.05156	0.01637	0.07130	0.09403	0.27290	0.05179
V4	0.33390	-0.26986	0.16629	1.00000	0.62619	0.39266	0.38290	0.36422	-0.09737	0.29270
V5	0.30053	-0.37716	0.05156	0.62619	1.00000	0.57873	0.53387	0.58811	-0.25790	0.43548
V6	0.51485	-0.33573	0.01637	0.39266	0.57873	1.00000	0.63997	0.41206	-0.27435	0.27815
V7	0.32767	-0.36497	0.07130	0.38290	0.53387	0.63997	1.00000	0.41906	-0.19461	0.27857
V8	0.17888	-0.33805	0.09403	0.36422	0.58811	0.41206	0.41906	1.00000	-0.23551	0.49403
V9	-0.02516	0.17473	0.27290	-0.09737	-0.25790	-0.27435	-0.19461	-0.23551	1.00000	-0.16996
V10	0.10482	-0.25733	0.05179	0.29270	0.43548	0.27815	0.27857	0.49403	-0.16996	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0432657(0.43265704E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.30972	1	3.83095	38.3	38.3
V2	0.21514	2	1.31274	13.1	51.4
V3	0.13694	3	1.11433	11.1	62.6
V4	0.43529	4	0.81498	8.1	70.7
V5	0.62901	5	0.67814	6.8	77.5
V6	0.58738	6	0.61666	6.2	83.7
V7	0.47037	7	0.58088	5.8	89.5
V8	0.44194	8	0.47185	4.7	94.2
V9	0.20106	9	0.32565	3.3	97.5
V10	0.28172	10	0.25380	2.5	100.0

CONVERGENCE REQUIRED 17 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.43991	0.22951	-0.33427
V2	-0.46534	0.00933	-0.10864
V3	0.09487	0.49574	0.18476
V4	0.60807	0.19664	0.09117
V5	0.82787	-0.01403	0.14971
V6	0.80129	0.00880	-0.44013
V7	0.68810	0.03820	-0.13973
V8	0.66910	-0.09108	0.31784
V9	-0.31572	0.56557	0.06572
V10	0.49773	-0.09129	0.31442

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.35793	1	3.38485	72.5	72.5
V2	0.22843	2	0.67543	14.5	87.0
V3	0.28890	3	0.60584	13.0	100.0
V4	0.41674				
V5	0.70798				
V6	0.83586				
V7	0.49447				
V8	0.55701				
V9	0.42388				
V10	0.35493				

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.09379	0.58404	0.08965
V2	-0.42446	-0.21906	0.01663
V3	0.12965	0.06017	0.51814
V4	0.49690	0.37818	0.16374
V5	0.72707	0.42165	-0.03936
V6	0.32814	0.83397	-0.18077
V7	0.42990	0.55332	-0.05911
V8	0.72278	0.17833	-0.05286
V9	-0.26714	-0.10010	0.58523
V10	0.59023	0.07043	-0.03997

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.76093	0.64362	-0.08205
FACTOR 2	-0.12162	0.26570	0.95635
FACTOR 3	0.63733	-0.71774	0.28045

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.07558	0.16575	0.11703
V2	-0.10367	0.02145	-0.01998
V3	0.06384	0.01658	0.35464
V4	0.07527	0.09371	0.16332
V5	0.42783	-0.02523	0.03719
V6	-0.21796	0.79478	-0.22598
V7	0.07256	0.08599	0.02381
V8	0.35215	-0.15351	-0.00112
V9	-0.07720	0.07754	0.46199
V10	0.21314	-0.11473	-0.00444

Appendix G

Experimental Factor Matrices and Related Statistics for Data Group D1

DIM1OFMR

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.29131	0.36881	0.21691	-0.19153	-0.36652	-0.00555	-0.04397	-0.47315
V2	-0.79772	1.00000	0.50718	-0.20790	-0.24427	0.30983	0.31532	0.03158	0.07491	0.44181
V3	-0.29131	0.50718	1.00000	0.03394	-0.09976	0.17987	0.09911	0.07942	-0.11589	0.17060
V4	0.36881	-0.20790	0.03394	1.00000	0.15592	0.11889	-0.85885	-0.27986	0.02603	-0.06516
V5	0.21691	-0.24427	-0.09976	0.15592	1.00000	0.01546	-0.22321	-0.50639	0.23303	-0.11315
V6	-0.19153	0.30983	0.17987	0.11889	0.01546	1.00000	-0.06421	-0.14505	0.29901	0.75696
V7	-0.36652	0.31532	0.09911	-0.85885	-0.22321	-0.06421	1.00000	0.37144	-0.09921	0.17350
V8	-0.00555	0.03158	0.07942	-0.27986	-0.50639	-0.14505	0.37144	1.00000	-0.31349	-0.00884
V9	-0.04397	0.07491	-0.11589	0.02603	0.23303	0.29901	-0.09921	-0.31349	1.00000	0.13595
V10	-0.47315	0.44181	0.17060	-0.06516	-0.11315	0.75696	0.17350	-0.00884	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0050694(0.50693899E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.76429	1	3.08499	30.9	30.9
V2	0.76572	2	2.23609	22.4	53.2
V3	0.34384	3	1.35685	13.6	66.8
V4	0.79567	4	1.08757	10.9	77.7
V5	0.33010	5	0.73738	7.4	85.0
V6	0.69892	6	0.66671	6.7	91.7
V7	0.80372	7	0.38450	3.8	95.5
V8	0.40304	8	0.20314	2.0	97.6
V9	0.22957	9	0.16327	1.6	99.2
V10	0.73055	10	0.07943	0.8	100.0

AFTER 12 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 11

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.74101	-0.20385	-0.02179
V2	0.76444	0.32991	0.17444
V3	0.33984	0.18919	0.27363
V4	-0.65425	0.59072	0.46613
V5	-0.35478	0.22164	-0.45599
V6	0.30152	0.63762	-0.09865
V7	0.69670	-0.49209	-0.22699
V8	0.27439	-0.45762	0.38965
V9	-0.01664	0.34195	-0.39338
V10	0.53774	0.51960	-0.04624

VARIABLE	COMMUNALITY
V1	0.59112
V2	0.72363
V3	0.22616
V4	0.99428
V5	0.38292
V6	0.50721
V7	0.77907
V8	0.43653
V9	0.27195
V10	0.56128

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.74389	50.1	50.1
2	1.82930	33.4	83.5
3	0.90095	16.5	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.68961	0.33123	0.07650
V2	0.81677	-0.19171	-0.14057
V3	0.42875	0.04434	-0.20091
V4	-0.02794	0.99390	0.07528
V5	-0.21782	0.10211	0.57013
V6	0.60807	0.12488	0.34910
V7	0.16931	-0.83545	-0.22898
V8	-0.00417	-0.22287	-0.62197
V9	0.12447	-0.00516	0.50639
V10	0.72184	-0.06102	0.19106

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.75181	-0.62018	-0.22397
FACTOR 2	0.62883	0.57214	0.52653
FACTOR 3	0.19839	0.53669	-0.82013

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.13938	-0.14149	0.05692
V2	0.52328	-0.09138	-0.11568
V3	0.02303	-0.00382	-0.06063
V4	0.20026	1.10094	-0.36912
V5	-0.03604	-0.02583	0.29693
V6	0.19420	0.08530	0.18084
V7	0.07401	0.08334	-0.27472
V8	0.01865	0.05003	-0.36323
V9	0.00346	-0.01633	0.23331
V10	0.26959	-0.09449	0.16579

D1M1OSWR

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.28513	0.37007	0.19091	-0.19153	-0.36470	-0.01092	-0.04397	-0.47315
V2	-0.79772	1.00000	0.50057	-0.20911	-0.20594	0.30983	0.31227	0.03634	0.07491	0.44181
V3	-0.28513	0.50057	1.00000	0.03285	-0.08087	0.16341	0.09709	0.08284	-0.11624	0.15866
V4	0.37007	-0.20911	0.03285	1.00000	0.16202	0.11698	-0.85954	-0.28104	0.02680	-0.06614
V5	0.19091	-0.20594	-0.08087	0.16202	1.00000	0.08972	-0.22365	-0.52299	0.26902	-0.05631
V6	-0.19153	0.30983	0.16341	0.11698	0.08972	1.00000	-0.07019	-0.13946	0.29901	0.75696
V7	-0.36470	0.31227	0.09709	-0.85954	-0.22365	-0.07019	1.00000	0.37111	-0.09650	0.16815
V8	-0.01092	0.03634	0.08284	-0.28104	-0.52299	-0.13946	0.37111	1.00000	-0.31351	-0.00757
V9	-0.04397	0.07491	-0.11624	0.02680	0.26902	0.29901	-0.09650	-0.31351	1.00000	0.13595
V10	-0.47315	0.44181	0.15866	-0.06614	-0.05631	0.75696	0.16815	-0.00757	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0050902 (0.50902367E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.76427	1	3.04789	30.5	30.5
V2	0.76468	2	2.28206	22.8	53.3
V3	0.33599	3	1.35851	13.6	66.9
V4	0.79538	4	1.07800	10.8	77.7
V5	0.33897	5	0.73530	7.4	85.0
V6	0.69967	6	0.67049	6.7	91.7
V7	0.80317	7	0.37826	3.8	95.5
V8	0.40404	8	0.20603	2.1	97.6
V9	0.23029	9	0.16415	1.6	99.2
V10	0.73026	10	0.07923	0.8	100.0

AFTER 13 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 12

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.74107	-0.21719	-0.05085
V2	0.76301	0.34224	0.20865
V3	0.32835	0.17844	0.28658
V4	-0.67145	0.55984	0.48537
V5	-0.32293	0.29871	-0.46004
V6	0.28227	0.64736	-0.09701
V7	0.70372	-0.47006	-0.24645
V8	0.27996	-0.46023	0.35410
V9	-0.02196	0.35696	-0.38449
V10	0.52152	0.53006	-0.03912

VARIABLE	COMMUNALITY
V1	0.59894
V2	0.74284
V3	0.22178
V4	0.99986
V5	0.40515
V6	0.50817
V7	0.77691
V8	0.41557
V9	0.27573
V10	0.55448

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.72006	49.5	49.5
2	1.85902	33.8	83.3
3	0.92037	16.7	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.69973	0.32246	0.07297
V2	0.83254	-0.18080	-0.13053
V3	0.42638	0.04913	-0.19382
V4	-0.03463	0.99606	0.08071
V5	-0.17065	0.10654	0.60389
V6	0.58644	0.11520	0.38656
V7	0.17350	-0.83442	-0.22484
V8	0.01250	-0.22549	-0.60380
V9	0.10866	-0.00977	0.51364
V10	0.70686	-0.06632	0.22456

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.74614	-0.63094	-0.21259
FACTOR 2	0.61776	0.53698	0.57448
FACTOR 3	0.24830	0.55997	-0.79043

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.13597	-0.14892	0.05327
V2	0.55820	-0.07736	-0.12700
V3	0.01809	-0.00575	-0.05790
V4	0.20789	1.11943	-0.34723
V5	-0.02960	-0.02449	0.31989
V6	0.17971	0.07982	0.19798
V7	0.07824	0.09645	-0.25804
V8	0.02795	0.04602	-0.32655
V9	-0.00701	-0.02079	0.23249
V10	0.25710	-0.10249	0.16556

D1M1OPC

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.28833	0.38858	0.18813	-0.19153	-0.38064	-0.01166	-0.04397	-0.47315
V2	-0.79772	1.00000	0.50400	-0.23579	-0.20218	0.30983	0.33230	0.03712	0.07491	0.44181
V3	-0.28833	0.50400	1.00000	0.01888	-0.07546	0.16983	0.10706	0.07921	-0.10277	0.16162
V4	0.38858	-0.23579	0.01888	1.00000	0.15882	0.06242	-0.86148	-0.27660	0.01728	-0.11005
V5	0.18813	-0.20218	-0.07546	0.15882	1.00000	0.09372	-0.22083	-0.52359	0.27048	-0.05436
V6	-0.19153	0.30983	0.16983	0.06242	0.09372	1.00000	-0.03182	-0.13546	0.29901	0.75696
V7	-0.38064	0.33230	0.10706	-0.86148	-0.22083	-0.03182	1.00000	0.36718	-0.08879	0.19491
V8	-0.01166	0.03712	0.07921	-0.27660	-0.52359	-0.13546	0.36718	1.00000	-0.31605	-0.00350
V9	-0.04397	0.07491	-0.10277	0.01728	0.27048	0.29901	-0.08879	-0.31605	1.00000	0.13595
V10	-0.47315	0.44181	0.16162	-0.11005	-0.05436	0.75696	0.19491	-0.00350	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0051232 (0.51232427E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.76207	1	3.11064	31.1	31.1
V2	0.76316	2	2.22725	22.3	53.4
V3	0.33608	3	1.34203	13.4	66.8
V4	0.79352	4	1.07939	10.8	77.6
V5	0.33888	5	0.73775	7.4	85.0
V6	0.69777	6	0.67453	6.7	91.7
V7	0.80274	7	0.37821	3.8	95.5
V8	0.40559	8	0.20701	2.1	97.6
V9	0.22669	9	0.16245	1.6	99.2
V10	0.72743	10	0.08065	0.8	100.0

AFTER 15 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 14

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.74030	-0.19886	-0.08267
V2	0.76944	0.32209	0.24632
V3	0.33166	0.17211	0.29500
V4	-0.69000	0.52731	0.49456
V5	-0.30494	0.32623	-0.44617
V6	0.31135	0.62674	-0.10334
V7	0.71419	-0.45734	-0.25453
V8	0.26669	-0.48037	0.32868
V9	-0.00775	0.37144	-0.36839
V10	0.54004	0.50678	-0.03691

VARIABLE	COMMUNALITY
V1	0.59442
V2	0.75645
V3	0.22665
V4	0.99875
V5	0.39848
V6	0.50042
V7	0.78402
V8	0.40991
V9	0.27373
V10	0.54983

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.78901	50.8	50.8
2	1.78491	32.5	83.3
3	0.91875	16.7	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.69814	0.31918	0.07171
V2	0.84178	-0.17989	-0.12447
V3	0.43953	0.04816	-0.17646
V4	-0.06029	0.99458	0.07702
V5	-0.17348	0.10586	0.59765
V6	0.56976	0.06739	0.41383
V7	0.19216	-0.83582	-0.22021
V8	0.01887	-0.22885	-0.59765
V9	0.10003	-0.01456	0.51334
V10	0.69161	-0.10156	0.24737

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.75195	-0.63427	-0.17962
FACTOR 2	0.58547	0.51734	0.62416
FACTOR 3	0.30296	0.57450	-0.76037

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.11726	-0.14629	0.05064
V2	0.59679	-0.04080	-0.13805
V3	0.01762	-0.00645	-0.05088
V4	0.22069	1.10831	-0.32836
V5	-0.03026	-0.01856	0.31266
V6	0.16691	0.07687	0.20969
V7	0.07403	0.07789	-0.25386
V8	0.03188	0.04298	-0.31975
V9	-0.01131	-0.02148	0.23106
V10	0.25313	-0.10103	0.17963

DIMIOME

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.26300	0.37236	0.19234	-0.19153	-0.36495	-0.01661	-0.04397	-0.47315
V2	-0.79772	1.00000	0.47067	-0.21515	-0.20959	0.30983	0.31277	0.04618	0.07491	0.44181
V3	-0.26300	0.47067	1.00000	0.03001	-0.08013	0.10219	0.09798	0.08484	-0.11673	0.11049
V4	0.37236	-0.21515	0.03001	1.00000	0.16145	0.10150	-0.86058	-0.28083	0.02263	-0.08247
V5	0.19234	-0.20959	-0.08013	0.16145	1.00000	0.08277	-0.22376	-0.51958	0.24515	-0.06208
V6	-0.19153	0.30983	0.10219	0.10150	0.08277	1.00000	-0.06922	-0.12104	0.29901	0.75696
V7	-0.36495	0.31277	0.09798	-0.86058	-0.22376	-0.06922	1.00000	0.37199	-0.09408	0.16874
V8	-0.01661	0.04618	0.08484	-0.28083	-0.51958	-0.12104	0.37199	1.00000	-0.28631	0.00672
V9	-0.04397	0.07491	-0.11673	0.02263	0.24515	0.29901	-0.09408	-0.28631	1.00000	0.13595
V10	-0.47315	0.44181	0.11049	-0.08247	-0.06208	0.75696	0.16874	0.00672	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0055532(0.55532046E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.76153	1	3.04026	30.4	30.4
V2	0.76023	2	2.23059	22.3	52.7
V3	0.30469	3	1.34026	13.4	66.1
V4	0.79287	4	1.11680	11.2	77.3
V5	0.33219	5	0.74015	7.4	84.7
V6	0.69803	6	0.69378	6.9	91.6
V7	0.80172	7	0.38257	3.8	95.4
V8	0.39477	8	0.21311	2.1	97.6
V9	0.20956	9	0.16149	1.6	99.2
V10	0.72739	10	0.08092	0.8	100.0

AFTER 16 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 15

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.73910	-0.21407	0.09119
V2	0.76642	0.34018	-0.26224
V3	0.29414	0.13349	-0.31349
V4	-0.68221	0.55700	-0.46897
V5	-0.31630	0.27366	0.41778
V6	0.28646	0.65501	0.16226
V7	0.70823	-0.47930	0.23396
V8	0.27943	-0.42481	-0.30261
V9	-0.01081	0.34288	0.36395
V10	0.52696	0.53625	0.09321

VARIABLE	COMMUNALITY
V1	0.60041
V2	0.77189
V3	0.20261
V4	0.99560
V5	0.34947
V6	0.53742
V7	0.78606
V8	0.35012
V9	0.25014
V10	0.57394

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.72517	50.3	50.3
2	1.80888	33.4	83.7
3	0.88362	16.3	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.70960	0.30062	0.08069
V2	0.85225	-0.15504	-0.14671
V3	0.38672	0.05926	-0.22259
V4	-0.05236	0.99317	0.08040
V5	-0.18779	0.11923	0.54771
V6	0.56407	0.08645	0.46019
V7	0.18243	-0.83793	-0.22507
V8	0.03813	-0.24167	-0.53876
V9	0.09835	-0.00664	0.49033
V10	0.69277	-0.09237	0.29235

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.75296	-0.63250	-0.18164
FACTOR 2	0.59924	0.54495	0.58647
FACTOR 3	-0.27196	-0.55044	0.78934

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.10807	-0.13919	0.03472
V2	0.61882	-0.01681	-0.20037
V3	0.00378	-0.00786	-0.06085
V4	0.19816	1.09362	-0.34280
V5	-0.02840	-0.00644	0.27933
V6	0.15006	0.05111	0.27543
V7	0.06492	0.06208	-0.26593
V8	0.03679	0.03956	-0.27978
V9	-0.01333	-0.01916	0.22425
V10	0.25942	-0.10697	0.20087

D1M25FMR

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.49952	0.68630	0.41474	-0.19153	-0.64201	-0.10044	-0.04397	-0.47315
V2	-0.79772	1.00000	0.70141	-0.49623	-0.40681	0.30983	0.56082	0.09672	0.07491	0.44181
V3	-0.49952	0.70141	1.00000	-0.11949	-0.15853	0.32012	0.23594	0.05158	-0.06653	0.32238
V4	0.68630	-0.49623	-0.11949	1.00000	0.29808	-0.00174	-0.90207	-0.34515	0.08176	-0.23773
V5	0.41474	-0.40681	-0.15853	0.29808	1.00000	-0.01916	-0.32151	-0.47249	0.25773	-0.20671
V6	-0.19153	0.30983	0.32012	-0.00174	-0.01916	1.00000	0.01405	-0.07654	0.29901	0.75696
V7	-0.64201	0.56082	0.23594	-0.90207	-0.32151	0.01405	1.00000	0.39620	-0.10035	0.28779
V8	-0.10044	0.09672	0.05158	-0.34515	-0.47249	-0.07654	0.39620	1.00000	-0.32995	0.09447
V9	-0.04397	0.07491	-0.06653	0.08176	0.25773	0.29901	-0.10035	-0.32995	1.00000	0.13595
V10	-0.47315	0.44181	0.32238	-0.23773	-0.20671	0.75696	0.28779	0.09447	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0008867(0.88665099E-03)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.83725	1	3.[illegible]7729	39.8	39.8
V2	0.80837	2	2.03983	20.4	60.2
V3	0.66941	3	1.17149	11.7	71.9
V4	0.88815	4	1.02300	10.2	82.1
V5	0.48614	5	0.67402	6.7	88.9
V6	0.72337	6	0.54057	5.4	94.3
V7	0.86356	7	0.23413	2.3	96.6
V8	0.45628	8	0.15309	1.5	98.1
V9	0.30897	9	0.13468	1.3	99.5
V10	0.74481	10	0.05184	0.5	100.0

MORE THAN 25 ITERATIONS REQUIRED.

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.88432	-0.01921	0.28413
V2	0.84124	0.15463	-0.20376
V3	0.50442	0.22542	-0.06492
V4	-0.72638	0.35679	0.13821
V5	-0.46574	0.25282	-0.24752
V6	0.36305	0.78989	0.35059
V7	0.77209	-0.35095	-0.09460
V8	0.34561	-0.52364	0.60334
V9	-0.03300	0.40215	-0.19305
V10	0.58349	0.50485	0.29376

VARIABLE	COMMUNALITY
V1	0.86311
V2	0.77312
V3	0.30947
V4	0.67403
V5	0.34210
V6	0.87864
V7	0.72824
V8	0.75766
V9	0.20008
V10	0.68163

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.67761	59.2	59.2
2	1.70419	27.5	86.7
3	0.82627	13.3	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.89989	-0.22907	0.02896
V2	0.80409	0.35562	0.00926
V3	0.43507	0.34350	0.04884
V4	-0.75186	0.04918	0.32607
V5	-0.32883	-0.11867	0.46892
V6	0.03142	0.92679	0.13681
V7	0.77041	-0.00439	-0.36699
V8	0.09960	0.04146	-0.86372
V9	-0.00026	0.19756	0.40131
V10	0.29364	0.76914	-0.06183

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.87094	0.40359	-0.28033
FACTOR 2	-0.15331	0.76517	0.62530
FACTOR 3	-0.46686	0.50163	-0.72829

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.64325	-0.18847	-0.19392
V2	0.35399	0.16379	0.14949
V3	-0.13866	-0.13916	-0.04472
V4	0.13220	0.33555	0.15269
V5	0.10351	0.04683	0.16388
V6	-0.04531	0.86853	0.10460
V7	0.40559	0.02252	-0.04984
V8	-0.06511	0.17578	-0.69850
V9	-0.05011	-0.08105	0.07676
V10	-0.13904	0.07240	-0.14431

D1M25SWR

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.48473	0.69258	0.41927	-0.19153	-0.65180	-0.08814	-0.04397	-0.47315
V2	-0.79772	1.00000	0.69155	-0.50764	-0.41281	0.30983	0.57344	0.08021	0.07491	0.44181
V3	-0.48473	0.69155	1.00000	-0.11526	-0.15038	0.25675	0.24346	0.03701	-0.04132	0.28882
V4	0.69258	-0.50764	-0.11526	1.00000	0.30203	-0.00301	-0.90276	-0.33299	0.07156	-0.24138
V5	0.41927	-0.41281	-0.15038	0.30203	1.00000	-0.03392	-0.33390	-0.46532	0.26492	-0.20654
V6	-0.19153	0.30983	0.25675	-0.00301	-0.03392	1.00000	0.06465	-0.07078	0.29901	0.75696
V7	-0.65180	0.57344	0.24346	-0.90276	-0.33390	0.06465	1.00000	0.38701	-0.12317	0.30599
V8	-0.08814	0.08021	0.03701	-0.33299	-0.46532	-0.07078	0.38701	1.00000	-0.34075	0.09648
V9	-0.04397	0.07491	-0.04132	0.07156	0.26492	0.29901	-0.12317	-0.34075	1.00000	0.13595
V10	-0.47315	0.44181	0.28882	-0.24138	-0.20654	0.75696	0.30599	0.09648	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0009793(0.97932317E-03)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.82677	1	3.98351	39.8	39.8
V2	0.80911	2	2.00964	20.1	59.9
V3	0.63644	3	1.16281	11.6	71.6
V4	0.88307	4	1.05182	10.5	82.1
V5	0.49003	5	0.66179	6.6	88.7
V6	0.68410	6	0.55071	5.5	94.2
V7	0.85829	7	0.24722	2.5	96.7
V8	0.45748	8	0.14115	1.4	98.1
V9	0.28304	9	0.13148	1.3	99.4
V10	0.72255	10	0.05981	0.6	100.0

MORE THAN 25 ITERATIONS REQUIRED.

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.88485	-0.00552	0.28741
V2	0.84957	0.14038	-0.25221
V3	0.48226	0.18395	-0.14455
V4	-0.72583	0.34608	0.08889
V5	-0.46794	0.25677	-0.22828
V6	0.37466	0.79973	0.38059
V7	0.78459	-0.32840	-0.02790
V8	0.32406	-0.50850	0.58309
V9	-0.03129	0.42251	-0.18999
V10	0.58606	0.50255	0.30779

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.86559	1	3.68851	59.4	59.4
V2	0.80509	2	1.67634	27.0	86.4
V3	0.28730	3	0.84358	13.6	100.0
V4	0.65450				
V5	0.33701				
V6	0.92479				
V7	0.72420				
V8	0.70359				
V9	0.21559				
V10	0.69076				

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.91195	-0.17344	0.06210
V2	0.85181	0.28175	0.01089
V3	0.47435	0.23823	0.07443
V4	-0.71272	0.04431	0.38023
V5	-0.32971	-0.09996	0.46724
V6	0.07719	0.94889	0.13579
V7	0.73437	0.02352	-0.42937
V8	0.06164	0.04776	-0.83517
V9	0.02111	0.20638	0.41539
V10	0.32511	0.76180	-0.06875

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.88001	0.36649	-0.30212
FACTOR 2	-0.09420	0.75813	0.64526
FACTOR 3	-0.46553	0.53937	-0.70168

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.62997	-0.08998	-0.15001
V2	0.49375	0.04403	0.24362
V3	-0.16231	-0.06472	-0.03368
V4	0.19299	0.12687	0.12080
V5	0.13725	0.01770	0.19039
V6	-0.09077	0.90516	0.08298
V7	0.34868	-0.07509	-0.20719
V8	-0.04179	0.15533	-0.60993
V9	-0.03114	-0.05559	0.08846
V10	-0.09902	0.08312	-0.12175

DIM25PC

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.50550	0.70694	0.41055	-0.19153	-0.64525	-0.05475	-0.04397	-0.47315
V2	-0.79772	1.00000	0.70859	-0.53018	-0.42238	0.30983	0.56717	0.04947	0.07491	0.44181
V3	-0.50550	0.70859	1.00000	-0.14977	-0.15794	0.26598	0.24845	0.00838	-0.01141	0.30346
V4	0.70694	-0.53018	-0.14977	1.00000	0.29632	-0.05539	-0.90536	-0.29804	0.04122	-0.28032
V5	0.41055	-0.42238	-0.15794	0.29632	1.00000	-0.03712	-0.31256	-0.42381	0.15958	-0.20664
V6	-0.19153	0.30983	0.26598	-0.05539	-0.03712	1.00000	0.05968	-0.08756	0.29901	0.75696
V7	-0.64525	0.56717	0.24845	-0.90536	-0.31256	0.05968	1.00000	0.35563	-0.07806	0.30542
V8	-0.05475	0.04947	0.00838	-0.29804	-0.42381	-0.08756	0.35563	1.00000	-0.35736	0.04977
V9	-0.04397	0.07491	-0.01141	0.04122	0.15958	0.29901	-0.07806	-0.35736	1.00000	0.13595
V10	-0.47315	0.44181	0.30346	-0.28032	-0.20664	0.75696	0.30542	0.04977	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0010598(0.1059756 1E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.82434	1	3.99599	40.0	40.0
V2	0.81215	2	1.96723	19.7	59.6
V3	0.63861	3	1.13423	11.3	71.0
V4	0.88558	4	1.04109	10.4	81.4
V5	0.43575	5	0.73560	7.4	88.7
V6	0.69261	6	0.53839	5.4	94.1
V7	0.85758	7	0.23868	2.4	96.5
V8	0.43625	8	0.16171	1.6	98.1
V9	0.23057	9	0.12922	1.3	99.4
V10	0.72136	10	0.05779	0.6	100.0

AFTER 7 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 6

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.86250	0.04774	0.16931
V2	0.89589	0.10910	-0.42379
V3	0.53039	0.20317	-0.39596
V4	-0.75614	0.39143	-0.22002
V5	-0.42940	0.20358	-0.04503
V6	0.38609	0.76824	0.32033
V7	0.78100	-0.39781	0.20994
V8	0.22222	-0.39914	0.27473
V9	0.01557	0.36838	-0.03941
V10	0.60312	0.52414	0.33482

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.77486	1	3.75637	61.8	61.8
V2	0.99411	2	1.56831	25.8	87.6
V3	0.47938	3	0.75130	12.4	100.0
V4	0.77337				
V5	0.22786				
V6	0.84187				
V7	0.81229				
V8	0.28417				
V9	0.13750				
V10	0.75057				

FOSTER DATA RUN

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.46559	-0.72030	-0.19811
V2	-0.25992	0.93947	0.20963
V3	0.00464	0.67302	0.16248
V4	0.80934	-0.33500	-0.07813
V5	0.40711	-0.24843	-0.01999
V6	0.06443	0.12850	0.90620
V7	-0.82311	0.35888	0.07734
V8	-0.51781	-0.07966	-0.09847
V9	0.23343	0.07810	0.27732
V10	-0.22239	0.24476	0.80076

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	-0.60758	0.70305	0.36955
FACTOR 2	0.60418	0.10709	0.78962
FACTOR 3	-0.51556	-0.70303	0.48983

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.00671	-0.23872	-0.06629
V2	0.40920	1.30209	-0.22608
V3	-0.03605	-0.18185	-0.00907
V4	0.41112	0.27004	0.00696
V5	0.20528	0.24897	-0.01170
V6	0.08829	-0.15393	0.71094
V7	-0.52604	-0.15306	0.05026
V8	-0.10152	0.07310	-0.05797
V9	0.06850	-0.00902	0.02019
V10	-0.14183	-0.10029	0.31820

DIM25ME

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.25420	0.47871	0.25317	-0.19153	-0.42891	-0.07135	-0.04397	-0.47315
V2	-0.79772	1.00000	0.45265	-0.27946	-0.24858	0.30983	0.34101	0.08129	0.07491	0.44181
V3	-0.25420	0.45265	1.00000	0.06129	-0.03303	0.13813	0.08318	0.03393	-0.08279	0.15852
V4	0.47871	-0.27946	0.06129	1.00000	0.20684	0.07694	-0.88601	-0.35203	0.07965	-0.13330
V5	0.25317	-0.24858	-0.03303	0.20684	1.00000	0.05001	-0.23315	-0.46470	0.20435	-0.11414
V6	-0.19153	0.30983	0.13813	0.07694	0.05001	1.00000	-0.06012	-0.07449	0.29901	0.75696
V7	-0.42891	0.34101	0.08318	-0.88601	-0.23315	-0.06012	1.00000	0.40791	-0.11539	0.17289
V8	-0.07135	0.08129	0.03393	-0.35203	-0.46470	-0.07449	0.40791	1.00000	-0.23945	0.06735
V9	-0.04397	0.07491	-0.08279	0.07965	0.20435	0.29901	-0.11539	-0.23945	1.00000	0.13595
V10	-0.47315	0.44181	0.15852	-0.13330	-0.11414	0.75696	0.17289	0.06735	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0043665(0.43665282E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.78558	1	3.22754	32.3	32.3
V2	0.75329	2	2.15800	21.6	53.9
V3	0.30972	3	1.21888	12.2	66.0
V4	0.84375	4	1.11125	11.1	77.2
V5	0.29952	5	0.77452	7.7	84.9
V6	0.69244	6	0.68675	6.9	91.8
V7	0.83137	7	0.38474	3.8	95.6
V8	0.36401	8	0.22338	2.2	97.9
V9	0.18096	9	0.14507	1.5	99.3
V10	0.71992	10	0.06979	0.7	100.0

AFTER 8 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 7

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.78382	-0.09222	0.22902
V2	0.82189	0.27188	-0.48604
V3	0.27129	0.17343	-0.31305
V4	-0.67442	0.55000	-0.28528
V5	-0.32101	0.20805	0.07640
V6	0.35101	0.75324	0.40259
V7	0.70653	-0.52829	0.22629
V8	0.29877	-0.35532	0.08766
V9	-0.00521	0.31763	0.12563
V10	0.58110	0.53625	0.29125

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.67532	1	2.97073	53.2	53.2
V2	0.98566	2	1.81945	32.6	85.8
V3	0.20167	3	0.79552	14.2	100.0
V4	0.83874				
V5	0.15217				
V6	0.85265				
V7	0.82949				
V8	0.22323				
V9	0.11670				
V10	0.71006				

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.39964	-0.68494	-0.21555
V2	-0.22074	0.94520	0.20866
V3	0.03441	0.44597	0.03995
V4	0.91340	-0.06547	-0.01248
V5	0.32518	-0.20022	0.07964
V6	0.09077	0.13541	0.90889
V7	-0.90076	0.13454	0.00518
V8	-0.46145	0.02628	-0.09800
V9	0.15948	-0.00719	0.30202
V10	-0.16502	0.30138	0.76942

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	-0.68835	0.62905	0.36122
FACTOR 2	0.63178	0.27522	0.72465
FACTOR 3	-0.35643	-0.72702	0.58686

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.01178	0.13787	-0.15336
V2	0.13616	1.21890	-0.25617
V3	-0.00611	-0.04323	-0.02199
V4	0.52966	0.10048	-0.02583
V5	0.10827	0.05830	0.02161
V6	0.04599	-0.30309	0.80520
V7	-0.40172	-0.17223	0.05107
V8	-0.05451	0.02742	-0.05141
V9	0.02553	-0.05489	0.03691
V10	-0.10083	0.11980	0.19266

DIM50FMR

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.75336	-0.07592	0.30224	-0.19153	-0.16385	0.04715	-0.04397	-0.47315
V2	-0.79772	1.00000	0.85116	-0.12121	-0.37691	0.30983	0.36831	-0.04815	0.07491	0.44181
V3	-0.75336	0.85116	1.00000	0.02656	-0.26381	0.16812	0.26828	0.00517	-0.10490	0.34936
V4	-0.07592	-0.12121	0.02656	1.00000	0.09655	-0.11682	-0.72648	-0.54089	0.28624	-0.11778
V5	0.30224	-0.37691	-0.26381	0.09655	1.00000	0.03321	-0.46934	-0.42480	0.23468	-0.44910
V6	-0.19153	0.30983	0.16812	-0.11682	0.03321	1.00000	0.01823	-0.15797	0.29901	0.75696
V7	-0.16385	0.36831	0.26828	-0.72648	-0.46934	0.01823	1.00000	0.62545	-0.28349	0.27956
V8	0.04715	-0.04815	0.00517	-0.54089	-0.42480	-0.15797	0.62545	1.00000	-0.49545	0.18850
V9	-0.04397	0.07491	-0.10490	0.28624	0.23468	0.29901	-0.28349	-0.49545	1.00000	0.13595
V10	-0.47315	0.44181	0.34936	-0.11778	-0.44910	0.75696	0.27956	0.18850	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0003015(0.30151452E-03)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.81404	1	3.56189	35.6	35.6
V2	0.91543	2	2.53075	25.3	60.9
V3	0.83881	3	1.44997	14.5	75.4
V4	0.73458	4	0.91635	9.2	84.6
V5	0.74748	5	0.65957	6.6	91.2
V6	0.88090	6	0.35958	3.6	94.8
V7	0.76618	7	0.25144	2.5	97.3
V8	0.67133	8	0.15319	1.5	98.8
V9	0.47574	9	0.08459	0.8	99.7
V10	0.90926	10	0.03258	0.3	100.0

AFTER 22 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 21

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.73229	-0.33722	0.31719
V2	0.86261	0.27320	-0.26503
V3	0.74895	0.23852	-0.39547
V4	-0.29610	0.58833	-0.24942
V5	-0.50246	0.26008	0.06862
V6	0.43721	0.44211	0.78203
V7	0.59583	-0.64745	0.07878
V8	0.30137	-0.78454	0.08968
V9	-0.09265	0.51636	0.19035
V10	0.69366	0.17356	0.46054

VARIABLE	COMMUNALITY
V1	0.75057
V2	0.88898
V3	0.77422
V4	0.49601
V5	0.32481
V6	0.99819
V7	0.78041
V8	0.71437
V9	0.31144
V10	0.72339

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.30816	48.9	48.9
2	2.18592	32.3	81.2
3	1.26832	18.8	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.85410	0.03033	-0.14199
V2	0.91274	0.09010	0.21855
V3	0.87684	0.05391	0.04962
V4	0.06971	-0.68697	-0.13868
V5	-0.35894	-0.43840	-0.06149
V6	0.09091	-0.09691	0.99022
V7	0.23986	0.84469	0.09687
V8	-0.04482	0.84189	-0.05988
V9	-0.01208	-0.47376	0.29471
V10	0.37772	0.20789	0.73314

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.80453	0.42995	0.40974
FACTOR 2	0.30814	-0.89194	0.33089
FACTOR 3	-0.50773	0.13995	0.85007

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.07563	0.16438	-0.50181
V2	1.04355	0.20624	-0.59087
V3	0.01762	-0.18716	0.00095
V4	0.10311	0.01521	0.16280
V5	0.28682	0.12788	-0.41351
V6	-0.69347	-0.19315	1.74397
V7	-0.10346	0.54965	0.30116
V8	-0.05036	0.40836	0.16094
V9	-0.11947	-0.15485	0.12831
V10	0.66683	0.25578	-0.86219

DIM50SWR

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.74911	0.11570	0.52057	-0.19153	-0.32798	-0.16292	-0.04397	-0.47315
V2	-0.79772	1.00000	0.85067	-0.20137	-0.48793	0.30983	0.42508	0.07825	0.07491	0.44181
V3	-0.74911	0.85067	1.00000	-0.07198	-0.37080	0.19296	0.34113	0.13450	-0.10870	0.36722
V4	0.11570	-0.20137	-0.07198	1.00000	0.06251	-0.13708	-0.76200	-0.53402	0.29613	-0.16175
V5	0.52057	-0.48793	-0.37080	0.06251	1.00000	0.01549	-0.35216	-0.40558	0.14922	-0.48547
V6	-0.19153	0.30983	0.19296	-0.13708	0.01549	1.00000	0.13343	-0.14084	0.29901	0.75696
V7	-0.32798	0.42508	0.34113	-0.76200	-0.35216	0.13343	1.00000	0.59642	-0.30655	0.31103
V8	-0.16292	0.07825	0.13450	-0.53402	-0.40558	-0.14084	0.59642	1.00000	-0.48465	0.23819
V9	-0.04397	0.07491	-0.10870	0.29613	0.14922	0.29901	-0.30655	-0.48465	1.00000	0.13595
V10	-0.47315	0.44181	0.36722	-0.16175	-0.48547	0.75696	0.31103	0.23819	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0004190 (0.41898596E-03)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.72379	1	3.93111	39.3	39.3
V2	0.88613	2	2.23222	22.3	61.6
V3	0.83366	3	1.40873	14.1	75.7
V4	0.71837	4	0.91462	9.1	84.9
V5	0.73895	5	0.62596	6.3	91.1
V6	0.85174	6	0.33902	3.4	94.5
V7	0.72626	7	0.24463	2.4	97.0
V8	0.65269	8	0.16455	1.6	98.6
V9	0.43583	9	0.09189	0.9	99.5
V10	0.88150	10	0.04721	0.5	100.0

AFTER 7 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 6

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.78328	-0.23127	0.32984
V2	0.84400	0.27254	-0.28096
V3	0.74227	0.19628	-0.36610
V4	-0.42457	0.54553	-0.34266
V5	-0.56802	0.07034	0.17643
V6	0.40869	0.55011	0.71501
V7	0.67692	-0.52247	0.20629
V8	0.43506	-0.65941	0.09298
V9	-0.12060	0.56205	0.10301
V10	0.66606	0.29759	0.39346

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.77581	1	3.65246	54.2	54.2
V2	0.86555	2	1.88373	28.0	82.2
V3	0.72352	3	1.19817	17.8	100.0
V4	0.59528				
V5	0.35872				
V6	0.98090				
V7	0.77374				
V8	0.63275				
V9	0.34106				
V10	0.68701				

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.86705	-0.06429	-0.14108
V2	0.90057	0.07122	0.22236
V3	0.84433	0.06467	0.08021
V4	-0.02392	-0.75168	-0.17230
V5	-0.53547	-0.26548	-0.03902
V6	0.08311	-0.07081	0.98384
V7	0.30629	0.80700	0.16932
V8	0.13641	0.77992	-0.07662
V9	-0.01074	-0.49844	0.30413
V10	0.40456	0.16528	0.70429

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.80880	0.45319	0.37477
FACTOR 2	0.25183	-0.84280	0.47568
FACTOR 3	-0.53143	0.29035	0.79579

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.22744	0.07373	-0.16695
V2	0.89992	-0.13406	-0.35914
V3	-0.07568	-0.02226	0.02724
V4	0.19653	-0.20689	0.00266
V5	0.26043	0.00961	-0.38380
V6	-0.56759	-0.12037	1.52626
V7	-0.00025	0.51181	0.06438
V8	-0.00327	0.29814	0.14411
V9	-0.09731	-0.10588	0.10274
V10	0.52909	0.11407	-0.63555

DIM5OPC

FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.70733	-0.00266	0.29013	-0.19153	-0.37392	0.02980	-0.04397	-0.47315
V2	-0.79772	1.00000	0.86432	-0.05876	-0.32179	0.30983	0.50123	-0.06781	0.07491	0.44181
V3	-0.70733	0.86432	1.00000	0.08380	-0.17604	0.23545	0.37363	-0.05712	-0.00111	0.37235
V4	-0.00266	-0.05876	0.08380	1.00000	-0.01070	0.01665	-0.63910	-0.59462	0.34402	-0.02523
V5	0.29013	-0.32179	-0.17604	-0.01070	1.00000	-0.28289	-0.28067	-0.15484	0.11409	-0.51756
V6	-0.19153	0.30983	0.23545	0.01665	-0.28289	1.00000	0.14529	-0.12182	0.29901	0.75696
V7	-0.37392	0.50123	0.37363	-0.63910	-0.28067	0.14529	1.00000	0.44008	-0.09367	0.28212
V8	0.02980	-0.06781	-0.05712	-0.59462	-0.15484	-0.12182	0.44008	1.00000	-0.55088	0.05068
V9	-0.04397	0.07491	-0.00111	0.34402	0.11409	0.29901	-0.09367	-0.55088	1.00000	0.13595
V10	-0.47315	0.44181	0.37235	-0.02523	-0.51756	0.75696	0.28212	0.05068	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0013461(0.13461043E-02)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.71621	1	3.60725	36.1	36.1
V2	0.87639	2	2.36074	23.6	59.7
V3	0.81605	3	1.38117	13.8	73.5
V4	0.69015	4	0.97712	9.8	83.3
V5	0.47484	5	0.61412	6.1	89.4
V6	0.68898	6	0.35723	3.6	93.0
V7	0.69907	7	0.32610	3.3	96.2
V8	0.57293	8	0.17005	1.7	97.9
V9	0.47480	9	0.13465	1.3	99.3
V10	0.76582	10	0.07150	0.7	100.0

AFTER 14 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 13

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.76024	-0.07716	0.27336
V2	0.91850	0.07855	-0.38250
V3	0.76422	0.11737	-0.39476
V4	-0.13809	0.75799	-0.09565
V5	-0.43141	0.06357	-0.22884
V6	0.50590	0.26793	0.53302
V7	0.56203	-0.53556	-0.02286
V8	0.08072	-0.82584	0.13403
V9	0.05283	0.53269	0.08680
V10	0.76586	0.15089	0.62243

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.65865	1	3.37848	52.2	52.2
V2	0.99612	2	1.95164	30.2	82.4
V3	0.75364	3	1.13593	17.6	100.0
V4	0.60277				
V5	0.24252				
V6	0.61184				
V7	0.60322				
V8	0.70649				
V9	0.29408				
V10	0.99672				

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.77799	0.00877	-0.23088
V2	0.96978	-0.02135	0.23493
V3	0.85567	0.03908	0.14119
V4	-0.00208	0.77465	-0.05172
V5	-0.20725	0.13845	-0.42474
V6	0.11038	0.15709	0.75827
V7	0.42829	-0.60472	0.23260
V8	-0.07141	-0.83654	0.03997
V9	0.02805	0.51280	0.17416
V10	0.25846	-0.00066	0.96432

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.80392	-0.13747	0.57863
FACTOR 2	0.06918	0.98793	0.13860
FACTOR 3	-0.59070	-0.07140	0.80373

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.00373	-0.01048	0.28115
V2	1.12906	0.00631	0.14974
V3	-0.04196	0.01883	-0.28782
V4	0.08935	0.33493	0.08200
V5	0.07649	0.04858	0.14928
V6	-0.14058	0.08625	-0.09351
V7	-0.03265	-0.18313	0.13921
V8	0.06084	-0.49917	-0.05314
V9	-0.01416	0.07044	-0.02821
V10	-0.07021	0.02028	1.24827

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FILE D1 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.79772	-0.27715	0.02660	0.12484	-0.19153	-0.08614	-0.01747	-0.04397	-0.47315
V2	-0.79772	1.00000	0.42050	-0.10936	-0.16802	0.30983	0.18984	0.00728	0.07491	0.44181
V3	-0.27715	0.42050	1.00000	0.06331	-0.04816	0.09901	0.13777	0.01111	-0.16401	0.12690
V4	0.02660	-0.10936	0.06331	1.00000	0.01014	-0.05479	-0.75413	-0.54958	0.13679	-0.06658
V5	0.12484	-0.16802	-0.04816	0.01014	1.00000	-0.06997	-0.23287	-0.22362	0.18358	-0.24084
V6	-0.19153	0.30983	0.09901	-0.05479	-0.06997	1.00000	0.05222	-0.01328	0.29901	0.75696
V7	-0.08614	0.18984	0.13777	-0.75413	-0.23287	0.05222	1.00000	0.58027	-0.17746	0.12793
V8	-0.01747	0.00728	0.01111	-0.54958	-0.22362	-0.01328	0.58027	1.00000	-0.23560	0.12427
V9	-0.04397	0.07491	-0.16401	0.13679	0.18358	0.29901	-0.17746	-0.23560	1.00000	0.13595
V10	-0.47315	0.44181	0.12690	-0.06658	-0.24084	0.75696	0.12793	0.12427	0.13595	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0107653 (0.10785252E-01)

FILE D1 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.72039	1	2.86203	28.6	28.6
V2	0.73096	2	2.26765	22.7	51.3
V3	0.30333	3	1.38760	13.9	65.2
V4	0.65998	4	1.04983	10.5	75.7
V5	0.24008	5	0.80186	8.0	83.7
V6	0.68641	6	0.63599	6.4	90.1
V7	0.67095	7	0.47422	4.7	94.8
V8	0.42930	8	0.22567	2.3	97.0
V9	0.22700	9	0.17692	1.8	98.8
V10	0.72828	10	0.11813	1.2	100.0

MORE THAN 25 ITERATIONS REQUIRED.

FILE D1 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.65995	-0.26476	0.39665
V2	0.80665	0.26055	-0.46174
V3	0.30141	0.07304	-0.27073
V4	-0.35617	0.68907	-0.12126
V5	-0.24972	0.11531	0.03142
V6	0.61705	0.37271	0.65732
V7	0.49337	-0.76293	0.03392
V8	0.29971	-0.62035	0.07975
V9	0.02825	0.32047	0.21916
V10	0.71451	0.26677	0.31918

VARIABLE	COMMUNALITY
V1	0.66296
V2	0.93177
V3	0.16948
V4	0.61638
V5	0.07664
V6	0.95174
V7	0.82662
V8	0.48102
V9	0.15154
V10	0.68356

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	2.59158	46.7	46.7
2	1.91111	34.4	81.1
3	1.04902	18.9	100.0

FILE D1 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.01586	-0.79742	-0.16381
V2	0.07791	0.94282	0.19181
V3	0.03605	0.40994	-0.01117
V4	-0.78504	0.01000	-0.00025
V5	-0.21176	-0.16690	-0.06280
V6	0.05540	0.10749	0.96805
V7	0.90034	0.12466	-0.02159
V8	0.69277	-0.00464	-0.03278
V9	-0.23521	-0.03781	0.30788
V10	0.14379	0.36920	0.72565

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.46256	0.70907	0.53221
FACTOR 2	-0.87450	0.26611	0.40551
FACTOR 3	0.14591	-0.65299	0.74318

FILE D1 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.01534	0.02453	-0.18707
V2	-0.07056	1.00486	-0.23099
V3	-0.02927	-0.02711	-0.06244
V4	-0.18230	0.17518	0.02106
V5	-0.00274	0.05259	-0.02406
V6	0.00771	-0.32454	1.04720
V7	0.64850	0.04954	-0.02897
V8	0.19441	0.02164	0.00874
V9	-0.05930	-0.06775	-0.00155
V10	0.06825	0.21047	-0.04713

Appendix H

Experimental Factor Matrices and Related Statistics for Data Group D2

D2M10FMR

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.13554	0.14434	0.34355	0.32326	0.52287	0.32765	0.18822	0.00931	0.10490
V2	-0.13554	1.00000	-0.06165	-0.26986	-0.38225	-0.34324	-0.36497	-0.33805	0.25874	-0.25635
V3	0.14434	-0.06165	1.00000	0.17665	0.10051	0.04111	0.08089	0.10268	0.20951	0.10410
V4	0.34355	-0.26986	0.17665	1.00000	0.66186	0.42607	0.38290	0.36422	-0.10008	0.29198
V5	0.32326	-0.38225	0.10051	0.66186	1.00000	0.60460	0.55129	0.57707	-0.26084	0.42757
V6	0.52287	-0.34324	0.04111	0.42607	0.60460	1.00000	0.64616	0.41631	-0.30322	0.26413
V7	0.32765	-0.36497	0.08089	0.38290	0.55129	0.64616	1.00000	0.41906	-0.24003	0.28295
V8	0.18822	-0.33805	0.10268	0.36422	0.57707	0.41631	0.41906	1.00000	-0.26055	0.49309
V9	0.00931	0.25874	0.20951	-0.10008	-0.26084	-0.30322	-0.24003	-0.26055	1.00000	-0.20171
V10	0.10490	-0.25635	0.10410	0.29198	0.42757	0.26413	0.28295	0.49309	-0.20171	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0373325(0.37332505E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.32999	1	3.90911	39.1	39.1
V2	0.21843	2	1.32442	13.2	52.3
V3	0.10769	3	1.07861	10.8	63.1
V4	0.46913	4	0.78350	7.8	71.0
V5	0.65551	5	0.68474	6.8	77.8
V6	0.60827	6	0.62331	6.2	84.0
V7	0.47582	7	0.57621	5.8	89.8
V8	0.43166	8	0.47630	4.8	94.6
V9	0.21971	9	0.30472	3.0	97.6
V10	0.28479	10	0.23905	2.4	100.0

CONVERGENCE REQUIRED 19 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.45201	0.40654	-0.16029
V2	-0.47270	0.15008	-0.01823
V3	0.12857	0.30760	0.27384
V4	0.62635	0.18469	0.19199
V5	0.83978	-0.00532	0.16806
V6	0.82104	0.16151	-0.43308
V7	0.68982	0.03028	-0.13663
V8	0.65532	-0.20396	0.24670
V9	-0.34994	0.52831	0.24986
V10	0.49052	-0.20090	0.29120

VARIABLE	COMMUNALITY
V1	0.39528
V2	0.24630
V3	0.18614
V4	0.46329
V5	0.73351
V6	0.88775
V7	0.49544
V8	0.53190
V9	0.46399
V10	0.36577

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.48433	73.1	73.1
2	0.70462	14.8	87.8
3	0.58042	12.2	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.08590	0.58968	0.20043
V2	-0.42104	-0.23351	0.12040
V3	0.11824	0.08061	0.40701
V4	0.49335	0.40047	0.24397
V5	0.71546	0.46486	0.07441
V6	0.31234	0.87185	-0.17338
V7	0.42660	0.55342	-0.08467
V8	0.70066	0.20091	-0.02450
V9	-0.33864	-0.11936	0.57885
V10	0.60096	0.06700	0.01119

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.74220	0.66940	-0.03231
FACTOR 2	-0.40272	0.48401	0.77688
FACTOR 3	0.53568	-0.56359	0.62881

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.06917	0.13732	0.21024
V2	-0.09981	0.01361	0.05475
V3	0.03853	0.01889	0.23456
V4	0.07424	0.07441	0.20612
V5	0.45263	-0.02791	0.18673
V6	-0.27923	0.87420	-0.32511
V7	0.08078	0.04478	-0.01641
V8	0.32367	-0.13652	0.00399
V9	-0.12959	0.08933	0.48657
V10	0.22857	-0.11391	0.02542

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FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATICN COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.13635	0.13218	0.34274	0.32397	0.52366	0.32933	0.18678	-0.00340	0.10273
V2	-0.13635	1.00000	-0.07334	-0.26986	-0.37020	-0.33521	-0.36497	-0.33805	0.21153	-0.25635
V3	0.13218	-0.07334	1.00000	0.18067	0.10213	0.02502	0.04811	0.11662	0.28882	0.13167
V4	0.34274	-0.26986	0.18067	1.00000	0.66851	0.42439	0.38290	0.36422	-0.08272	0.29198
V5	0.32397	-0.37020	0.10213	0.66851	1.00000	0.60017	0.54504	0.57372	-0.23013	0.41663
V6	0.52366	-0.33521	0.02502	0.42439	0.60017	1.00000	0.64798	0.41327	-0.29911	0.25904
V7	0.32933	-0.36497	0.04811	0.38290	0.54504	0.64798	1.00000	0.41906	-0.26526	0.28295
V8	0.18678	-0.33805	0.11662	0.36422	0.57372	0.41327	0.41906	1.00000	-0.20849	0.49309
V9	-0.00340	0.21153	0.28882	-0.08272	-0.23013	-0.29911	-0.26526	-0.20849	1.00000	-0.12456
V10	0.10273	-0.25635	0.13167	0.29198	0.41663	0.25904	0.28295	0.49309	-0.12456	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0368213(0.36821309E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.32548	1	3.87193	38.7	38.7
V2	0.20885	2	1.37131	13.7	52.4
V3	0.15277	3	1.11604	11.2	63.6
V4	0.47796	4	0.77744	7.8	71.4
V5	0.65367	5	0.68567	6.9	78.2
V6	0.60560	6	0.60254	6.0	84.2
V7	0.47936	7	0.55040	5.5	89.8
V8	0.43194	8	0.47683	4.8	94.5
V9	0.22888	9	0.31019	3.1	97.6
V10	0.28089	10	0.23764	2.4	100.0

CONVERGENCE REQUIRED 20 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.45972	0.17479	0.41011
V2	-0.46477	0.06179	0.11715
V3	0.12510	0.50373	-0.03210
V4	0.62802	0.22133	-0.00111
V5	0.83355	0.07833	-0.10924
V6	0.80616	-0.14039	0.38463
V7	0.69794	-0.10875	0.11263
V8	0.65609	0.03565	-0.33871
V9	-0.31733	0.62690	0.09326
V10	0.48446	0.09429	-0.36159

VARIABLE	COMMUNALITY
V1	0.41009
V2	0.23355
V3	0.27042
V4	0.44340
V5	0.71287
V6	0.81754
V7	0.51164
V8	0.54645
V9	0.50240
V10	0.37434

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.43510	71.2	71.2
2	0.77794	16.1	87.4
3	0.60967	12.6	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.07740	0.61910	0.14425
V2	-0.41603	-0.22247	0.10476
V3	0.15440	0.08037	0.49002
V4	0.48125	0.42928	0.16588
V5	0.69370	0.48129	0.00296
V6	0.32425	0.81991	-0.20035
V7	0.42972	0.54715	-0.16614
V8	0.71361	0.19060	-0.02978
V9	-0.24573	-0.11856	0.65419
V10	0.60728	0.06091	0.04296

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.73664	0.67069	-0.08682
FACTOR 2	0.08079	0.04019	0.99592
FACTOR 3	-0.67144	0.74065	0.02458

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.10323	0.21318	0.16024
V2	-0.10243	0.01709	0.03027
V3	0.05987	0.02301	0.28354
V4	0.06198	0.09687	0.14640
V5	0.40008	0.03462	0.09682
V6	-0.20856	0.71797	-0.21718
V7	0.07678	0.08132	-0.06927
V8	0.35475	-0.15408	0.01301
V9	-0.08190	0.07641	0.52629
V10	0.24614	-0.12585	0.04863

D2M10PC

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.13514	0.14738	0.35491	0.33052	0.50521	0.30913	0.18092	0.01202	0.09929
V2	-0.13514	1.00000	-0.05653	-0.26986	-0.34648	-0.32733	-0.36497	-0.33805	0.23687	-0.25635
V3	0.14738	-0.05653	1.00000	0.18137	0.10621	0.03397	0.07701	0.09816	0.21223	0.09663
V4	0.35491	-0.26986	0.18137	1.00000	0.69167	0.40178	0.38290	0.36422	-0.10603	0.29198
V5	0.33052	-0.34648	0.10621	0.69167	1.00000	0.56300	0.50884	0.53946	-0.24423	0.38752
V6	0.50521	-0.32733	0.03397	0.40178	0.56300	1.00000	0.65274	0.40736	-0.29324	0.25595
V7	0.30913	-0.36497	0.07701	0.38290	0.50884	0.65274	1.00000	0.41906	-0.22679	0.28295
V8	0.18092	-0.33805	0.09816	0.36422	0.53946	0.40736	0.41906	1.00000	-0.25160	0.49309
V9	0.01202	0.23687	0.21223	-0.10603	-0.24423	-0.29324	-0.22679	-0.25160	1.00000	-0.17999
V10	0.09929	-0.25635	0.09663	0.29198	0.38752	0.25595	0.28295	0.49309	-0.17999	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0411142(0.41114226E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.32054	1	3.82981	38.3	38.3
V2	0.20824	2	1.32803	13.3	51.6
V3	0.10728	3	1.08041	10.8	62.4
V4	0.51023	4	0.79223	7.9	70.3
V5	0.63572	5	0.70889	7.1	77.4
V6	0.59539	6	0.64943	6.5	83.9
V7	0.48221	7	0.59061	5.9	89.8
V8	0.42094	8	0.47659	4.8	94.6
V9	0.20439	9	0.30511	3.1	97.6
V10	0.27500	10	0.23886	2.4	100.0

MORE THAN 25 ITERATIONS REQUIRED.

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.45225	0.40363	-0.12818
V2	-0.46152	0.15941	-0.02084
V3	0.12947	0.30356	0.26411
V4	0.64900	0.19487	0.25190
V5	0.81010	0.02105	0.19240
V6	0.81856	0.14550	-0.48392
V7	0.68471	0.00396	-0.15124
V8	0.64662	-0.24018	0.21875
V9	-0.32599	0.47077	0.21740
V10	0.47722	-0.21968	0.25965

VARIABLE	COMMUNALITY
V1	0.38388
V2	0.23885
V3	0.17866
V4	0.52264
V5	0.69372
V6	0.92539
V7	0.49172
V8	0.52366
V9	0.37516
V10	0.34342

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.40278	72.8	72.8
2	0.66765	14.3	87.0
3	0.60668	13.0	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.09302	0.56075	0.24656
V2	-0.42469	-0.22320	0.09309
V3	0.09295	0.06833	0.40664
V4	0.52175	0.37279	0.33382
V5	0.68927	0.43645	0.16772
V6	0.30305	0.89792	-0.16522
V7	0.43228	0.54792	-0.06814
V8	0.69700	0.19316	-0.02311
V9	-0.34361	-0.13201	0.48955
V10	0.58223	0.06531	0.01254

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.74402	0.66717	0.03623
FACTOR 2	-0.44488	0.45421	0.77186
FACTOR 3	0.49851	-0.59040	0.63476

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.07049	0.10028	0.24551
V2	-0.11211	0.01414	0.06069
V3	0.01178	0.01984	0.23589
V4	0.10675	0.07856	0.27555
V5	0.39040	-0.04902	0.22413
V6	-0.27098	0.95653	-0.38178
V7	0.11265	-0.00148	-0.00847
V8	0.33979	-0.13979	-0.03623
V9	-0.14059	0.08117	0.38324
V10	0.22153	-0.10775	0.00057

D2M10ME

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.12972	0.13977	0.31086	0.31072	0.51894	0.31098	0.18093	0.01251	0.09701
V2	-0.12972	1.00000	-0.05297	-0.26986	-0.34489	-0.31632	-0.36497	-0.33805	0.22219	-0.25635
V3	0.13977	-0.05297	1.00000	0.15546	0.09107	0.03612	0.07934	0.09732	0.21353	0.09377
V4	0.31086	-0.26986	0.15546	1.00000	0.61948	0.40926	0.38290	0.36422	-0.10521	0.29198
V5	0.31072	-0.34489	0.09107	0.61948	1.00000	0.59346	0.52610	0.55437	-0.25231	0.39340
V6	0.51894	-0.31632	0.03612	0.40926	0.59346	1.00000	0.60599	0.39214	-0.29375	0.23343
V7	0.31098	-0.36497	0.07934	0.38290	0.52610	0.60599	1.00000	0.41906	-0.21838	0.28295
V8	0.18093	-0.33805	0.09732	0.36422	0.55437	0.39214	0.41906	1.00000	-0.23424	0.49309
V9	0.01251	0.22219	0.21353	-0.10521	-0.25231	-0.29375	-0.21838	-0.23424	1.00000	-0.16629
V10	0.09701	-0.25635	0.09377	0.29198	0.39340	0.23343	0.28295	0.49309	-0.16629	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0499464(0.49946450E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.31789	1	3.78749	37.9	37.9
V2	0.20544	2	1.30457	13.0	50.9
V3	0.09827	3	1.09971	11.0	61.9
V4	0.41375	4	0.78492	7.8	69.8
V5	0.60325	5	0.68712	6.9	76.6
V6	0.58321	6	0.66462	6.6	83.3
V7	0.44258	7	0.57891	5.8	89.1
V8	0.42452	8	0.47911	4.8	93.9
V9	0.20045	9	0.34730	3.5	97.3
V10	0.27687	10	0.26620	2.7	100.0

CONVERGENCE REQUIRED 18 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.44408	0.42908	-0.09185
V2	-0.46073	0.14118	-0.01692
V3	0.12008	0.26938	0.33490
V4	0.61220	0.10936	0.17785
V5	0.80863	-0.02878	0.10424
V6	0.80438	0.24816	-0.39286
V7	0.67956	0.04298	-0.08429
V8	0.65833	-0.24607	0.23729
V9	-0.33149	0.45347	0.36118
V10	0.48190	-0.24492	0.28115

VARIABLE	COMMUNALITY
V1	0.38975
V2	0.23256
V3	0.19915
V4	0.41838
V5	0.66557
V6	0.86296
V7	0.47075
V8	0.55026
V9	0.44597
V10	0.37126

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.33691	72.4	72.4
2	0.67900	14.7	87.2
3	0.59070	12.8	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.08339	0.59170	0.18081
V2	-0.41696	-0.21552	0.11067
V3	0.12272	0.08786	0.41996
V4	0.48754	0.39284	0.16236
V5	0.66284	0.47561	0.00267
V6	0.29136	0.86149	-0.18949
V7	0.44313	0.51720	-0.08304
V8	0.71736	0.18659	-0.02904
V9	-0.28598	-0.11664	0.59210
V10	0.60704	0.04964	0.01711

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.74124	0.66755	-0.07034
FACTOR 2	-0.47028	0.59123	0.65519
FACTOR 3	0.47896	-0.45257	0.75218

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.06846	0.15605	0.20578
V2	-0.10756	0.01273	0.04405
V3	0.04053	0.02701	0.25950
V4	0.10483	0.07302	0.15888
V5	0.34572	0.01530	0.10306
V6	-0.25203	0.82348	-0.28738
V7	0.10733	0.04597	-0.00365
V8	0.36999	-0.14151	0.01943
V9	-0.09464	0.08426	0.49264
V10	0.24598	-0.11355	0.03763

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FILE NOFC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.16518	0.15434	0.31996	0.34016	0.58779	0.40179	0.16113	0.05329	0.15234
V2	-0.16518	1.00000	0.00648	-0.26986	-0.39346	-0.37440	-0.36497	-0.33805	0.26512	-0.25635
V3	0.15434	0.00648	1.00000	0.17732	0.11601	0.07744	0.15329	0.11939	0.12973	0.14477
V4	0.31996	-0.26986	0.17732	1.00000	0.68587	0.39531	0.38290	0.36422	-0.08504	0.29198
V5	0.34016	-0.39346	0.11601	0.68587	1.00000	0.58827	0.56753	0.60080	-0.25118	0.43223
V6	0.58779	-0.37440	0.07744	0.39531	0.58827	1.00000	0.67411	0.41756	-0.30152	0.25811
V7	0.40179	-0.36497	0.15329	0.38290	0.56753	0.67411	1.00000	0.41906	-0.30955	0.28295
V8	0.16113	-0.33805	0.11939	0.36422	0.60080	0.41756	0.41906	1.00000	-0.31774	0.49309
V9	0.05329	0.26512	0.12973	-0.08504	-0.25118	-0.30152	-0.30955	-0.31774	1.00000	-0.19377
V10	0.15234	-0.25635	0.14477	0.29198	0.43223	0.25811	0.28295	0.49309	-0.19377	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0268523(0.26852265E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.42325	1	3.98817	39.9	39.9
V2	0.22575	2	1.31877	13.2	53.1
V3	0.10067	3	1.09458	10.9	64.0
V4	0.49528	4	0.80618	8.1	72.1
V5	0.68909	5	0.70702	7.1	79.1
V6	0.64493	6	0.68815	6.9	86.0
V7	0.52340	7	0.48696	4.9	90.9
V8	0.46456	8	0.43224	4.3	95.2
V9	0.25272	9	0.26342	2.6	97.9
V10	0.28633	10	0.21447	2.1	100.0

CONVERGENCE REQUIRED 18 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.49533	0.51769	-0.05430
V2	-0.47787	0.14982	0.08552
V3	0.15973	0.16504	0.23759
V4	0.61519	0.07669	0.32008
V5	0.85184	-0.08345	0.25304
V6	0.82483	0.28611	-0.37769
V7	0.72191	0.07402	-0.16600
V8	0.65417	-0.31218	0.13897
V9	-0.36100	0.46947	0.38063
V10	0.48153	-0.21394	0.19775

VARIABLE	COMMUNALITY
V1	0.51630
V2	0.25812
V3	0.10920
V4	0.48679
V5	0.79662
V6	0.90484
V7	0.55419
V8	0.54470
V9	0.49560
V10	0.31675

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.59495	72.1	72.1
2	0.78149	15.7	87.8
3	0.60669	12.2	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.08935	0.65093	0.29087
V2	-0.40504	-0.26500	0.15437
V3	0.13242	0.08495	0.29060
V4	0.55659	0.28969	0.30508
V5	0.79121	0.38273	0.15530
V6	0.32789	0.88713	-0.10167
V7	0.44343	0.59356	-0.07244
V8	0.71227	0.17594	-0.08009
V9	-0.36113	-0.14560	0.58650
V10	0.55459	0.09242	0.02513

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.75921	0.65071	0.01350
FACTOR 2	-0.51162	0.58385	0.63037
FACTOR 3	0.40230	-0.48549	0.77618

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.08096	0.15466	0.29533
V2	-0.07616	0.00410	0.09397
V3	0.03612	0.00851	0.14567
V4	0.07799	0.01734	0.20661
V5	0.58530	-0.14066	0.29737
V6	-0.26822	0.90342	-0.30321
V7	0.05794	0.08655	-0.04355
V8	0.28620	-0.14022	-0.07370
V9	-0.13003	0.05436	0.49419
V10	0.15294	-0.05358	0.01696

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FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.16385	0.14659	0.32209	0.34261	0.58933	0.40113	0.16193	0.05194	0.14768
V2	-0.16385	1.00000	0.00050	-0.26986	-0.37135	-0.35311	-0.36497	-0.33805	0.26428	-0.25635
V3	0.14659	0.00050	1.00000	0.18642	0.11045	0.06392	0.12378	0.11253	0.13352	0.15193
V4	0.32209	-0.26986	0.18642	1.00000	0.68418	0.39961	0.38290	0.36422	-0.11376	0.29198
V5	0.34261	-0.37135	0.11045	0.68418	1.00000	0.59122	0.57528	0.60225	-0.26100	0.41152
V6	0.58933	-0.35311	0.06392	0.39961	0.59122	1.00000	0.67535	0.41484	-0.29651	0.25764
V7	0.40113	-0.36497	0.12378	0.38290	0.57528	0.67535	1.00000	0.41906	-0.29957	0.28295
V8	0.16193	-0.33805	0.11253	0.36422	0.60225	0.41484	0.41906	1.00000	-0.32045	0.49309
V9	0.05194	0.26428	0.13352	-0.11376	-0.26100	-0.29651	-0.29957	-0.32045	1.00000	-0.19004
V10	0.14768	-0.25635	0.15193	0.29198	0.41152	0.25764	0.28295	0.49309	-0.19004	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0275799(0.27579881E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.42244	1	3.97772	39.8	39.8
V2	0.21457	2	1.31192	13.1	52.9
V3	0.09829	3	1.10788	11.1	64.0
V4	0.49536	4	0.76950	7.7	71.7
V5	0.68681	5	0.71668	7.2	78.8
V6	0.64279	6	0.70088	7.0	85.8
V7	0.52401	7	0.49917	5.0	90.8
V8	0.47110	8	0.43949	4.4	95.2
V9	0.24405	9	0.26202	2.6	97.9
V10	0.27985	10	0.21470	2.1	100.0

CONVERGENCE REQUIRED 18 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.49755	0.52284	-0.01453
V2	-0.46774	0.14888	0.09022
V3	0.15105	0.14173	0.28858
V4	0.61921	0.04716	0.30735
V5	0.84546	-0.09040	0.21931
V6	0.82296	0.31196	-0.35122
V7	0.72357	0.08231	-0.15986
V8	0.65709	-0.32954	0.12484
V9	-0.36313	0.43307	0.38292
V10	0.47635	-0.22498	0.19279

VARIABLE	COMMUNALITY
V1	0.52113
V2	0.24908
V3	0.12618
V4	0.48011
V5	0.77106
V6	0.89793
V7	0.55588
V8	0.55596
V9	0.46604
V10	0.31469

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.57876	72.5	72.5
2	0.77687	15.7	88.2
3	0.58248	11.8	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.07700	0.66244	0.27636
V2	-0.40918	-0.24767	0.14251
V3	0.12855	0.06892	0.32389
V4	0.54293	0.30622	0.30260
V5	0.76341	0.40278	0.16143
V6	0.33294	0.88007	-0.11204
V7	0.44976	0.59013	-0.07306
V8	0.72492	0.16723	-0.04984
V9	-0.39497	-0.12024	0.54368
V10	0.55102	0.08769	0.05811

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.75793	0.65179	0.02684
FACTOR 2	-0.56492	0.63523	0.52664
FACTOR 3	0.32621	-0.41432	0.84966

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.09812	0.17227	0.29953
V2	-0.08581	0.00212	0.08996
V3	0.03758	0.00233	0.17498
V4	0.08667	0.01751	0.21282
V5	0.51164	-0.09533	0.29511
V6	-0.23872	0.87272	-0.34562
V7	0.06560	0.08295	-0.05385
V8	0.31117	-0.15237	-0.05252
V9	-0.14924	0.06981	0.45503
V10	0.16309	-0.06337	0.04342

D2M25PC

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.16208	0.13949	0.27196	0.28887	0.59819	0.42376	0.16448	0.06283	0.14525
V2	-0.16208	1.00000	-0.00827	-0.26986	-0.34434	-0.33539	-0.36497	-0.33805	0.23599	-0.25635
V3	0.13949	-0.00827	1.00000	0.18685	0.11723	0.05805	0.12809	0.11197	0.13308	0.12954
V4	0.27196	-0.26986	0.18685	1.00000	0.72159	0.35097	0.38290	0.36422	-0.11604	0.29198
V5	0.28887	-0.34434	0.11723	0.72159	1.00000	0.50095	0.48378	0.52426	-0.22811	0.38986
V6	0.59819	-0.33539	0.05805	0.35097	0.50095	1.00000	0.68917	0.38204	-0.26632	0.24069
V7	0.42376	-0.36497	0.12809	0.38290	0.48378	0.68917	1.00000	0.41906	-0.26539	0.28295
V8	0.16448	-0.33805	0.11197	0.36422	0.52426	0.38204	0.41906	1.00000	-0.31830	0.49309
V9	0.06283	0.23599	0.13308	-0.11604	-0.22811	-0.26632	-0.26539	-0.31830	1.00000	-0.18386
V10	0.14525	-0.25635	0.12954	0.29198	0.38986	0.24069	0.28295	0.49309	-0.18386	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0323415(0.32341510E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.42443	1	3.83289	38.3	38.3
V2	0.20839	2	1.31208	13.1	51.4
V3	0.09061	3	1.14993	11.5	62.9
V4	0.54062	4	0.83222	8.3	71.3
V5	0.64490	5	0.73171	7.3	78.6
V6	0.64049	6	0.72947	7.3	85.9
V7	0.53241	7	0.48054	4.8	90.7
V8	0.42852	8	0.43777	4.4	95.1
V9	0.22590	9	0.27831	2.8	97.8
V10	0.27830	10	0.21503	2.2	100.0

CONVERGENCE REQUIRED 20 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.49505	0.50361	0.15304
V2	-0.46321	0.10166	0.14156
V3	0.15413	0.03404	0.27002
V4	0.64599	-0.18627	0.38810
V5	0.79372	-0.24034	0.24280
V6	0.80081	0.45786	-0.21823
V7	0.72455	0.17964	-0.13264
V8	0.63371	-0.30262	-0.10723
V9	-0.33215	0.25780	0.46947
V10	0.47009	-0.24633	-0.00103

VARIABLE	COMMUNALITY
V1	0.52212
V2	0.24493
V3	0.09783
V4	0.60263
V5	0.74671
V6	0.89856
V7	0.57484
V8	0.50467
V9	0.39719
V10	0.28167

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.42989	70.4	70.4
2	0.81820	16.8	87.2
3	0.62307	12.8	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.02005	0.66849	0.27358
V2	-0.43879	-0.21463	-0.07958
V3	-0.02486	0.07724	0.30206
V4	0.39735	0.17553	0.64337
V5	0.59138	0.24197	0.58174
V6	0.37127	0.86909	0.07346
V7	0.44862	0.59063	0.15727
V8	0.66188	0.15098	0.20925
V9	-0.57595	-0.06304	0.24797
V10	0.47165	0.08282	0.22882

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.69110	0.59104	0.41599
FACTOR 2	-0.59408	0.79234	-0.13879
FACTOR 3	-0.41164	-0.15122	0.89871

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.22252	0.18358	0.21123
V2	-0.12473	0.00473	0.04687
V3	-0.05248	0.01920	0.12744
V4	0.00372	-0.02470	0.37744
V5	0.27254	-0.18796	0.47740
V6	0.02386	0.87374	-0.34831
V7	0.10995	0.08487	-0.00132
V8	0.30086	-0.09410	-0.00996
V9	-0.30782	0.09482	0.26972
V10	0.12966	-0.03511	0.03603

D2M25ME

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.14946	0.13990	0.27175	0.31048	0.57171	0.32253	0.12196	0.07974	0.13486
V2	-0.14946	1.00000	-0.00121	-0.26986	-0.33563	-0.33006	-0.36497	-0.33805	0.20634	-0.25635
V3	0.13990	-0.00121	1.00000	0.14102	0.09002	0.05654	0.12111	0.09403	0.14070	0.12482
V4	0.27175	-0.26986	0.14102	1.00000	0.57442	0.36315	0.38290	0.36422	-0.08704	0.29198
V5	0.31048	-0.33563	0.09002	0.57442	1.00000	0.56205	0.50329	0.48894	-0.22463	0.38848
V6	0.57171	-0.33006	0.05654	0.36315	0.56205	1.00000	0.54672	0.32906	-0.26278	0.23378
V7	0.32253	-0.36497	0.12111	0.38290	0.50329	0.54672	1.00000	0.41906	-0.23468	0.28295
V8	0.12196	-0.33805	0.09403	0.36422	0.48894	0.32906	0.41906	1.00000	-0.24359	0.49309
V9	0.07974	0.20634	0.14070	-0.08704	-0.22463	-0.26278	-0.23468	-0.24359	1.00000	-0.15762
V10	0.13486	-0.25635	0.12482	0.29198	0.38848	0.23378	0.28295	0.49309	-0.15762	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0597878 (0.59787765E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.39742	1	3.67902	36.8	36.8
V2	0.21089	2	1.30664	13.1	49.9
V3	0.07295	3	1.10545	11.1	60.9
V4	0.36496	4	0.78095	7.8	68.7
V5	0.54100	5	0.74271	7.4	76.1
V6	0.57640	6	0.71133	7.1	83.3
V7	0.41264	7	0.54589	5.5	88.7
V8	0.39897	8	0.45460	4.5	93.3
V9	0.20076	9	0.39568	4.0	97.2
V10	0.28426	10	0.27771	2.8	100.0

CONVERGENCE REQUIRED 21 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.47231	0.53613	0.05207
V2	-0.47050	0.13388	0.06170
V3	0.13677	0.11637	0.30539
V4	0.58876	-0.00465	0.21292
V5	0.76805	-0.05492	0.08330
V6	0.78813	0.37297	-0.32282
V7	0.67519	0.01461	-0.04885
V8	0.63093	-0.35745	0.15685
V9	-0.31010	0.36088	0.46015
V10	0.49216	-0.25927	0.21225

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.51322	1	3.21318	70.8	70.8
V2	0.24310	2	0.78649	17.3	88.1
V3	0.12551	3	0.54005	11.9	100.0
V4	0.39199				
V5	0.59986				
V6	0.86447				
V7	0.45848				
V8	0.55045				
V9	0.43814				
V10	0.35450				

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.08893	0.66332	0.25558
V2	-0.41832	-0.21998	0.14042
V3	0.13885	0.07454	0.31729
V4	0.52606	0.30155	0.15596
V5	0.65150	0.41875	0.00762
V6	0.30439	0.86194	-0.16990
V7	0.49969	0.45070	-0.07517
V8	0.73413	0.09407	-0.05153
V9	-0.29229	-0.08051	0.58640
V10	0.59039	0.05950	0.04901

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.77481	0.62971	-0.05596
FACTOR 2	-0.54741	0.71254	0.43890
FACTOR 3	0.31625	-0.30943	0.89679

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.07368	0.20803	0.31408
V2	-0.09893	0.00841	0.06941
V3	0.04418	0.00638	0.18597
V4	0.14703	0.03138	0.14638
V5	0.29755	-0.01080	0.10050
V6	-0.18022	0.80582	-0.33601
V7	0.13392	0.04663	-0.00834
V8	0.38511	-0.16185	0.00926
V9	-0.08121	0.07080	0.48157
V10	0.21247	-0.08277	0.07112

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FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.29222	0.11171	0.50645	0.46222	0.67863	0.44800	0.10422	-0.07369	0.12937
V2	-0.29222	1.00000	0.05807	-0.26986	-0.46204	-0.38182	-0.36497	-0.33805	0.28702	-0.24960
V3	0.11171	0.05807	1.00000	0.18345	0.09856	0.03582	0.14607	0.11083	0.05183	0.19111
V4	0.50645	-0.26986	0.18345	1.00000	0.70914	0.45063	0.38290	0.36422	-0.10490	0.26477
V5	0.46222	-0.46204	0.09856	0.70914	1.00000	0.67406	0.58206	0.63557	-0.31532	0.49431
V6	0.67863	-0.38182	0.03582	0.45063	0.67406	1.00000	0.73117	0.46759	-0.38619	0.26038
V7	0.44800	-0.36497	0.14607	0.38290	0.58206	0.73117	1.00000	0.41906	-0.37757	0.27953
V8	0.10422	-0.33805	0.11083	0.36422	0.63557	0.46759	0.41906	1.00000	-0.35930	0.48545
V9	-0.07369	0.28702	0.05183	-0.10490	-0.31532	-0.38619	-0.37757	-0.35930	1.00000	-0.28371
V10	0.12937	-0.24960	0.19111	0.26477	0.49431	0.26038	0.27953	0.48545	-0.28371	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0090893(0.90893395E-02)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.62795	1	4.28100	42.8	42.8
V2	0.27433	2	1.28026	12.8	55.6
V3	0.13121	3	1.16843	11.7	67.3
V4	0.59638	4	0.83430	8.3	75.6
V5	0.77978	5	0.67120	6.7	82.4
V6	0.78206	6	0.55739	5.6	87.9
V7	0.57913	7	0.52719	5.3	93.2
V8	0.53556	8	0.36777	3.7	96.9
V9	0.28030	9	0.18696	1.9	98.7
V10	0.35361	10	0.12544	1.3	100.0

CONVERGENCE REQUIRED 12 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.60832	0.57755	0.02767
V2	-0.49019	0.07646	0.09910
V3	0.13514	0.00264	0.22039
V4	0.65747	0.16818	0.43485
V5	0.89888	-0.11683	0.23441
V6	0.86624	0.25720	-0.33715
V7	0.72068	0.05587	-0.21374
V8	0.64318	-0.45419	0.04388
V9	-0.41975	0.28845	0.33623
V10	0.47548	-0.35672	0.13535

VARIABLE	COMMUNALITY
V1	0.70439
V2	0.25595
V3	0.06684
V4	0.64965
V5	0.87659
V6	0.93018
V7	0.56819
V8	0.62190
V9	0.37244
V10	0.37165

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.95459	73.0	73.0
2	0.86737	16.0	89.0
3	0.59585	11.0	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.78433	-0.04736	0.29490
V2	-0.30224	-0.39025	-0.11094
V3	0.01958	0.02516	0.25656
V4	0.40661	0.17617	0.67326
V5	0.43595	0.58920	0.58256
V6	0.85347	0.44509	0.06050
V7	0.58088	0.46848	0.10628
V8	0.09955	0.72533	0.29307
V9	-0.18806	-0.56338	0.14030
V10	0.02614	0.52450	0.30962

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.65759	0.62887	0.41486
FACTOR 2	0.68086	-0.73179	0.03008
FACTOR 3	-0.32250	-0.26268	0.90939

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.22047	-0.35792	0.33282
V2	-0.05674	-0.08313	0.11295
V3	-0.00008	0.00233	0.08738
V4	0.10949	-0.19980	0.31725
V5	-0.17548	0.34134	0.72479
V6	0.89708	0.18067	-0.75573
V7	0.00192	0.08585	-0.00201
V8	-0.24636	0.31994	0.10474
V9	0.04185	-0.22115	0.14104
V10	-0.06143	0.14470	0.02229

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FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.23312	0.11643	0.49990	0.45917	0.67782	0.45378	0.10647	-0.08300	0.12326
V2	-0.23312	1.00000	0.04630	-0.26986	-0.39871	-0.34800	-0.36497	-0.33805	0.29178	-0.24960
V3	0.11643	0.04630	1.00000	0.20411	0.10067	0.02473	0.10906	0.11058	0.06396	0.18949
V4	0.49990	-0.26986	0.20411	1.00000	0.72407	0.44590	0.38290	0.36422	-0.15881	0.26477
V5	0.45917	-0.39871	0.10067	0.72407	1.00000	0.67409	0.58259	0.63433	-0.31807	0.42738
V6	0.67782	-0.34800	0.02473	0.44590	0.67409	1.00000	0.73322	0.47162	-0.38144	0.27676
V7	0.45378	-0.36497	0.10906	0.38290	0.58259	0.73322	1.00000	0.41906	-0.35583	0.27953
V8	0.10647	-0.33805	0.11058	0.36422	0.63433	0.47162	0.41906	1.00000	-0.35487	0.48545
V9	-0.08300	0.29178	0.06396	-0.15881	-0.31807	-0.38144	-0.35583	-0.35487	1.00000	-0.23259
V10	0.12326	-0.24960	0.18949	0.26477	0.42738	0.27676	0.27953	0.48545	-0.23259	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0103607(0.10360677E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.61945	1	4.23899	42.4	42.4
V2	0.22981	2	1.26115	12.6	55.0
V3	0.12788	3	1.17646	11.8	66.8
V4	0.60982	4	0.77335	7.7	74.5
V5	0.76606	5	0.69895	7.0	81.5
V6	0.77910	6	0.62408	6.2	87.7
V7	0.57577	7	0.53911	5.4	93.1
V8	0.54730	8	0.37036	3.7	96.8
V9	0.25039	9	0.18612	1.9	98.7
V10	0.28842	10	0.13141	1.3	100.0

CONVERGENCE REQUIRED 13 ITERATIONS

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.60620	0.57985	0.05011
V2	-0.46032	0.11942	0.11384
V3	0.13287	0.00219	0.27053
V4	0.67272	0.12716	0.44711
V5	0.88000	-0.10102	0.21041
V6	0.87037	0.25672	-0.33363
V7	0.72379	0.06610	-0.21425
V8	0.65360	-0.49009	0.02064
V9	-0.41369	0.23488	0.28552
V10	0.45336	-0.32483	0.11047

VARIABLE	COMMUNALITY
V1	0.70621
V2	0.23912
V3	0.09085
V4	0.66863
V5	0.82888
V6	0.93476
V7	0.57414
V8	0.66782
V9	0.30783
V10	0.32325

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.90926	73.2	73.2
2	0.84802	15.9	89.1
3	0.58421	10.9	100.0

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.02202	0.78982	0.28619
V2	-0.41736	-0.24607	-0.06616
V3	0.01723	0.01229	0.30066
V4	0.24044	0.40186	0.67032
V5	0.59884	0.44101	0.52516
V6	0.47850	0.83976	0.02459
V7	0.48591	0.57639	0.07617
V8	0.77247	0.07163	0.25684
V9	-0.51189	-0.18201	0.11256
V10	0.50066	0.03358	0.26732

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.66038	0.64911	0.37757
FACTOR 2	-0.70633	0.70763	0.01883
FACTOR 3	-0.25496	-0.27912	0.92579

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.36002	0.23647	0.34409
V2	-0.11132	-0.03336	0.09484
V3	-0.00798	-0.00089	0.10586
V4	-0.13004	0.09801	0.39972
V5	0.25650	-0.11071	0.55298
V6	0.21846	0.86945	-0.75320
V7	0.08946	0.00351	-0.00461
V8	0.39941	-0.29215	0.10681
V9	-0.16149	0.04003	0.11132
V10	0.12665	-0.07283	0.07013

D2M50PC

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.22281	0.14745	0.56442	0.51446	0.56642	0.32820	0.15052	-0.04099	0.13588
V2	-0.22281	1.00000	-0.00978	-0.26986	-0.34627	-0.32408	-0.36497	-0.33805	0.20872	-0.24960
V3	0.14745	-0.00978	1.00000	0.23199	0.12292	0.00422	0.10715	0.09095	0.07267	0.11806
V4	0.56442	-0.26986	0.23199	1.00000	0.78560	0.36074	0.38290	0.36422	-0.11756	0.26477
V5	0.51446	-0.34627	0.12292	0.78560	1.00000	0.49501	0.42434	0.46453	-0.20982	0.33335
V6	0.56642	-0.32408	0.00422	0.36074	0.49501	1.00000	0.75540	0.39735	-0.37060	0.24332
V7	0.32820	-0.36497	0.10715	0.38290	0.42434	0.75540	1.00000	0.41906	-0.35941	0.27953
V8	0.15052	-0.33805	0.09095	0.36422	0.46453	0.39735	0.41906	1.00000	-0.25845	0.48545
V9	-0.04099	0.20872	0.07267	-0.11756	-0.20982	-0.37060	-0.35941	-0.25845	1.00000	-0.18009
V10	0.13588	-0.24960	0.11806	0.26477	0.33335	0.24332	0.27953	0.48545	-0.18009	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0165869 (0.16586900E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.56829	1	3.93873	39.4	39.4
V2	0.21071	2	1.34503	13.5	52.8
V3	0.10525	3	1.11366	11.1	64.0
V4	0.70043	4	0.86899	8.7	72.7
V5	0.69762	5	0.74230	7.4	80.1
V6	0.74740	6	0.68473	6.8	86.9
V7	0.65162	7	0.54346	5.4	92.4
V8	0.41409	8	0.40918	4.1	96.5
V9	0.20785	9	0.22875	2.3	98.7
V10	0.26279	10	0.12513	1.3	100.0

AFTER 8 ITERATIONS COMMUNALITY OF ONE OR MORE VARIABLES EXCEEDED 1.0, PA2 FACTORING TERMINATED AT ITERATION # 7

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.59793	0.27752	0.37000
V2	-0.44980	0.10313	0.11985
V3	0.14787	0.19825	-0.05266
V4	0.74144	0.53187	-0.02643
V5	0.78983	0.30979	-0.08061
V6	0.81798	-0.39596	0.39979
V7	0.70891	-0.32327	0.08987
V8	0.60397	-0.15682	-0.45781
V9	-0.34163	0.31698	0.07000
V10	0.43679	-0.07290	-0.38139

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.57143	1	3.59919	69.4	69.4
V2	0.22732	2	0.89748	17.3	86.7
V3	0.06394	3	0.68910	13.3	100.0
V4	0.83332				
V5	0.72629				
V6	0.98571				
V7	0.61513				
V8	0.59896				
V9	0.22208				
V10	0.34156				

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.45245	0.60017	-0.08077
V2	-0.26828	-0.17201	-0.35462
V3	-0.03800	0.24304	0.05655
V4	0.18340	0.86206	0.23779
V5	0.29596	0.70737	0.37193
V6	0.95303	0.18751	0.20560
V7	0.66677	0.16073	0.38042
V8	0.19717	0.19554	0.72239
V9	-0.33778	0.06055	-0.32299
V10	0.09270	0.17062	0.55123

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.63418	0.58605	0.50434
FACTOR 2	-0.51039	0.80729	-0.29629
FACTOR 3	0.58079	0.06951	-0.81108

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	-0.13250	0.25466	-0.18945
V2	-0.04915	0.01722	-0.09382
V3	0.02002	0.03137	-0.00816
V4	0.02392	0.66656	-0.09641
V5	-0.14701	0.22766	0.19921
V6	1.23435	-0.20188	-0.27029
V7	-0.10445	-0.06571	0.23759
V8	-0.16104	-0.05762	0.52515
V9	0.00629	0.07675	-0.11647
V10	-0.05309	-0.00648	0.23709

D2M50ME

FILE NORC75 (CREATION DATE = 01-05-78)

CORRELATION COEFFICIENTS..

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00000	-0.15841	0.09532	0.33745	0.40074	0.67681	0.31110	0.06620	-0.02997	0.10342
V2	-0.15841	1.00000	0.02173	-0.26986	-0.28242	-0.23526	-0.36497	-0.33805	0.15499	-0.24960
V3	0.09532	0.02173	1.00000	0.12772	0.04686	-0.00783	0.09360	0.05643	0.08131	0.10345
V4	0.33745	-0.26986	0.12772	1.00000	0.51135	0.35763	0.38290	0.36422	-0.09460	0.26477
V5	0.40074	-0.28242	0.04686	0.51135	1.00000	0.62201	0.43288	0.39990	-0.23040	0.32614
V6	0.67681	-0.23526	-0.00783	0.35763	0.62201	1.00000	0.46793	0.27813	-0.29315	0.16831
V7	0.31110	-0.36497	0.09360	0.38290	0.43288	0.46793	1.00000	0.41906	-0.19654	0.27953
V8	0.06620	-0.33805	0.05643	0.36422	0.39990	0.27813	0.41906	1.00000	-0.18878	0.48545
V9	-0.02997	0.15499	0.08131	-0.09460	-0.23040	-0.29315	-0.19654	-0.18878	1.00000	-0.13733
V10	0.10342	-0.24960	0.10345	0.26477	0.32614	0.16831	0.27953	0.48545	-0.13733	1.00000

DETERMINANT OF CORRELATION MATRIX = 0.0576898(0.57689756E-01)

FILE NORC75 (CREATION DATE = 01-05-78)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.53005	1	3.54683	35.5	35.5
V2	0.19923	2	1.32958	13.3	48.8
V3	0.05536	3	1.14146	11.4	60.2
V4	0.34599	4	0.85820	8.6	68.8
V5	0.52087	5	0.76577	7.7	76.4
V6	0.66784	6	0.66101	6.6	83.0
V7	0.36670	7	0.59093	5.9	88.9
V8	0.40029	8	0.47054	4.7	93.6
V9	0.15602	9	0.42865	4.3	97.9
V10	0.27656	10	0.20699	2.1	100.0

MORE THAN 25 ITERATIONS REQUIRED.

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.57166	0.48839	-0.23360
V2	-0.42741	0.20266	0.04836
V3	0.08709	-0.04425	0.30436
V4	0.59044	-0.09323	0.24403
V5	0.73557	0.00951	0.00851
V6	0.83228	0.48711	-0.22685
V7	0.62933	-0.11141	0.01011
V8	0.57991	-0.50372	-0.04409
V9	-0.29094	0.06414	0.36771
V10	0.43634	-0.37862	0.05789

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
V1	0.61989	1	3.10682	69.8	69.8
V2	0.22609	2	0.94123	21.2	91.0
V3	0.10218	3	0.40123	9.0	100.0
V4	0.41686				
V5	0.54123				
V6	0.98142				
V7	0.40857				
V8	0.59197				
V9	0.22397				
V10	0.33710				

FILE NORC75 (CREATION DATE = 01-05-78)

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.76467	0.05186	0.18024
V2	-0.15777	-0.44533	0.05367
V3	0.05249	0.08855	0.30263
V4	0.37102	0.47824	0.22470
V5	0.52923	0.51054	-0.02232
V6	0.91586	0.24238	-0.28962
V7	0.36919	0.52172	-0.00911
V8	0.05524	0.76649	-0.03766
V9	-0.13526	-0.25526	0.37485
V10	0.04833	0.57520	0.06247

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	0.70958	0.70342	-0.04111
FACTOP 2	0.70100	-0.71064	-0.05987
FACTOR 3	0.07132	-0.01366	0.99736

FILE NORC75 (CREATION DATE = 01-05-78)

FACTOR SCORE COEFFICIENTS

	FACTOR 1	FACTOR 2	FACTOR 3
V1	0.17275	-0.09085	0.56896
V2	0.00316	-0.12364	0.05783
V3	0.03980	0.01570	0.17796
V4	0.10006	0.13390	0.21589
V5	-0.01815	0.20334	0.15487
V6	0.86611	-0.16808	-0.81783
V7	-0.01892	0.17911	0.07822
V8	-0.18909	0.46250	0.01280
V9	0.08171	-0.08085	0.20673
V10	-0.03091	0.19295	0.02994

Appendix 1

Scattergrams and Related Statistics

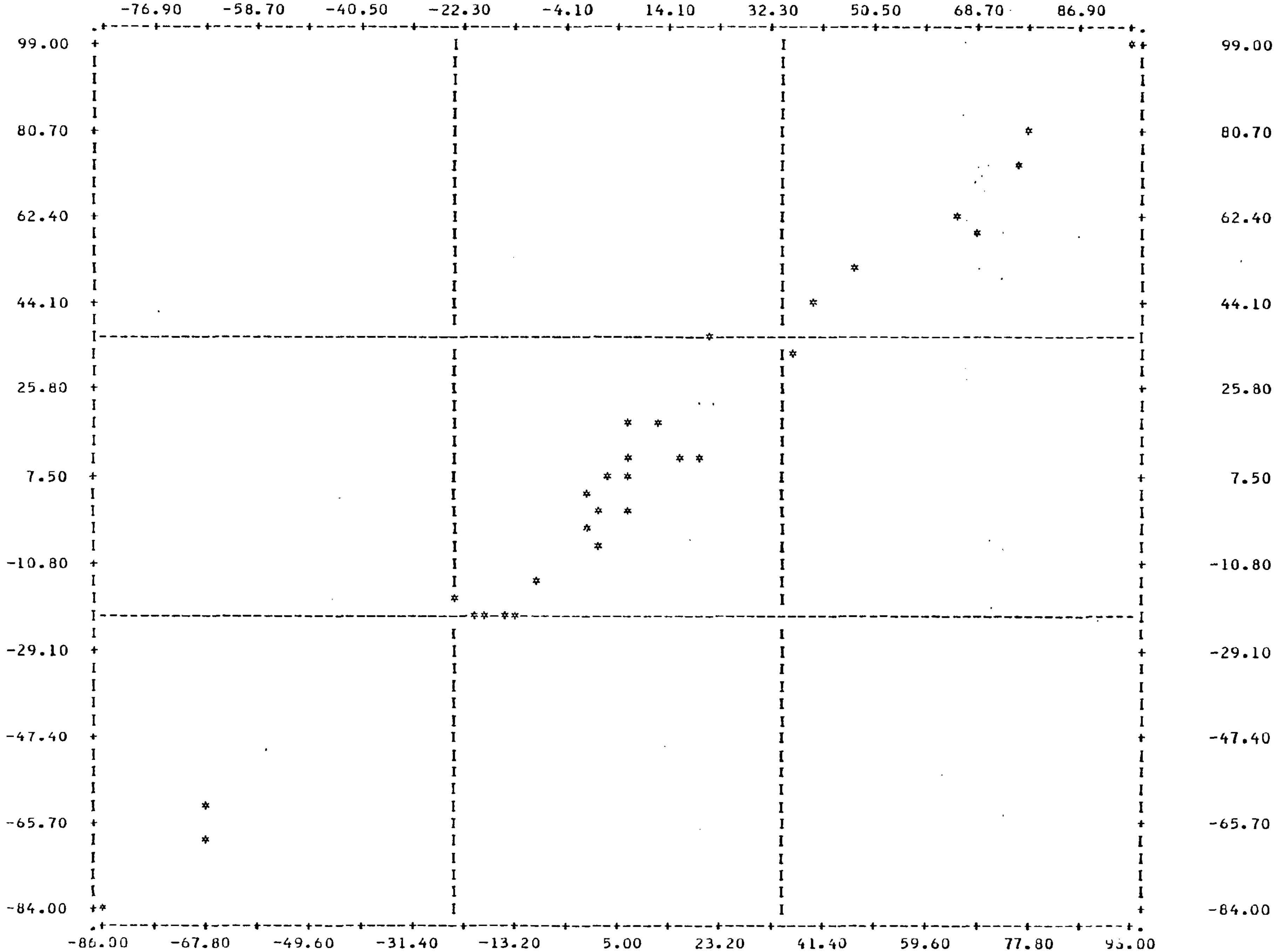
for

Data Group D1

Scattergram plots illustrate the experimental factor matrix loadings on the vertical (y) axis and the criterion factor matrix loadings on the horizontal (x) axis. Each asterisk (*) indicates a variable's loadings in each of the two factor matrices being correlated. If more than one point is found at any given position in the scattergram, the number of points at that position is printed. The stronger the relationship between loadings, the more closely the points in the scattergram depict a straight line. Note the table headings describing each scattergram at the top of each page. In addition, information regarding the linear regression equation for the best fitting imaginary line through the scattergram points is provided. For additional statistical information, see Runyan and Haber (1976).

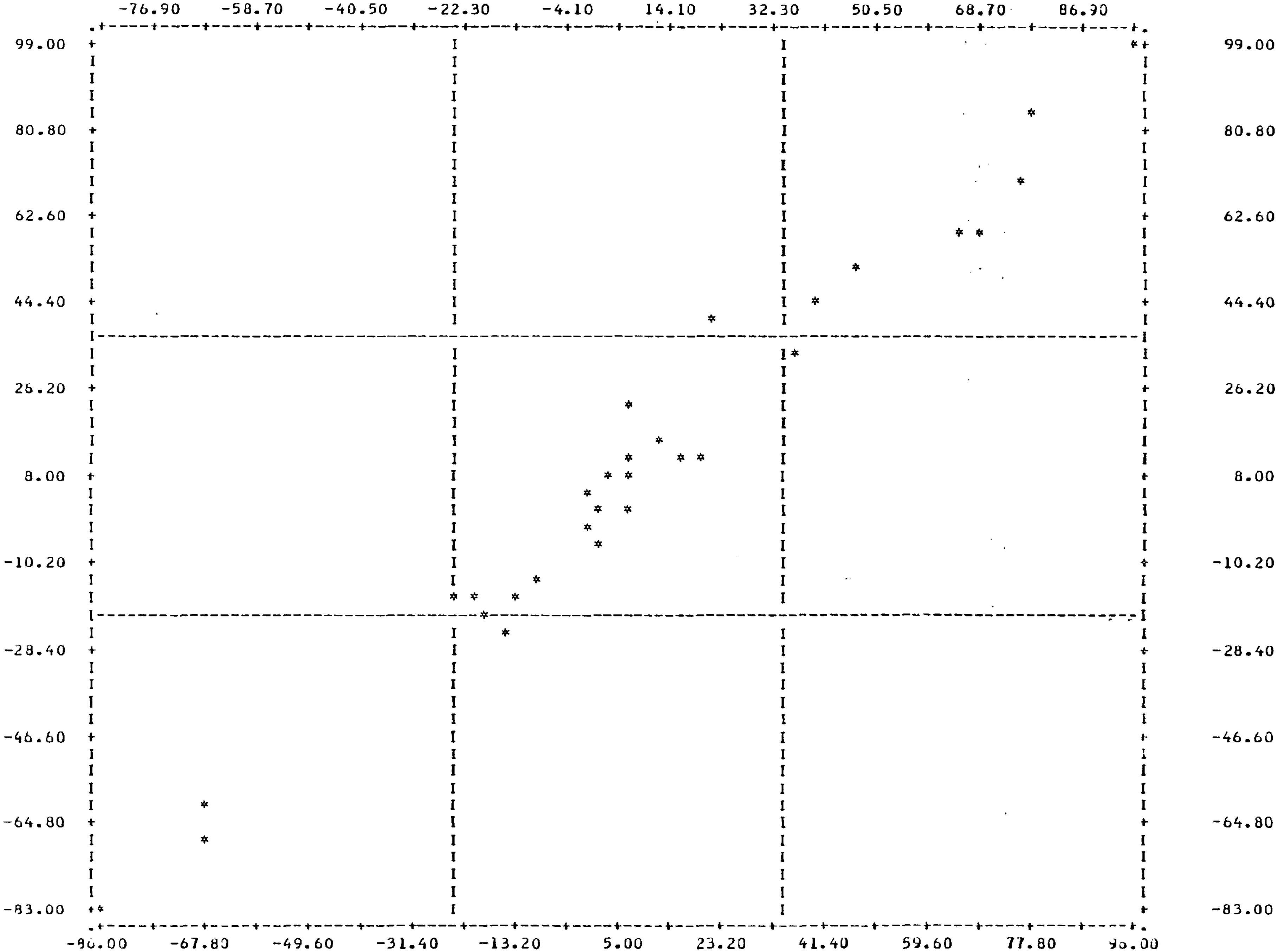
D1 LOADING MATRIX CALCULATIONS

FILE D1 (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) D1M1OFMR (ACROSS) D1FULL



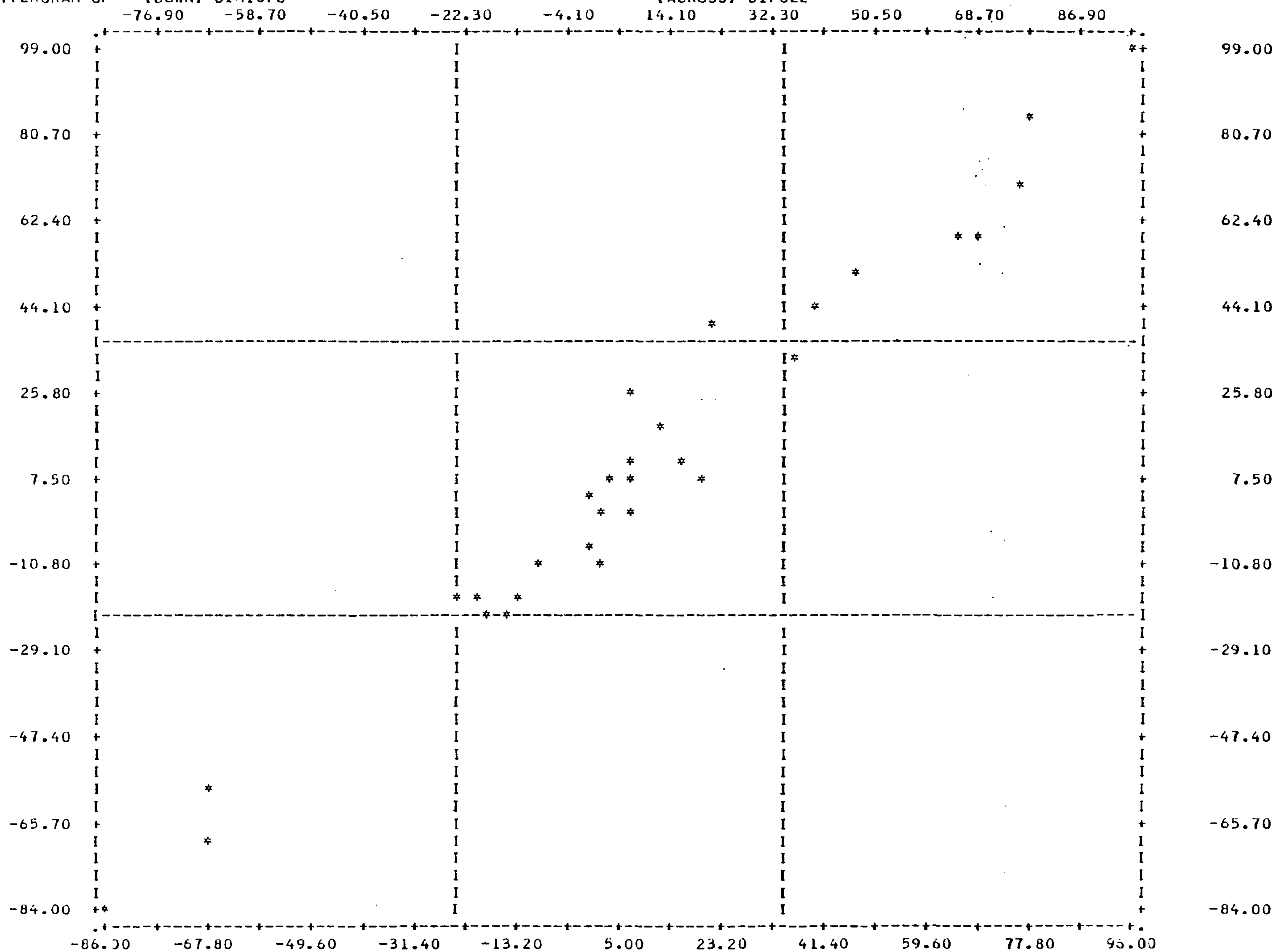
D1 LOADING MATRIX CALCULATIONS

FILE D1 (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) D1M10SWR (ACROSS) D1FULL

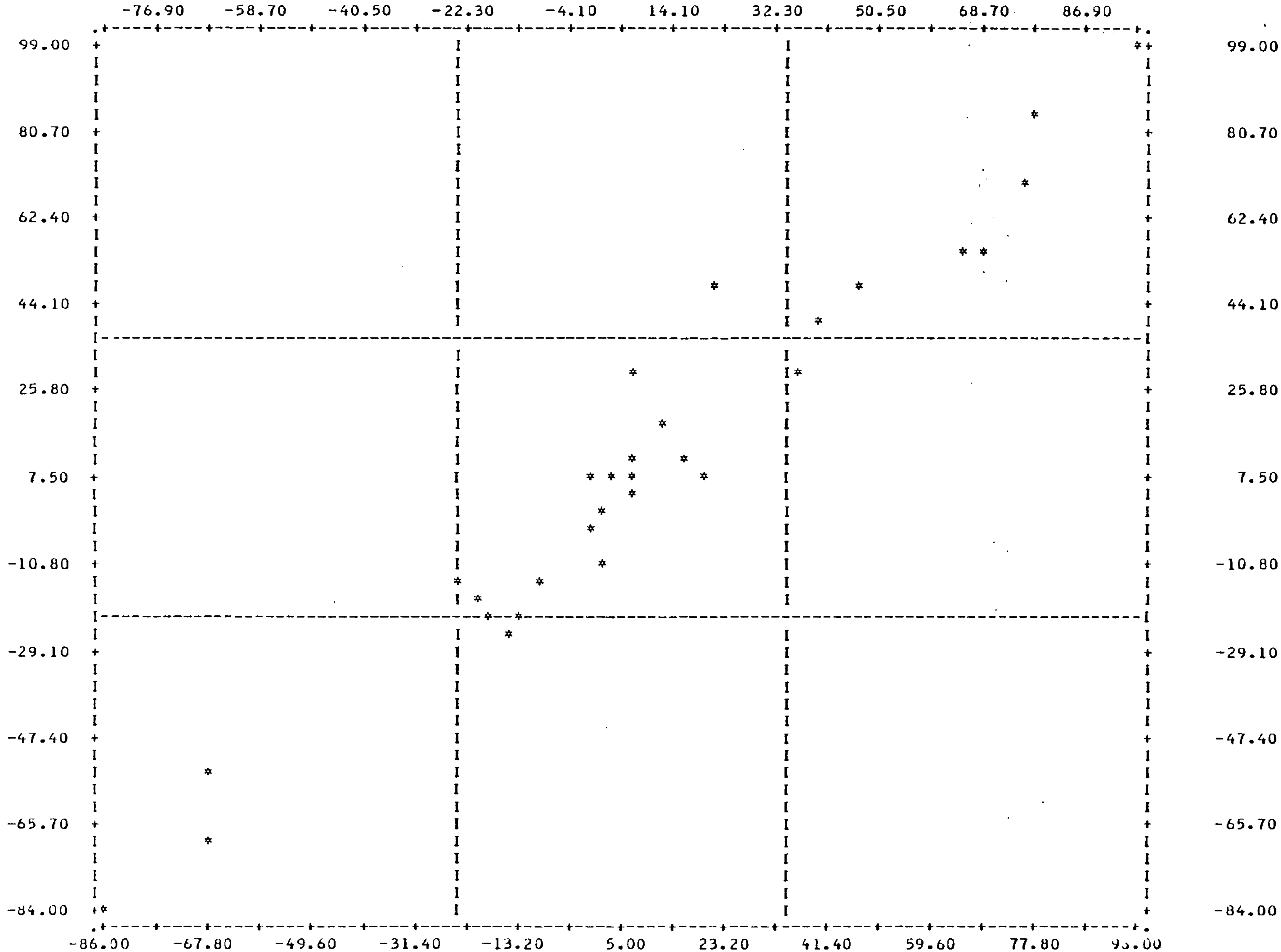


DI LOADING MATRIX CALCULATIONS

FILE DI (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) DIM10PC (ACROSS) DIFULL



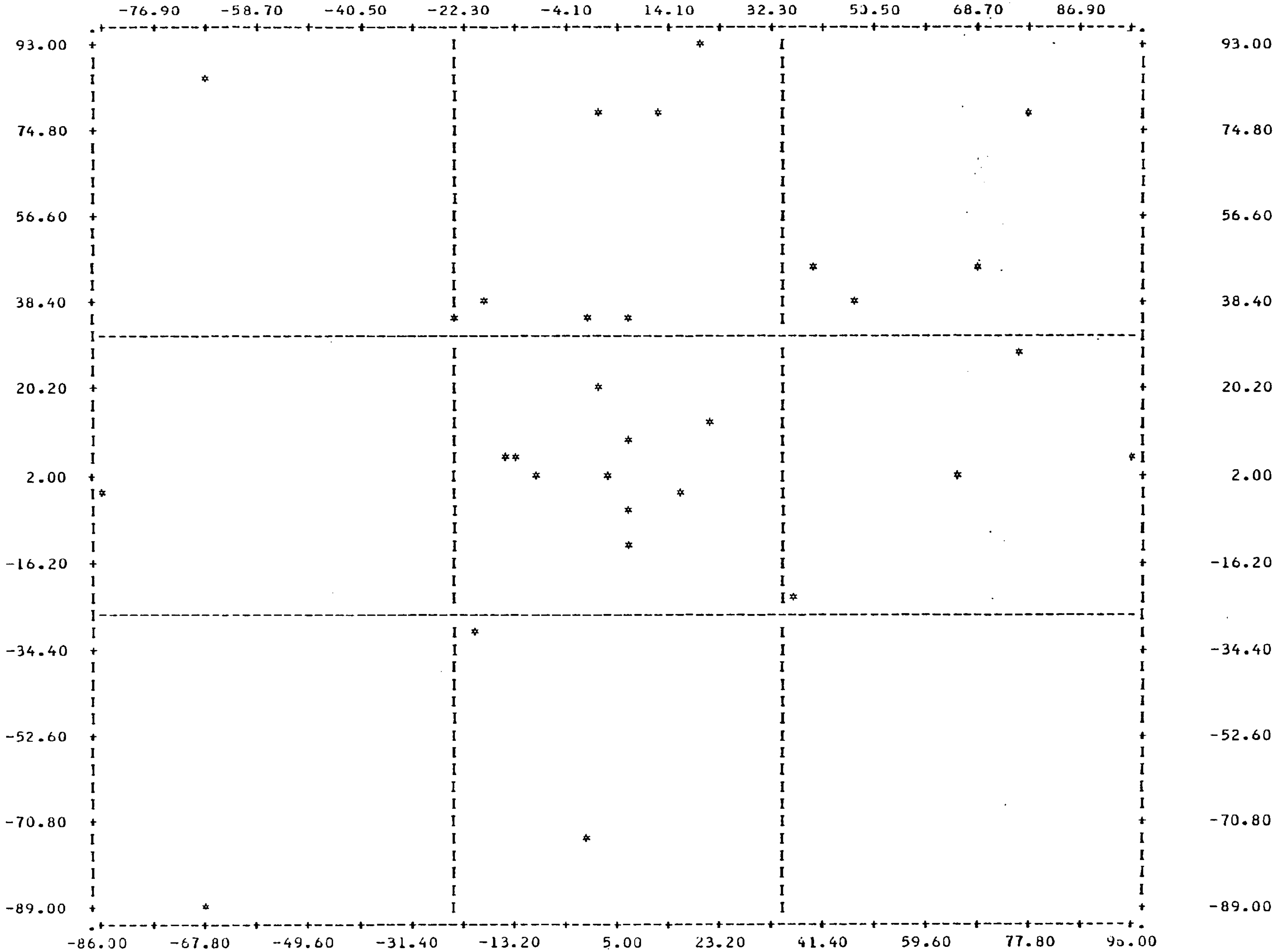
FILE D1 (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) DIMIOME (ACROSS) DIFULL



DI LOADING MATRIX CALCULATIONS

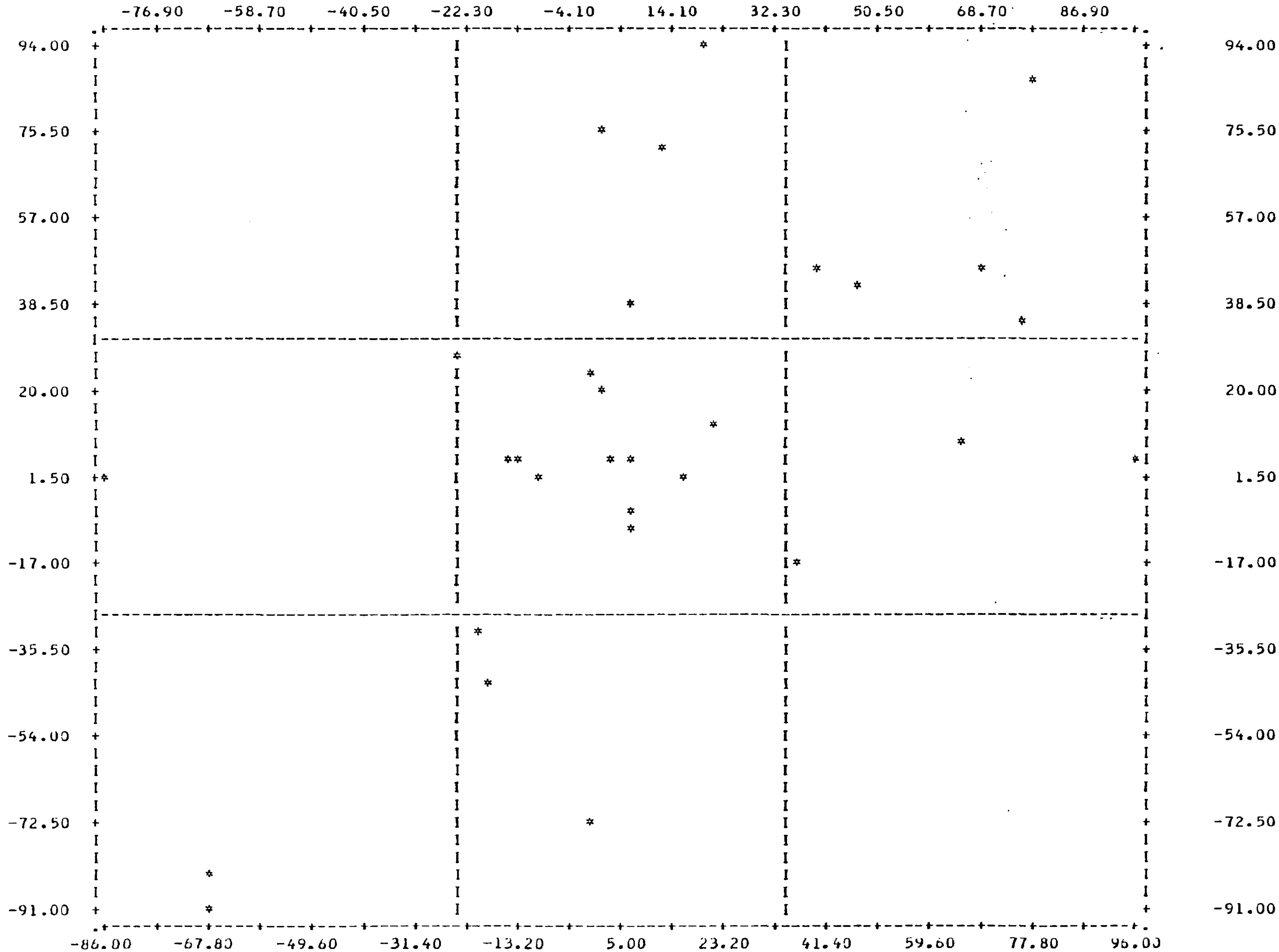
FILE DI (CREATION DATE = 01-12-78)

SCATTERGRAM OF (DOWN) DIM25FMR (ACROSS) DIFULL

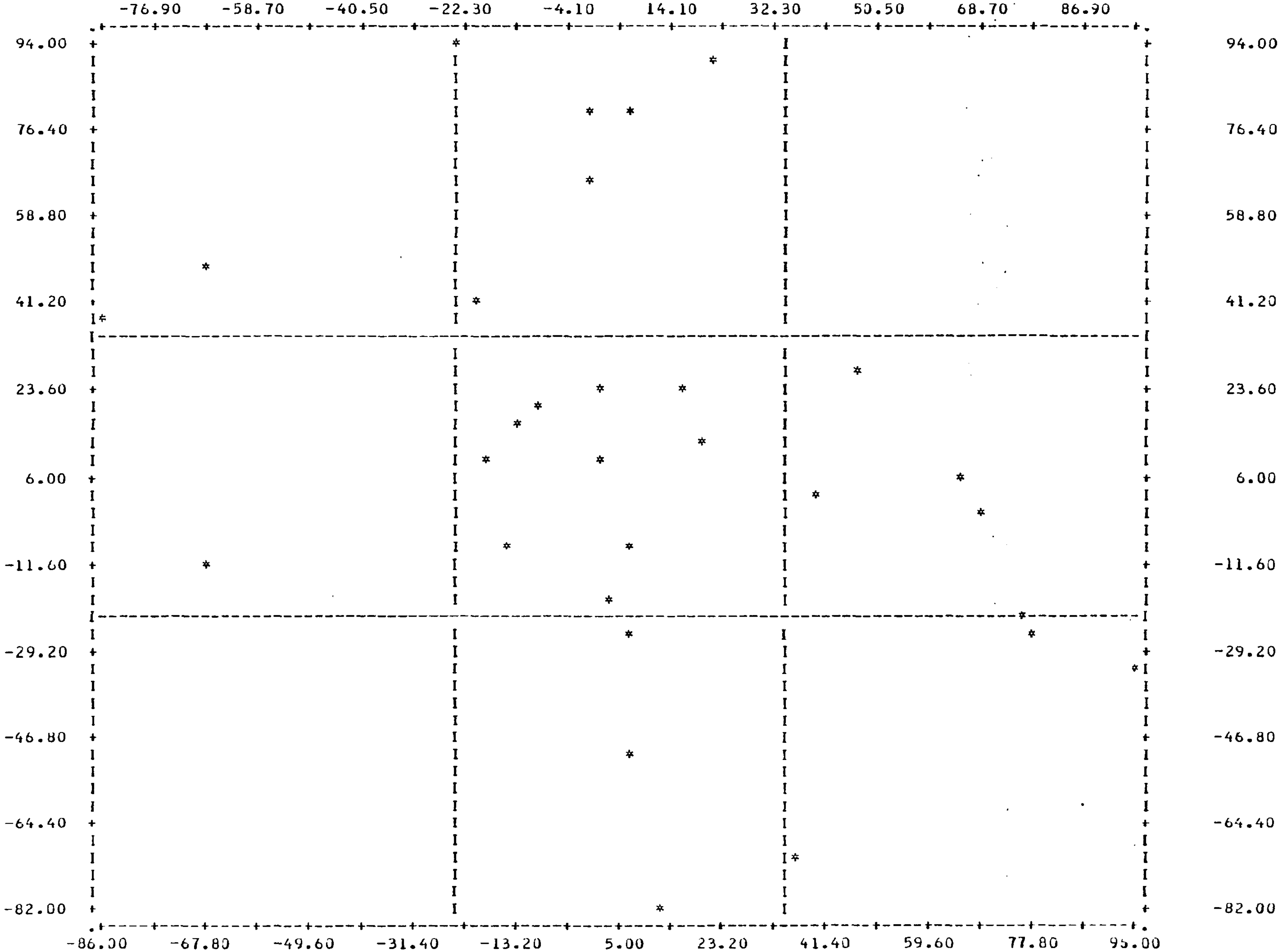


FILE D1 (CREATION DATE = 01-12-78)

SCATTERGRAM OF (DOWN) D1M25SWR (ACROSS) D1FULL

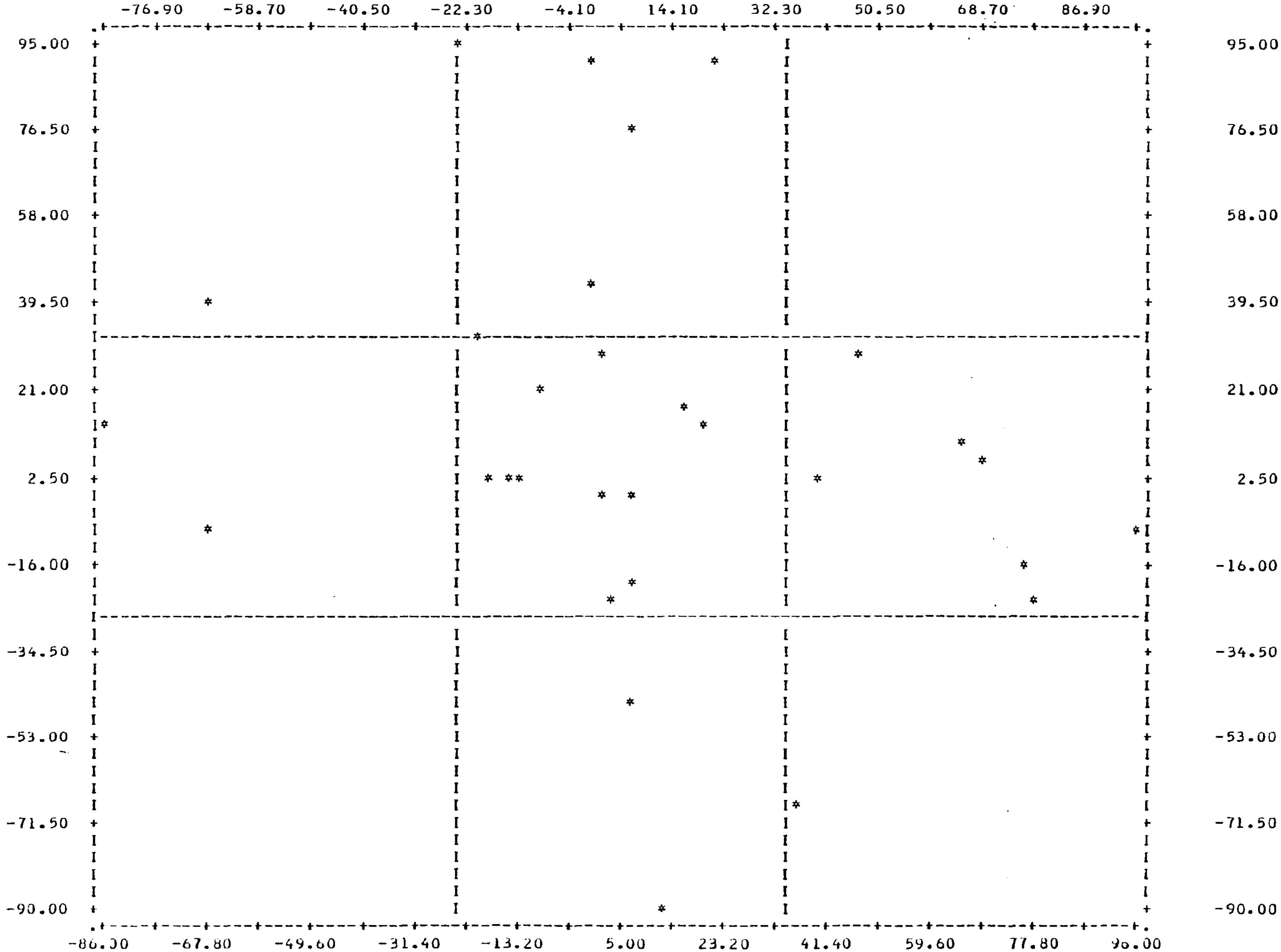


FILE D1 (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) D1M25PC (ACROSS) D1FULL

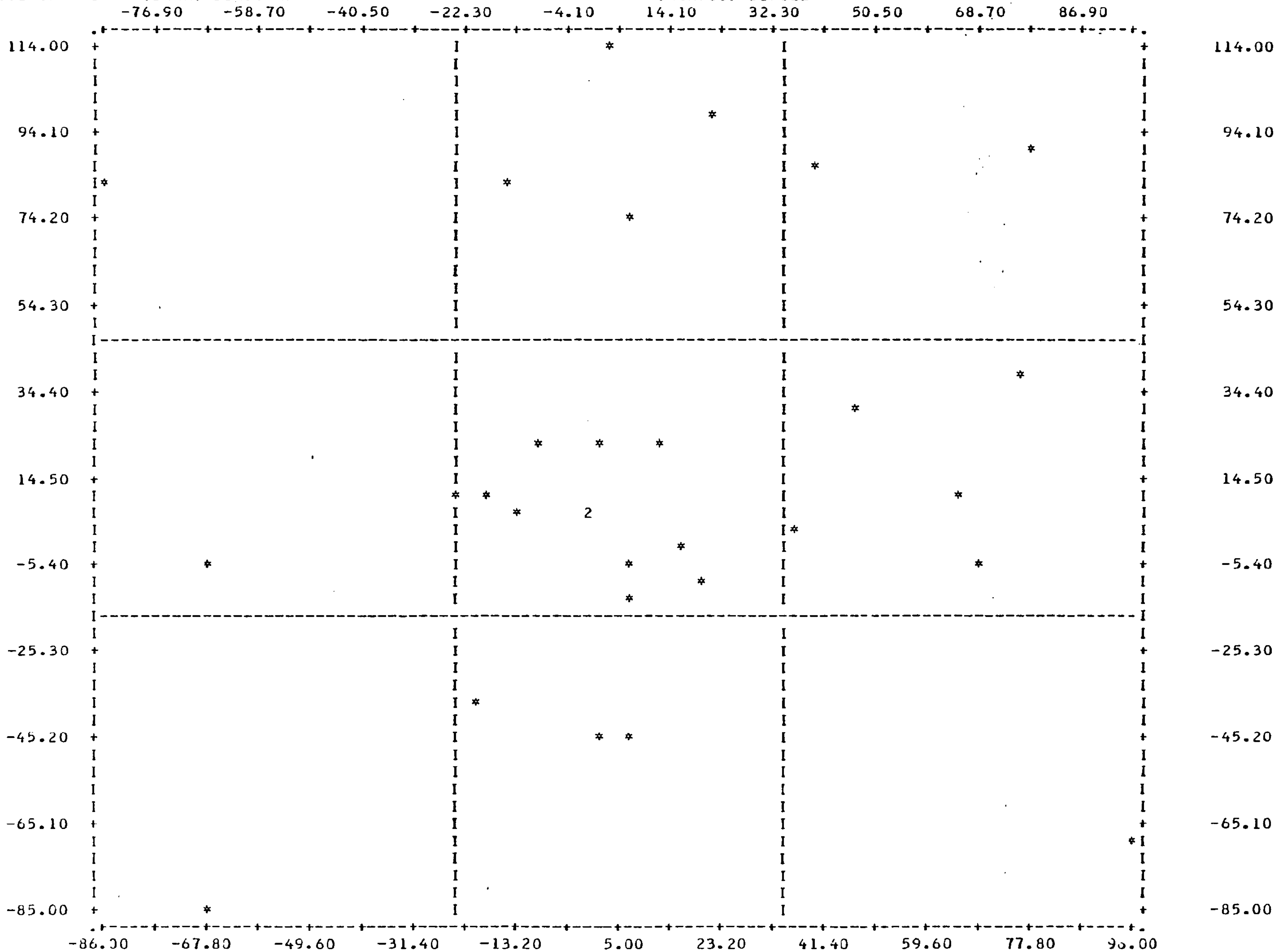


D1 LOADING MATRIX CALCULATIONS

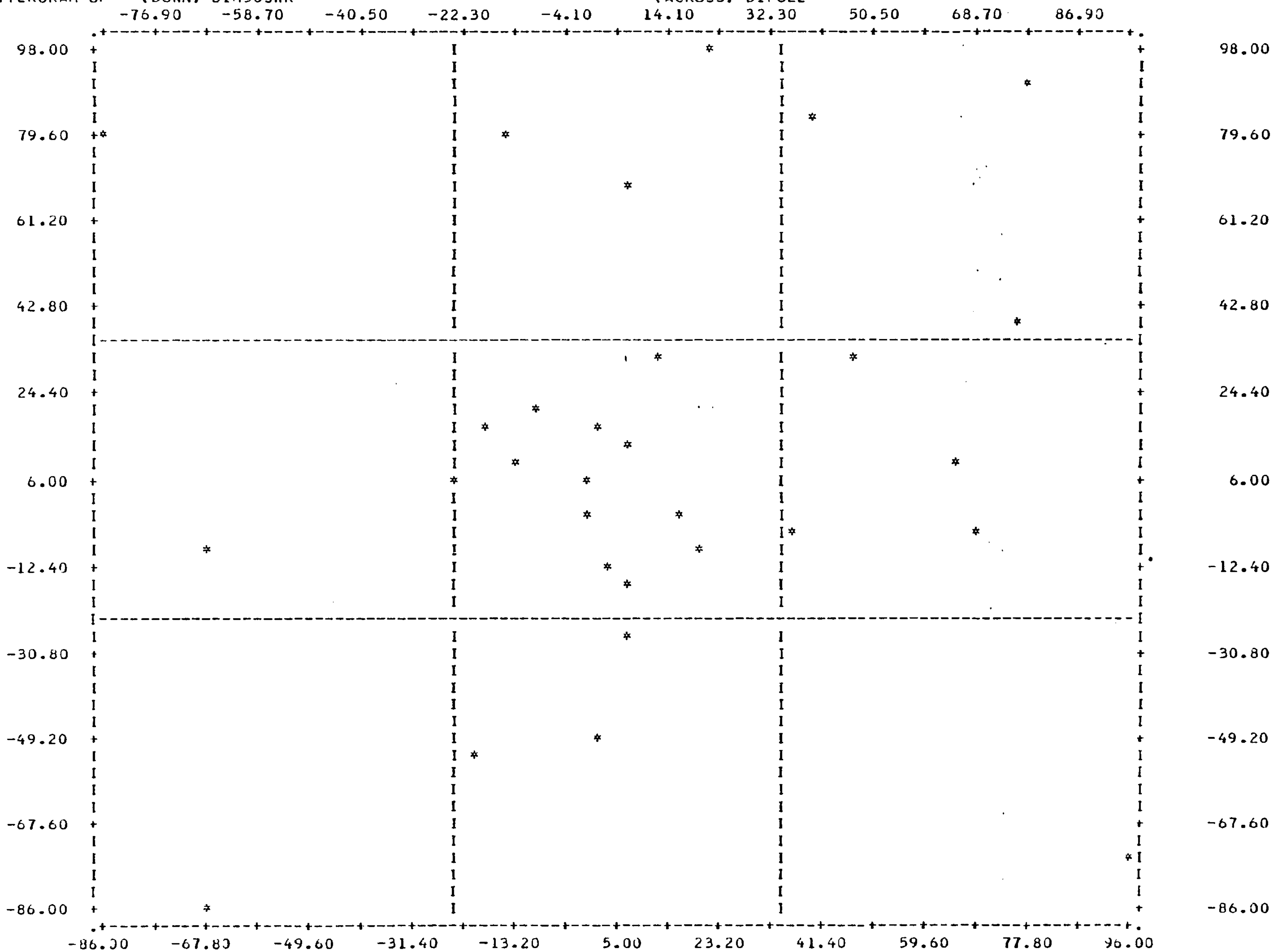
FILE D1 (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) D1M25ME (ACROSS) D1FULL



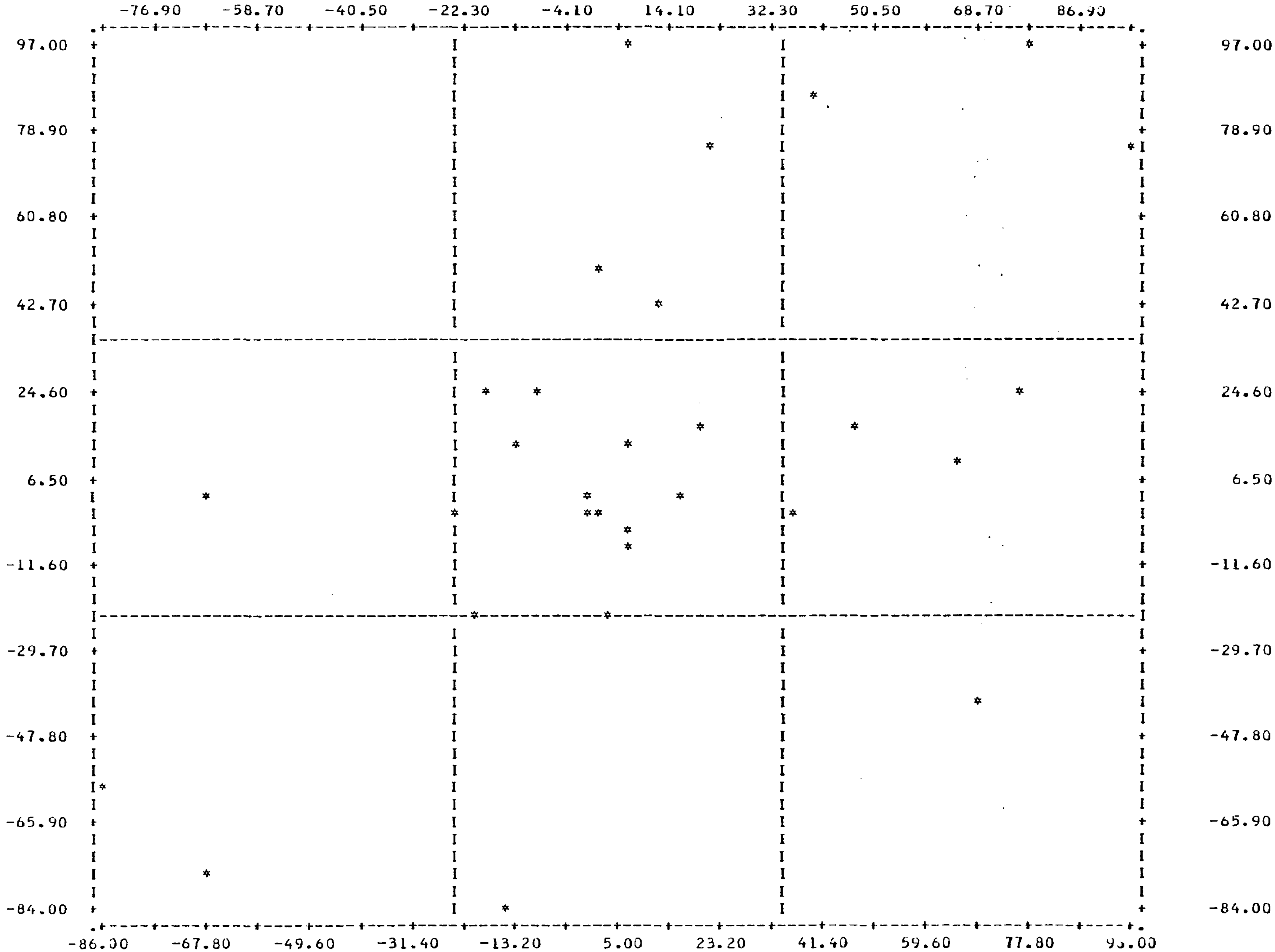
FILE D1 (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) D1M50FMR (ACROSS) D1FULL



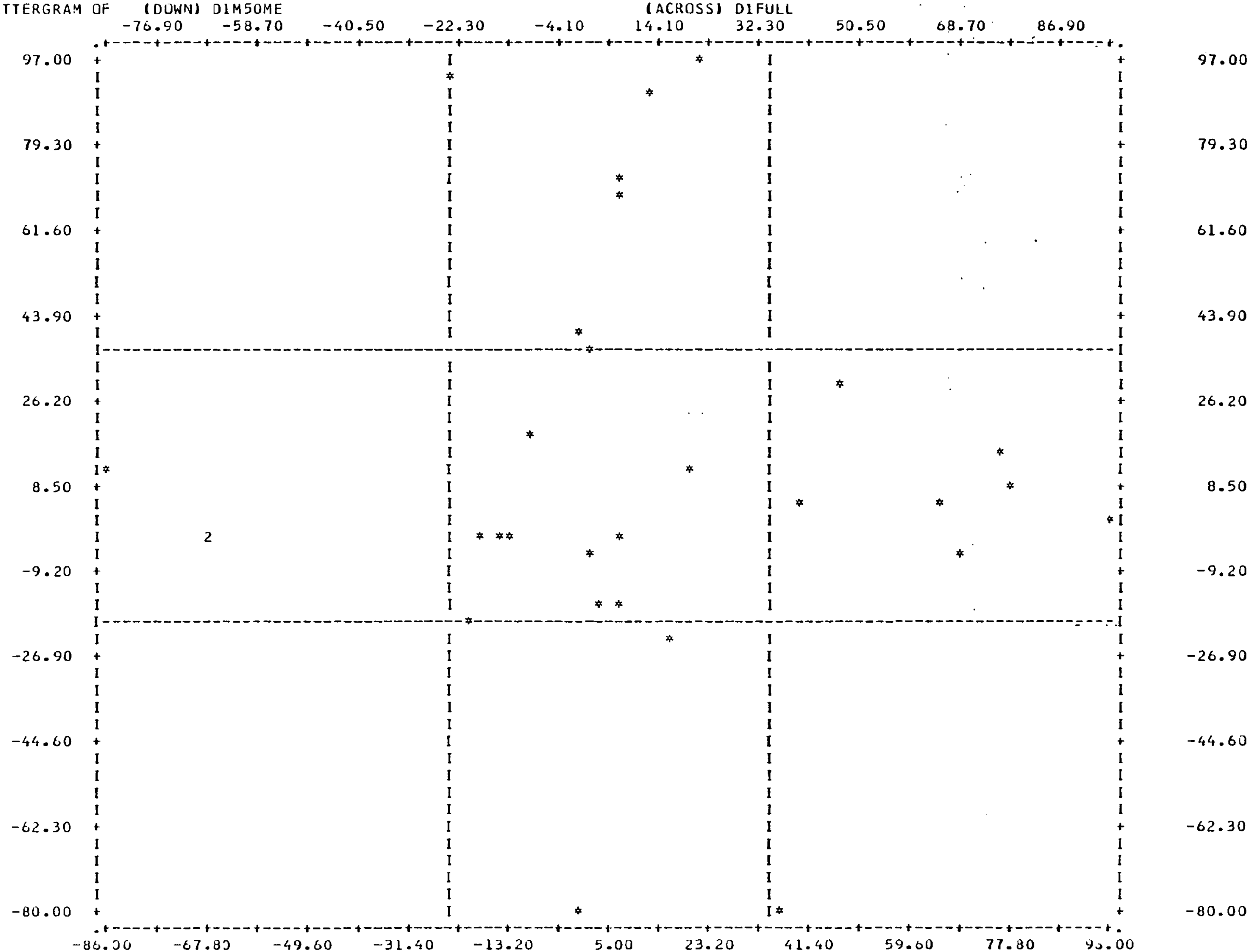
FILE DI (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) DIM50SWR (ACROSS) DIFULL



FILE DI (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) DIM50PC (ACROSS) DIFULL



FILE D1 (CREATION DATE = 01-12-78)
SCATTERGRAM OF (DOWN) DIM5OME (ACROSS) DIFULL



DI LOADING MATRIX CALCULATIONS

DIMIOSWR

STATISTICS..

CORRELATION (R)-	0.98725	R SQUARED -	0.97465	SIGNIFICANCE -	0.00001
STD ERR OF EST -	6.84802	INTERCEPT (A) -	0.65405	SLOPE (B) -	0.98338
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

DI LOADING MATRIX CALCULATIONS

DIMIOFMR

STATISTICS..

CORRELATION (R)-	0.99011	R SQUARED -	0.98032	SIGNIFICANCE -	0.00001
STD ERR OF EST -	6.06862	INTERCEPT (A) -	-0.02400	SLOPE (B) -	0.99180
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

DI LOADING MATRIX CALCULATIONS

DIMIOPC

STATISTICS..

CORRELATION (R)-	0.98331	R SQUARED -	0.96690	SIGNIFICANCE -	0.00001
STD ERR OF EST -	7.84823	INTERCEPT (A) -	0.53047	SLOPE (B) -	0.98232
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

DI LOADING MATRIX CALCULATIONS

DIMIOME

STATISTICS..

CORRELATION (R)-	0.97630	R SQUARED -	0.95317	SIGNIFICANCE -	0.00001
STD ERR OF EST -	9.25122	INTERCEPT (A) -	0.67707	SLOPE (B) -	0.96650
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

'*********' IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

D1 LOADING MATRIX CALCULATIONS

DIM25SWR

STATISTICS..

CORRELATION (R)-	0.52854	R SQUARED -	0.27936	SIGNIFICANCE -	0.00134
STD ERR OF EST -	38.81876	INTERCEPT (A) -	5.04675	SLOPE (B) -	0.35970
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

D1 LOADING MATRIX CALCULATIONS

DIM25FMR

STATISTICS..

CORRELATION (R)-	0.24118	R SQUARED -	0.05817	SIGNIFICANCE -	0.09958
STD ERR OF EST -	41.89355	INTERCEPT (A) -	15.73248	SLOPE (B) -	0.24110
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

D1 LOADING MATRIX CALCULATIONS

DIM25IOPC

STATISTICS..

CORRELATION (R)-	-0.34676	R SQUARED -	0.12024	SIGNIFICANCE -	0.03024
STD ERR OF EST -	42.45242	INTERCEPT (A) -	14.16797	SLOPE (B) -	-0.36345
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

D1 LOADING MATRIX CALCULATIONS

DIM25ME

STATISTICS..

CORRELATION (R)-	-0.22639	R SQUARED -	0.05125	SIGNIFICANCE -	0.11449
STD ERR OF EST -	42.17975	INTERCEPT (A) -	12.77042	SLOPE (B) -	-0.22702
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

'*********' IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

DI LOADING MATRIX CALCULATIONS

DIM50SWR

STATISTICS..

CORRELATION (R)-	0.09291	R SQUARED -	0.00863	SIGNIFICANCE -	0.31266
STD ERR OF EST -	47.21710	INTERCEPT (A) -	10.75448	SLOPE (B) -	0.10203
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

DI LOADING MATRIX CALCULATIONS

DIM50FMR

STATISTICS..

CORRELATION (R)-	0.06884	R SQUARED -	0.00474	SIGNIFICANCE -	0.35888
STD ERR OF EST -	50.63439	INTERCEPT (A) -	15.68355	SLOPE (B) -	0.08091
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

DI LOADING MATRIX CALCULATIONS

DIM50PC

STATISTICS..

CORRELATION (R)-	0.53118	R SQUARED -	0.28215	SIGNIFICANCE -	0.00126
STD ERR OF EST -	39.24936	INTERCEPT (A) -	6.71956	SLOPE (B) -	0.36983
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

DI LOADING MATRIX CALCULATIONS

DIM50ME

STATISTICS..

CORRELATION (R)-	-0.03311	R SQUARED -	0.00110	SIGNIFICANCE -	0.43105
STD ERR OF EST -	42.89527	INTERCEPT (A) -	11.97164	SLOPE (B) -	-0.03291
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

'*********' IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

Appendix J

Scattergrams and Related Statistics

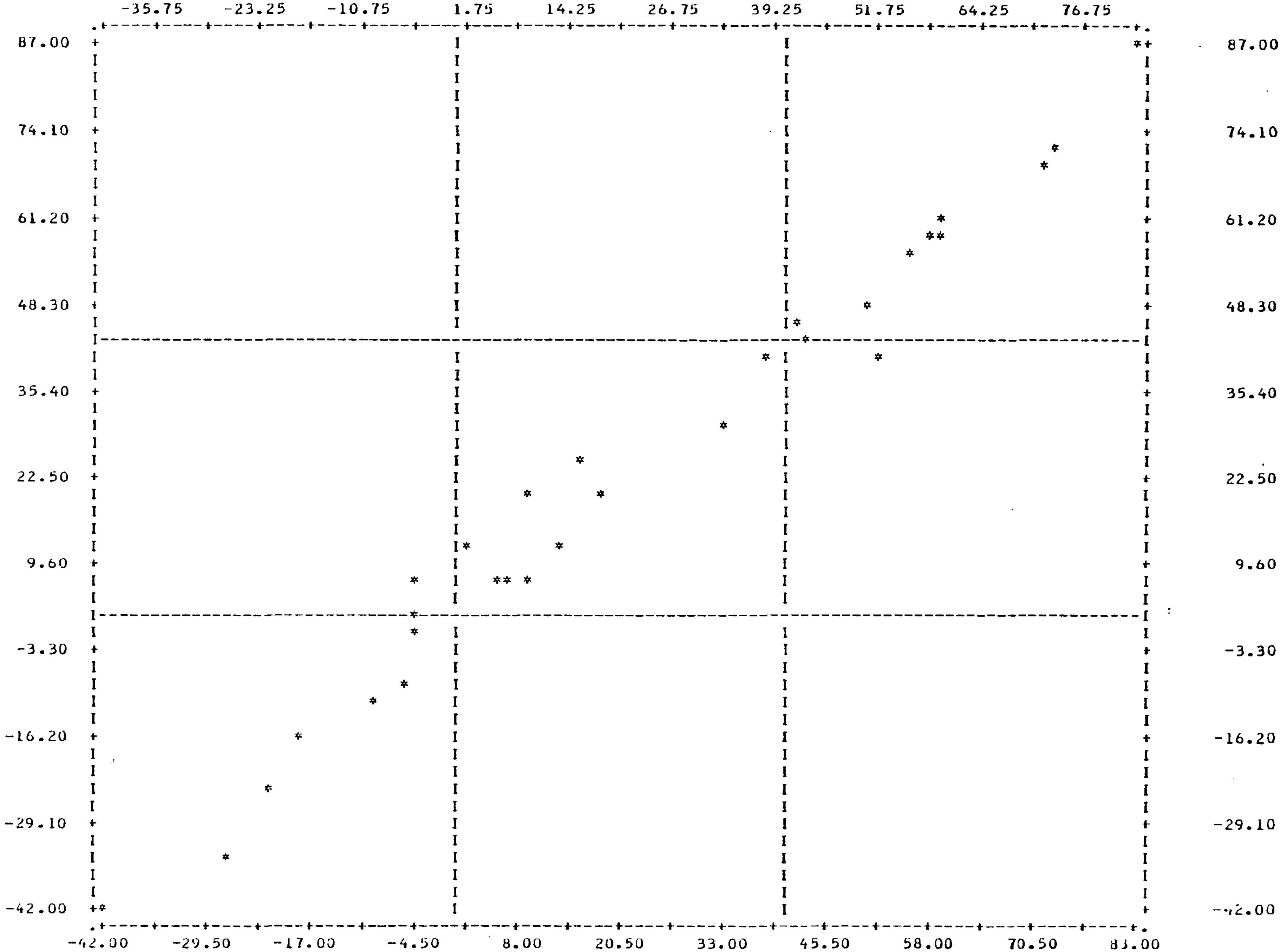
for

Data Group D2

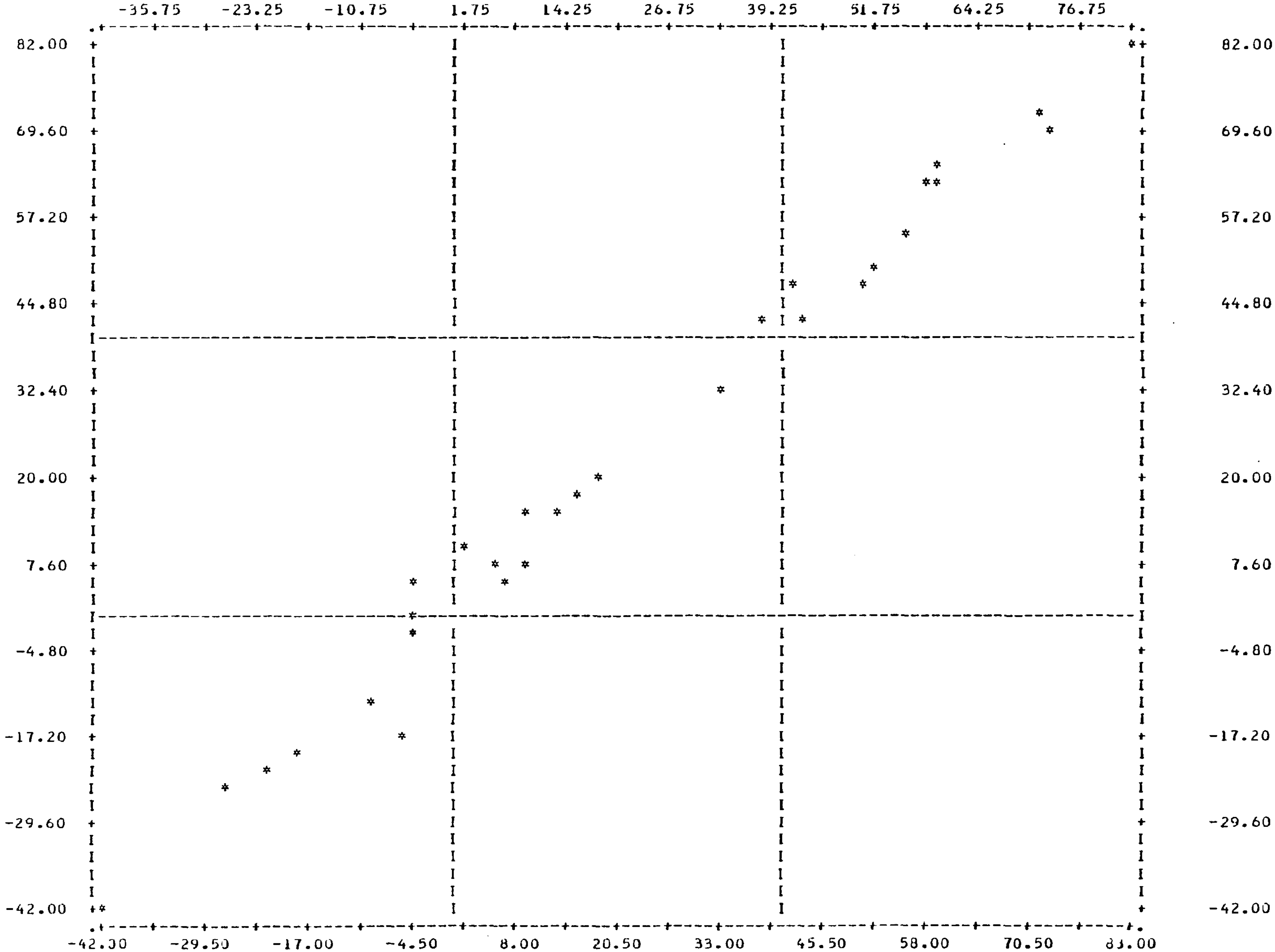
Scattergram plots illustrate the experimental factor matrix loadings on the vertical (y) axis and the criterion factor matrix loadings on the horizontal (x) axis. Each asterisk (*) indicates a variable's loadings in each of the two factor matrices being correlated. If more than one point is found at any given position in the scattergram, the number of points at that position is printed. The stronger the relationship between loadings, the more closely the points in the scattergram depict a straight line. Note the table headings describing each scattergram at the top of each page. In addition, information regarding the linear regression equation for the best fitting imaginary line through the scattergram points is provided. For additional statistical information, see Runyan and Haber (1976).

LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M10FMR (ACROSS) D2FULL

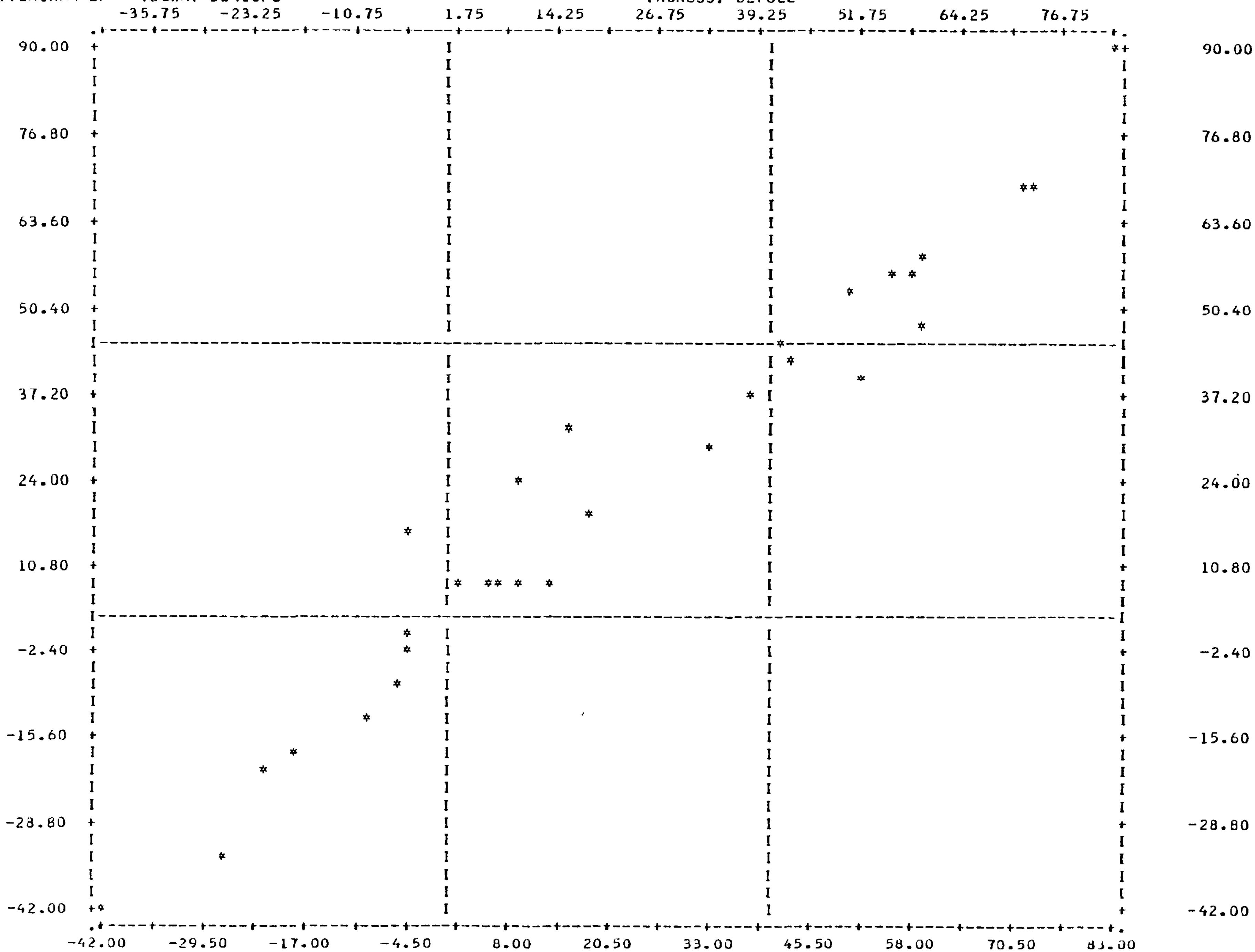


FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M10SWR (ACROSS) D2FULL

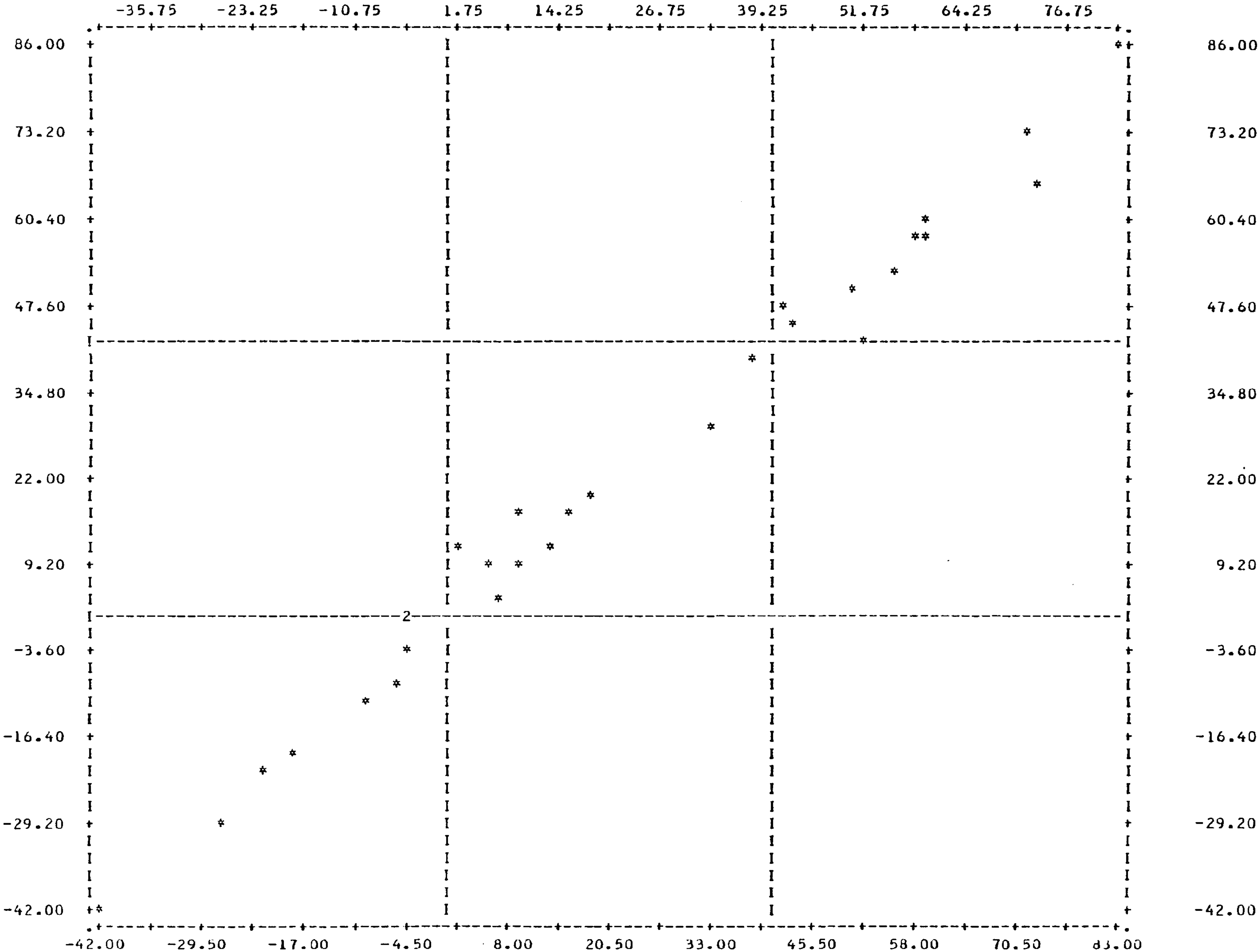


LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M10PC (ACROSS) D2FULL



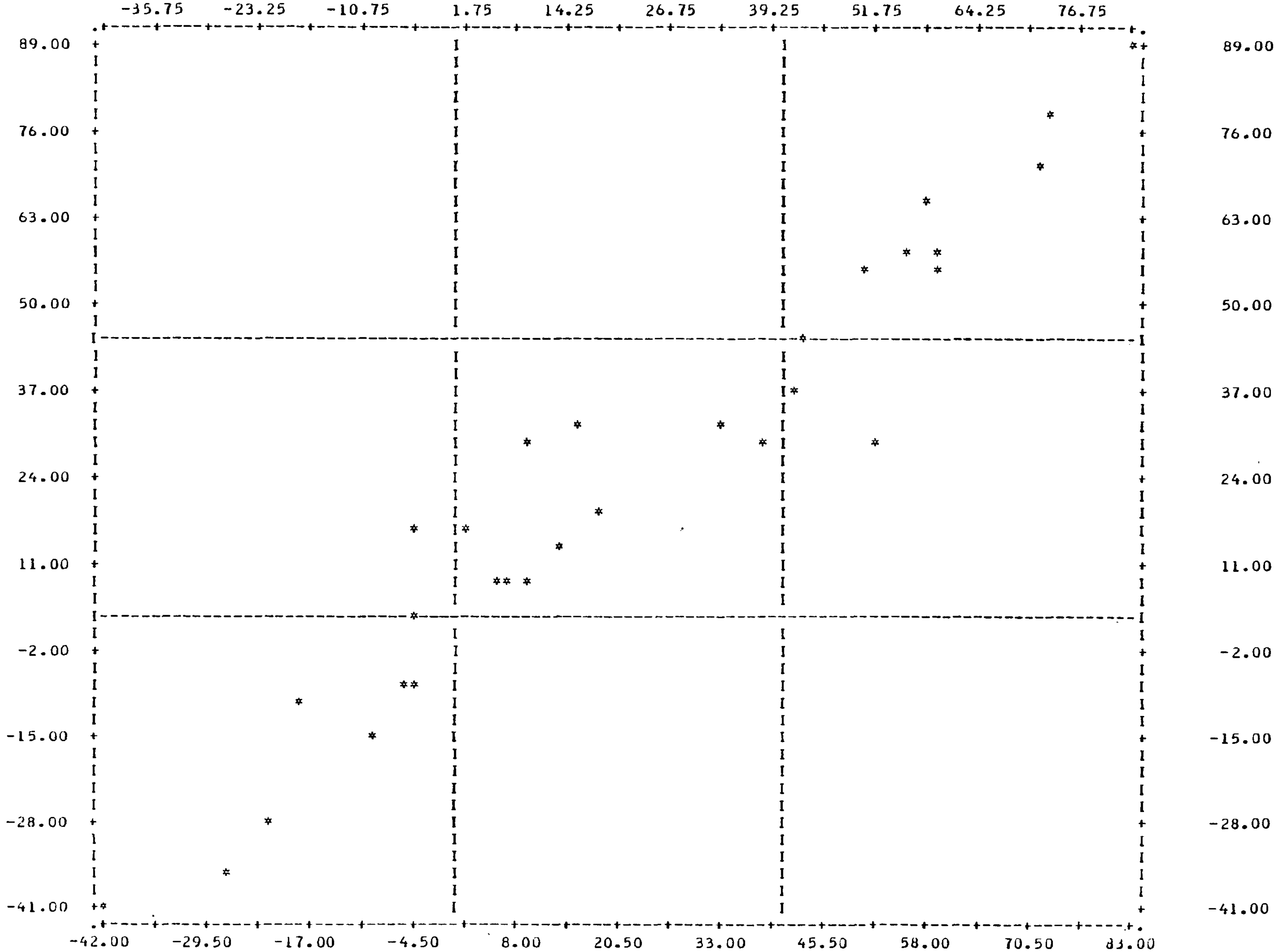
FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M10ME (ACROSS) D2FULL



LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS

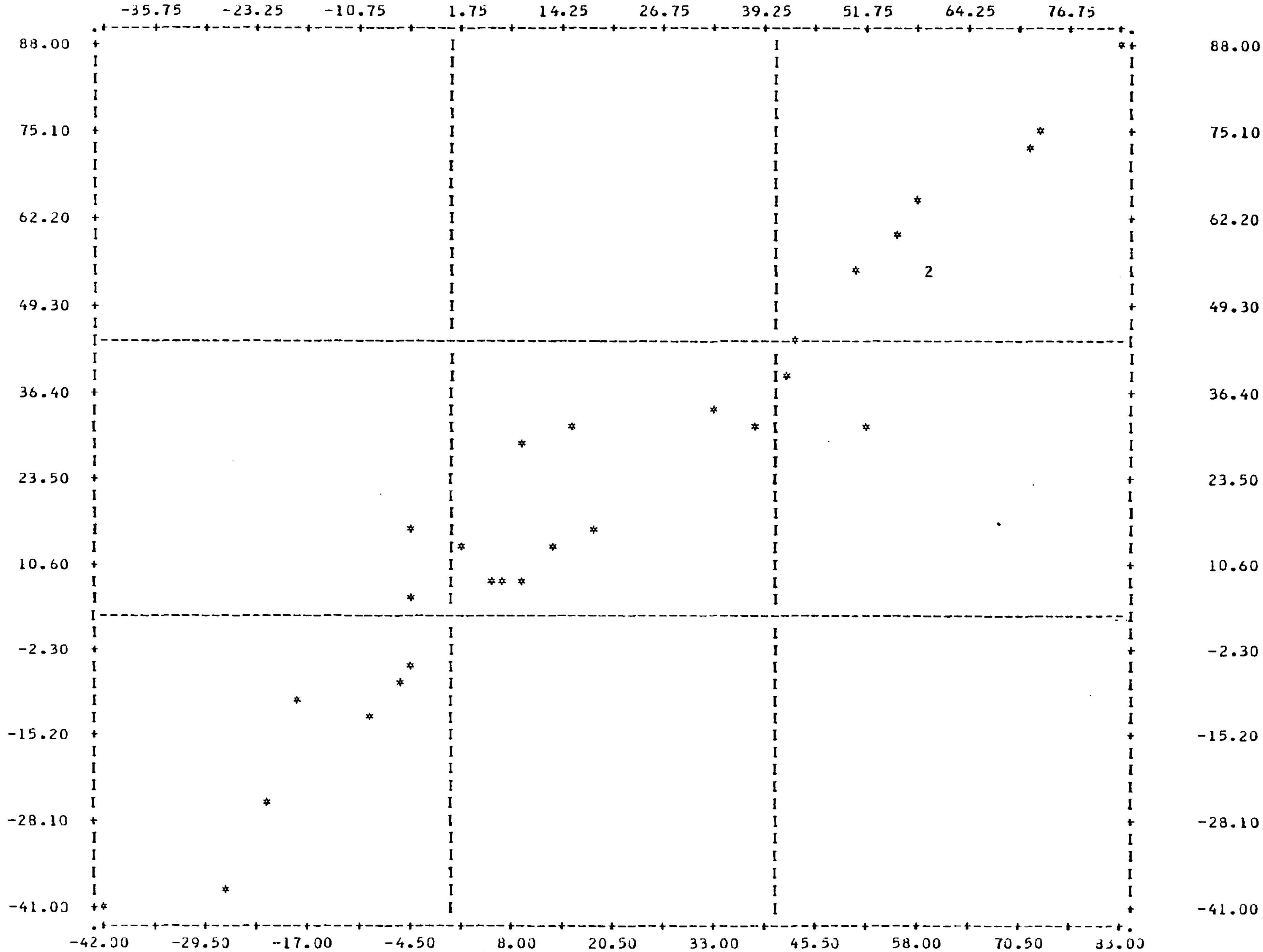
SCATTERGRAM OF (DOWN) D2M25FMR (ACROSS) D2FULL



LOADINGS MATRIX D2

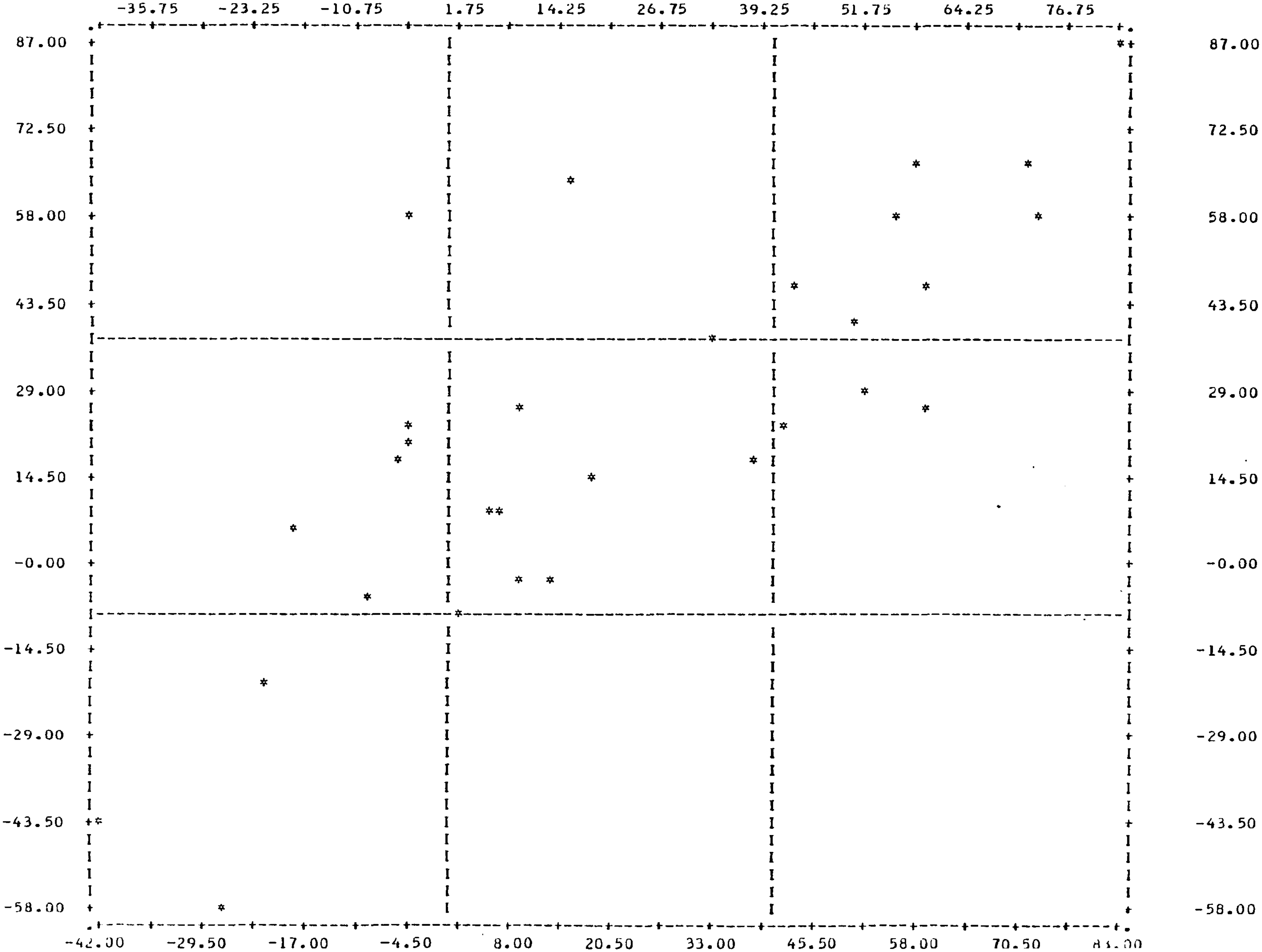
FILE D2 (CREATION DATE = 01-12-78) LOADINGS

SCATTERGRAM OF (DOWN) D2M25SWR (ACROSS) D2FULL



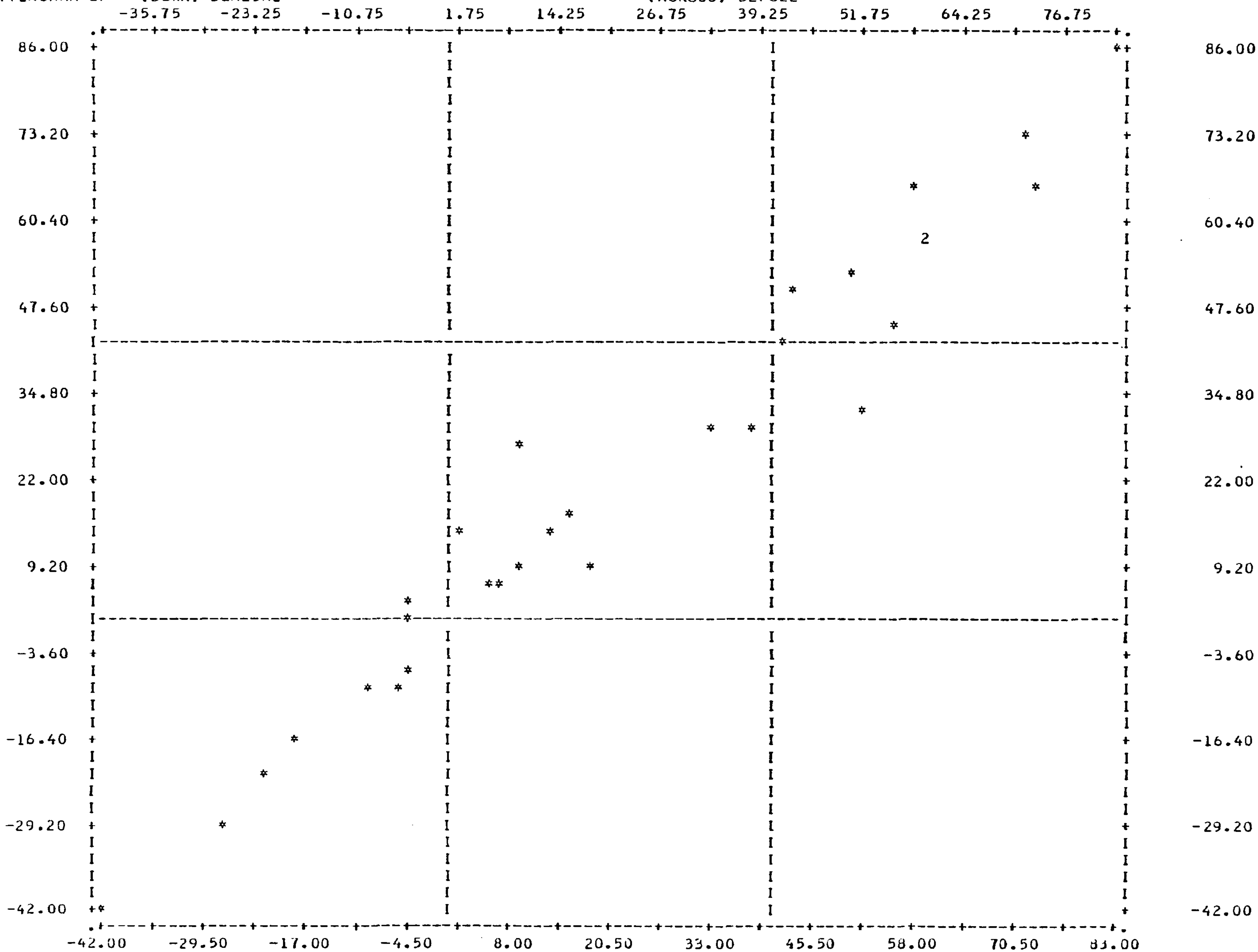
LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M25PC (ACROSS) D2FULL



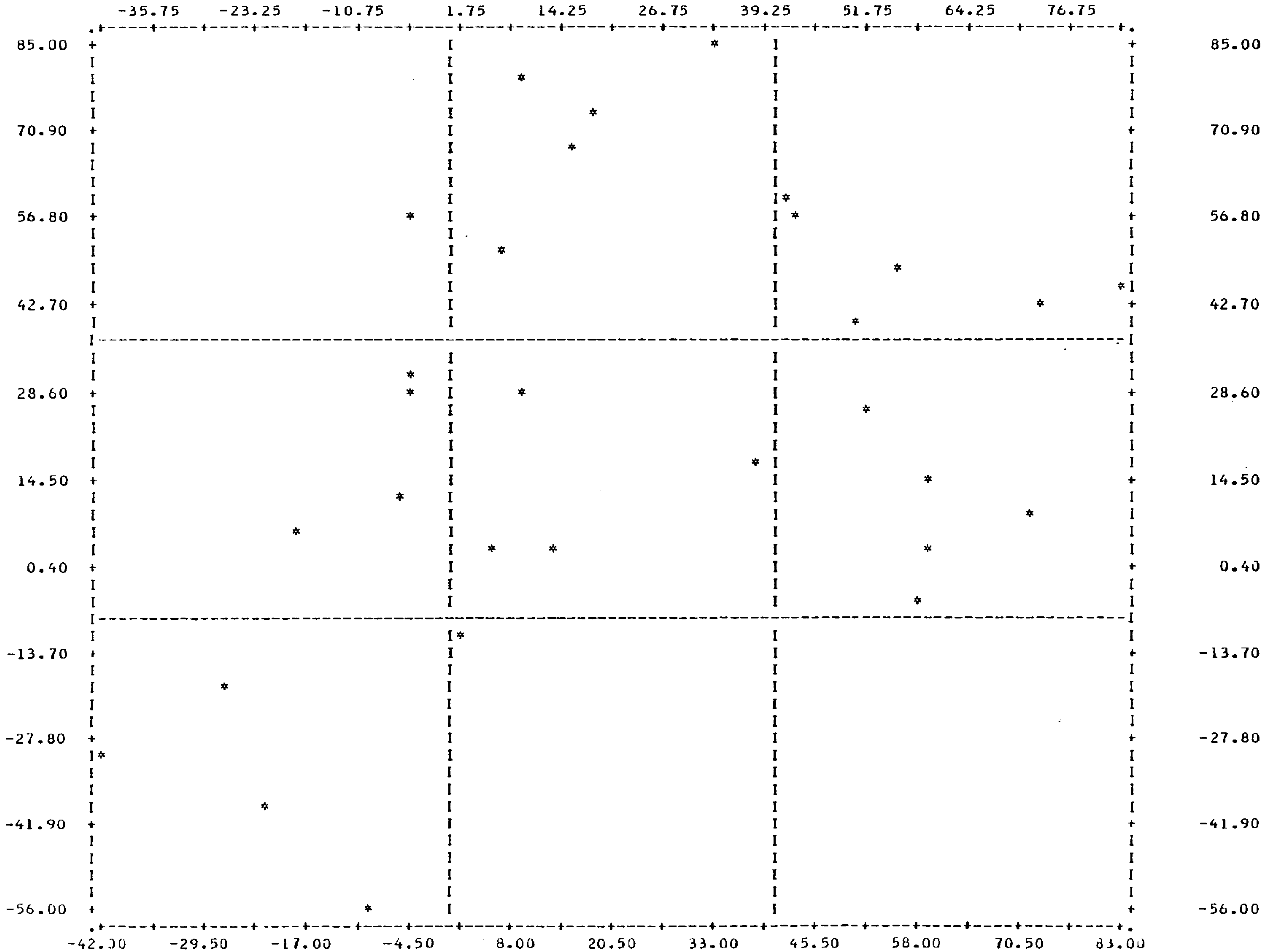
LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M25ME (ACROSS) D2FULL



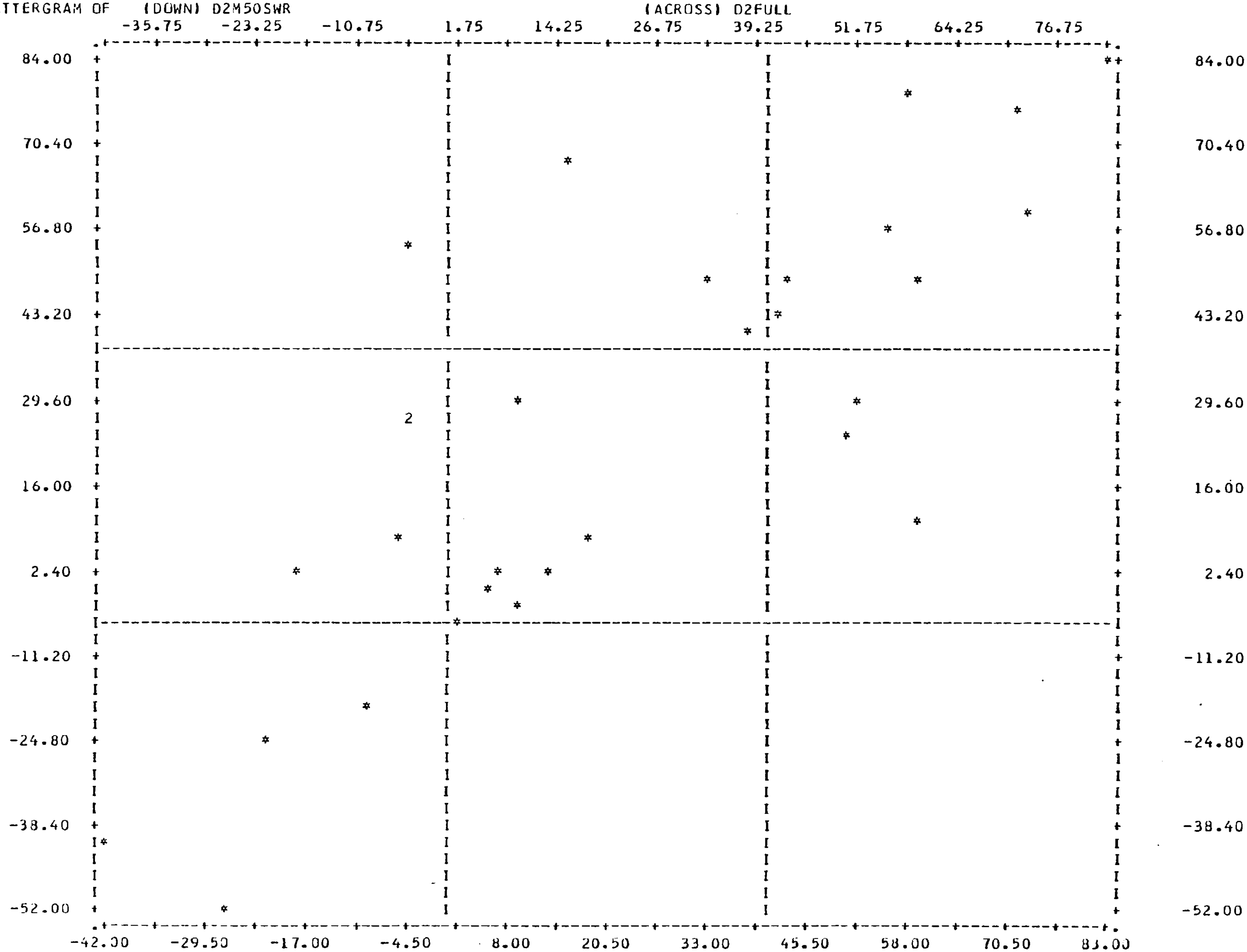
LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M50FMR (ACROSS) D2FULL



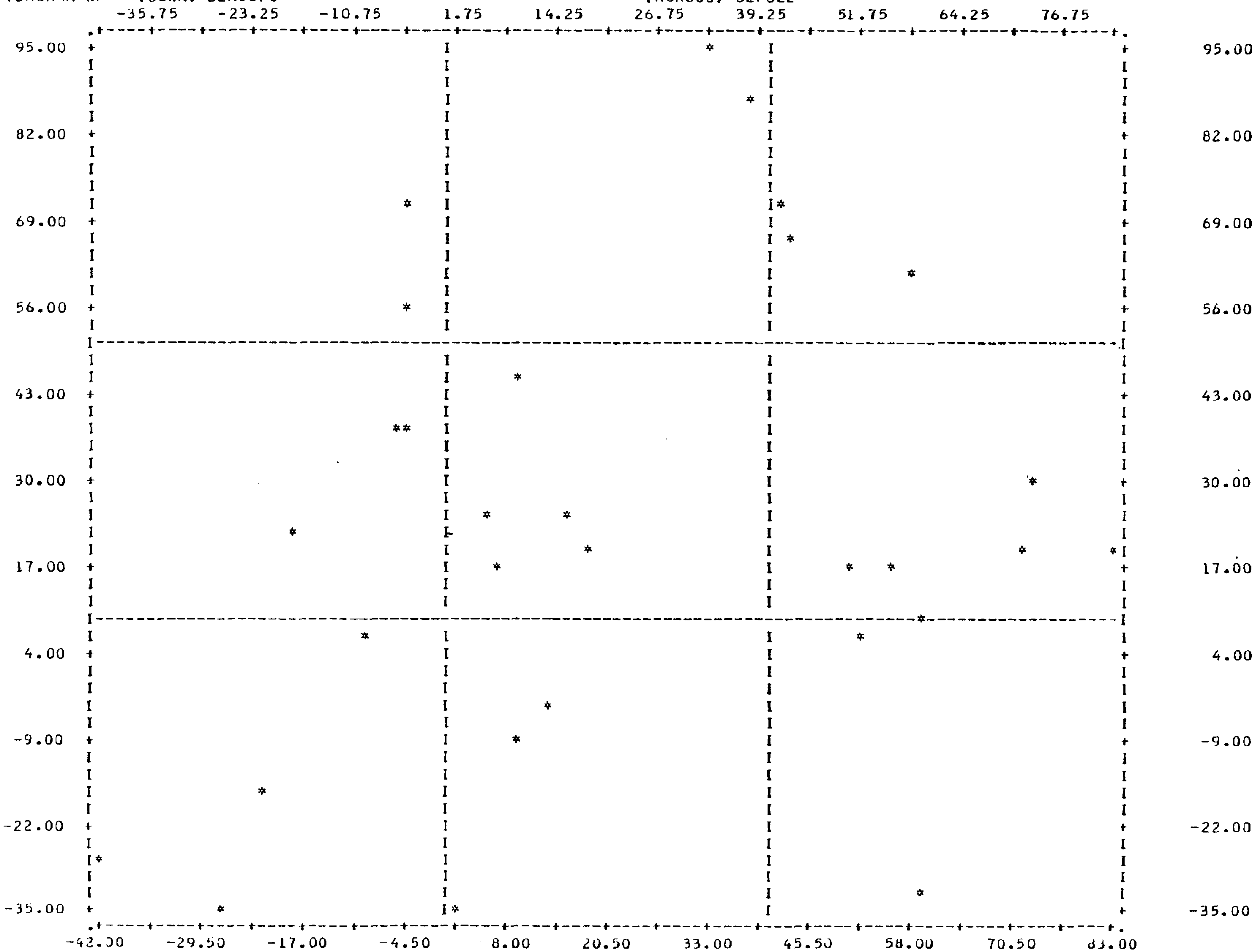
LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M50SWR (ACROSS) D2FULL



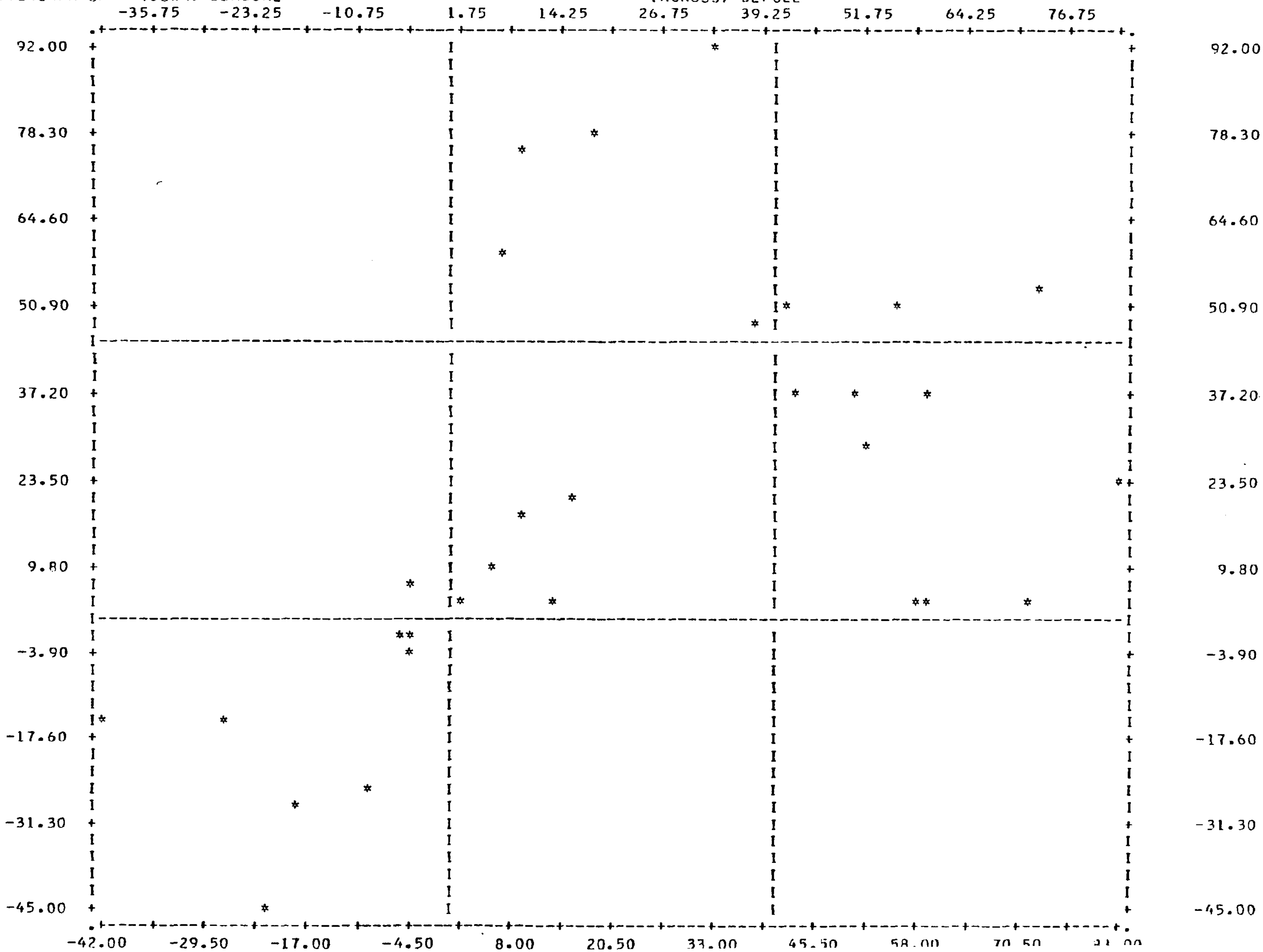
LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M50PC (ACROSS) D2FULL



LOADINGS MATRIX D2

FILE D2 (CREATION DATE = 01-12-78) LOADINGS
SCATTERGRAM OF (DOWN) D2M50ME (ACROSS) D2FULL



LOADINGS MATRIX D2

D2M10SWR

STATISTICS..

CORRELATION (R)-	0.99308	R SQUARED -	0.98621	SIGNIFICANCE -	0.00001
STD ERR OF EST -	3.98885	INTERCEPT (A) -	1.08617	SLOPE (B) -	0.99608
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M10FMR

STATISTICS..

CORRELATION (R)-	0.98995	R SQUARED -	0.98000	SIGNIFICANCE -	0.00001
STD ERR OF EST -	4.75221	INTERCEPT (A) -	1.49453	SLOPE (B) -	0.98204
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M10PC

STATISTICS..

CORRELATION (R)-	0.97762	R SQUARED -	0.95575	SIGNIFICANCE -	0.00001
STD ERR OF EST -	6.97005	INTERCEPT (A) -	2.09203	SLOPE (B) -	0.95636
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M10ME

STATISTICS..

CORRELATION (R)-	0.99258	R SQUARED -	0.98522	SIGNIFICANCE -	0.00001
STD ERR OF EST -	4.05122	INTERCEPT (A) -	0.95073	SLOPE (B) -	0.97645
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

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LOADINGS MATRIX D2

D2M25SWR

STATISTICS..

CORRELATION (R)-	0.96962	R SQUARED -	0.94016	SIGNIFICANCE -	0.00001
STD ERR OF EST -	8.29211	INTERCEPT (A) -	2.41651	SLOPE (B) -	0.97042
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M25FMR

STATISTICS..

CORRELATION (R)-	0.96655	R SQUARED -	0.93422	SIGNIFICANCE -	0.00001
STD ERR OF EST -	8.79724	INTERCEPT (A) -	2.23186	SLOPE (B) -	0.97882
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M25PC

STATISTICS..

CORRELATION (R)-	0.79193	R SQUARED -	0.62715	SIGNIFICANCE -	0.00001
STD ERR OF EST -	20.59939	INTERCEPT (A) -	6.33960	SLOPE (B) -	0.76879
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M25ME

STATISTICS..

CORRELATION (R)-	0.97792	R SQUARED -	0.95632	SIGNIFICANCE -	0.00001
STD ERR OF EST -	6.90164	INTERCEPT (A) -	1.25625	SLOPE (B) -	0.95343
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

'*********' IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

LOADINGS MATRIX D2

D2M50SWR

STATISTICS..

CORRELATION (R)-	0.79113	R SQUARED -	0.62589	SIGNIFICANCE -	0.00001
STD ERR OF EST -	21.81926	INTERCEPT (A) -	6.16317	SLOPE (B) -	0.83324
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M50FMR

STATISTICS..

CORRELATION (R)-	0.38317	R SQUARED -	0.14682	SIGNIFICANCE -	0.01831
STD ERR OF EST -	33.28656	INTERCEPT (A) -	15.37779	SLOPE (B) -	0.40769
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M50PC

STATISTICS..

CORRELATION (R)-	0.25422	R SQUARED -	0.06463	SIGNIFICANCE -	0.08761
STD ERR OF EST -	34.43248	INTERCEPT (A) -	17.43011	SLOPE (B) -	0.26722
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

LOADINGS MATRIX D2

D2M50ME

STATISTICS..

CORRELATION (R)-	0.50828	R SQUARED -	0.25835	SIGNIFICANCE -	0.00207
STD ERR OF EST -	29.10974	INTERCEPT (A) -	9.35731	SLOPE (B) -	0.50725
PLOTTED VALUES -	30	EXCLUDED VALUES-	0	MISSING VALUES -	0

'*********' IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

Appendix K

Raw Data for Data Group D1

```
 LIST 01FULL
>     1     100 900 900 500 100 500 500 100 500 500
>     2     100 800 900 100 200 300 800 700 300 400
>     3     100 900 900 100 200 400 900 700 300 400
>     4     200 700 600 100 300 400 700 600 600 300
>     5     300 500 300 100 100 200 900 900 500 400
>     6     400 500 600 200 100 200 800 800 200 200
>     7     300 700 800 100 200 300 600 700 200 200
>     8     300 400 800 400 300 100 400 800 300 200
>     9     200 700 800 200 200 500 700 700 500 500
>    10     100 800 800 100 200 200 800 800 200 300
>    11     300 900 900 200 100 100 900 900 100 100
>    12     100 900 900 100 100 100 800 800 200 200
>    13     100 900 900 100 100 300 900 900 100 300
>    14     200 800 900 300 200 400 700 800 600 400
>    15     100 800 800 300 100 600 500 700 400 700
>    16     100 900 900 100 100 600 900 900 100 900
>    17     200 500 800 200 100 300 900 900 200 700
>    18     300 700 900 100 200 200 900 700 300 200
>    19     400 700 800 100 300 300 800 700 600 300
>    20     100 900 900 100 100 900 900 900 900 900
>    21     500 500 500 100 100 500 700 800 300 500
>    22     100 900 900 100 300 600 900 900 200 600
>    23     300 600 700 100 300 400 900 700 400 200
>    24     100 900 900 100 100 700 900 900 100 900
>    25     100 900 900 100 100 100 900 900 100 100
>    26     100 900 900 100 100 800 900 900 100 900
>    27     100 900 900 100 100 500 900 900 200 700
>    28     100 800 900 100 100 100 900 900 200 500
>    29     300 700 900 100 200 500 900 800 200 500
>    30     300 700 800 300 200 200 700 800 300 200
>    31     400 600 700 400 300 100 600 700 300 100
>    32     300 900 900 500 400 700 500 500 500 900
>    33     300 600 800 300 300 400 600 700 300 400
>    34     100 800 900 200 200 400 700 700 400 400
>    35     100 700 900 200 200 300 700 700 400 400
>    36     200 800 900 400 100 400 500 900 800 300
>    37     100 800 800 200 100 100 800 800 100 500
>    38     100 900 900 100 100 100 900 900 100 800
>    39     100 900 900 100 100 900 900 900 800 900
>    40     100 800 800 100 100 100 800 900 100 500
>    41     200 600 900 100 200 300 900 800 300 300
>    42     900 500 900 900 100 500 100 900 100 100
>    43     400 300 700 500 300 600 300 600 300 600
>    44     500 600 900 300 500 500 800 600 500 500
>    45     300 700 700 200 200 700 700 700 700 700
>    46     300 800 900 100 100 200 900 900 900 300
>    47     100 800 800 500 100 500 700 900 100 900
>    48     100 900 900 200 100 200 900 900 200 500
>    49     200 900 900 100 100 100 900 900 200 100
>    50     700 200 900 100 100 100 700 900 100 100
>    51     100 900 900 500 100 500 400 900 200 200
>    52     800 200 800 200 100 400 900 900 100 100
>    53     100 900 900 100 100 700 900 700 100 700
>    54     100 900 900 100 200 800 900 700 300 700
>    55     100 900 900 100 200 800 900 700 700 700
>    56     100 900 900 100 200 500 900 700 300 400
>    57     100 900 900 400 100 900 600 900 200 900
>    58     100 900 900 500 100 900 500 900 500 900
>    59     200 900 900 100 100 800 600 700 500 900
>    60     100 900 900 100 100 900 900 900 100 900
```

Appendix L

Raw Data for Data Group D2

LIST D2FULL

>	1	6000	200	2100	5100	1700	1700	1900	1200	3400	1200
>	2	5000	100	2200	5000	1600	1200	1200	1600	3400	1000
>	3	5400	0	1800	5000	1200	1200	1200	1000	3800	1000
>	4	3600	300	1900	4300	1200	800	1200	1000	3300	800
>	5	7100	0	3200	4000	1200	2000	1600	1200	3700	900
>	6	5000	200	2800	5000	1400	1200	1200	1400	5700	1200
>	7	2000	700	2100	1500	1100	800	800	1200	3900	900
>	8	1700	700	1600	3400	900	900	500	1300	3000	900
>	9	4800	100	2300	3600	1200	1000	800	1200	2900	900
>	10	4100	1600	2900	3200	900	200	700	700	3200	1100
>	11	4800	200	2100	2000	1200	1200	800	1600	2500	1000
>	12	1700	200	2500	3600	1100	400	1200	1400	4900	1000
>	13	3200	600	2100	3700	1100	800	1000	1200	4100	1000
>	14	3300	300	2100	3700	1100	1000	1100	1200	3500	900
>	15	4100	500	2200	6100	1600	1000	1000	1600	4000	1200
>	16	3300	700	2300	4300	1200	800	800	1600	6400	1200
>	17	3700	500	2300	4500	1200	800	1200	1900	2900	800
>	18	4200	0	2200	3300	1400	1000	900	1900	5000	1100
>	19	2600	1300	1700	3600	1000	800	800	600	6500	400
>	20	4100	700	2300	5100	1400	1000	800	1200	4600	1200
>	21	4700	200	2500	4000	1200	1200	800	1200	2900	800
>	22	5000	100	1700	3900	1200	400	1000	1000	6800	900
>	23	6200	500	2000	3600	1400	1600	1600	1200	4200	1100
>	24	2600	300	2700	2500	800	100	100	1200	6200	900
>	25	6300	300	2000	5000	1800	1700	1300	1800	6700	1200
>	26	4600	100	2300	6000	1600	1200	1800	1600	3300	1000
>	27	4100	200	2400	3300	900	800	800	800	3900	1000
>	28	4500	300	2000	2000	1200	800	1000	1200	4100	900
>	29	4100	900	1900	4000	800	600	800	800	8000	200
>	30	1700	100	2100	3100	1200	800	1100	1000	2800	900
>	31	4100	1000	2000	2500	1000	300	300	1000	4700	900
>	32	5000	200	2400	6300	1800	1200	1200	2000	3200	1200
>	33	3600	300	2000	4600	1500	1000	1200	1500	3200	1100
>	34	5000	0	2000	3600	1200	1200	1100	1400	2400	800
>	35	4100	600	2200	4600	1200	700	700	800	5700	600
>	36	4100	200	1900	4600	1200	600	1200	1200	4600	1100
>	37	5000	900	3800	5000	800	400	1000	1200	6000	500
>	38	4300	300	2300	4000	1200	900	800	1200	5200	900
>	39	4100	100	1800	4800	1200	500	800	800	3900	900
>	40	3700	300	2300	3100	1200	900	800	1200	2700	900
>	41	2900	500	2300	6900	1600	1200	1000	1300	3400	1000
>	42	4100	400	2500	2500	1200	700	700	700	5600	600
>	43	5000	200	2000	4300	1600	700	1100	1400	4000	1200
>	44	2500	300	1800	2500	1200	600	300	1200	2300	700
>	45	2600	500	1700	1800	1000	100	400	700	5200	500
>	46	2600	1300	2400	2600	700	400	500	1200	4000	900
>	47	4100	700	1800	2000	800	800	800	1400	4200	300
>	48	3200	600	2000	3800	1400	1200	1600	1200	2300	700
>	49	2600	600	2900	3600	1600	500	1200	1200	5700	900
>	50	2600	400	1800	4600	1500	800	1200	1700	5100	1000
>	51	3700	500	2300	4200	1200	800	800	1100	5800	1100
>	52	3400	100	2100	2900	1400	1300	1200	1600	3900	1000
>	53	3300	100	2400	6300	2000	1200	1200	1900	2800	900
>	54	3600	400	2300	2000	1100	1100	800	1400	2900	1000
>	55	6200	300	2100	5000	1200	1200	1200	1200	4100	1200
>	56	4400	200	2700	4300	1800	1200	1200	1300	3000	900
>	57	4100	700	2400	2900	1300	500	500	1000	4300	1000
>	58	2700	500	1700	3600	1100	800	1200	1400	2500	1000
>	59	3200	300	2000	3600	1200	500	800	1200	4000	1200
>	60	4100	400	3000	5000	1200	800	1400	1200	3700	1000

>	61	4100	300	1800	4500	1200	800	700	1200	2900	900
>	62	5000	1300	1800	3600	1200	1100	800	1300	2300	800
>	63	3200	400	2100	2000	1100	800	400	900	6100	300
>	64	4800	100	1900	3600	1200	1200	1200	1200	3300.	900
>	65	6000	0	2100	7800	2000	1600	1600	1800	3800	1100
>	66	8200	100	2200	7800	2000	2000	1600	1600	3000	900
>	67	3500	0	2600	4700	1600	1100	1600	1600	2900	1000
>	68	5000	500	2100	6100	1200	1200	1200	1200	3000	800
>	69	3500	400	2200	4300	1500	1200	1200	1300	2900	600
>	70	4100	900	1800	1800	1100	1000	1000	1100	4300	500
>	71	8200	700	2100	6100	2000	2000	1000	1200	4300	1200
>	72	7100	100	2100	5100	1200	1200	1200	800	3100	400
>	73	5000	200	1600	2000	900	900	800	1200	5200	500
>	74	3200	300	2000	4300	1400	300	1100	1300	2700	900
>	75	3200	100	2300	4700	1300	500	800	1500	3400	1100
>	76	4100	300	2000	3500	1200	1200	1200	1000	4100	900
>	77	4000	600	2300	6700	1500	800	800	1200	5800	900
>	78	4100	900	2000	1200	800	800	800	800	4400	400
>	79	4100	300	2300	4100	1200	400	700	1200	6000	900
>	80	4800	300	2100	4000	800	700	700	1200	3400	700
>	81	4100	300	1900	3600	1200	300	1100	700	2100	400
>	82	8200	700	2900	4500	1400	1700	1200	1300	6600	1100
>	83	4100	200	2100	6000	1600	800	1400	1400	2500	1000
>	84	4100	600	2500	2700	1200	800	1000	1300	3200	1000
>	85	1600	400	2100	6000	1600	800	800	1200	2400	600
>	86	5000	300	1900	3200	1200	1200	700	1100	3200	800
>	87	4100	800	2000	4000	800	600	800	1200	5700	1100
>	88	4500	400	2500	3400	1200	800	1400	1200	3700	1100
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>	90	4800	300	2200	4000	1200	800	1200	400	7000	400
>	91	4400	1800	1600	2000	1100	200	800	1200	4400	1100
>	92	4100	100	2200	4600	1200	800	1200	1000	5700	700
>	93	4100	500	2100	4800	1000	600	800	1100	6800	600
>	94	3300	200	1900	3600	1200	1000	1100	1100	3100	900
>	95	4000	100	1700	3400	1300	1200	1200	1200	4000	900
>	96	5700	300	1900	4700	1200	1400	1200	1200	4800	1000
>	97	3000	300	2000	4700	1400	1300	1200	1300	2400	900
>	98	3900	200	2000	4600	1500	1000	1200	1800	2500	1000
>	99	5000	300	2400	2700	1100	800	800	1100	6200	300
>	100	3200	400	2000	4800	1200	600	800	1200	5300	1100
>	101	3200	600	1600	3900	1100	400	400	800	4900	900
>	102	4100	1000	2700	3300	1200	400	500	1200	4900	900
>	103	2700	1100	2200	3900	1400	1000	1200	1200	5800	700
>	104	4100	1000	2400	4600	1200	600	300	800	6700	400
>	105	3700	200	2100	4700	1200	1200	1000	1200	3700	900
>	106	1700	500	2400	4700	1200	1200	1200	1200	2600	900
>	107	5700	100	2300	4600	1700	800	1400	2000	5900	1200
>	108	1700	200	2400	3600	1100	900	900	700	5100	900
>	109	4500	200	2200	6100	1800	1200	1600	1600	2400	900
>	110	4100	500	1800	5000	1100	800	800	1000	3200	700
>	111	2200	900	1900	3100	1200	300	300	900	4500	700
>	112	4100	900	1900	2800	900	600	600	1200	3000	500
>	113	2600	900	2000	2600	900	600	800	800	5300	1200
>	114	3100	200	1900	5000	1500	600	1200	1400	4600	1100
>	115	4100	1100	2000	3700	1300	800	800	800	6400	800
>	116	4500	100	2400	4600	1200	800	800	1200	4700	900
>	117	4100	600	2500	2300	1000	300	1200	800	7600	400
>	118	6000	700	2300	4600	1200	600	600	1800	6500	1000
>	119	4500	400	2400	4700	1400	1200	1200	1200	6700	1100
>	120	2900	100	2500	5000	1600	1300	1200	1600	4900	1200

```
>     121        2700   400 2200 2800 1200 1000 1200  800 4000  900
>     122        1900   100 2300 5100 1700  800 1100 1600 6600 1000
>     123        2800   500 2100 3000  500  500 1200 1200 7900  600
>     124        6000   100 2500 3400 1500  400  700 1200 3300  900
>     125        3200   200 1900 1900 1000  800  900 1200 3400  900
>     126        4400   700 1700 1800  800  100 1200 1200 5000  800
>     127        7100   300 2100 6000 1700 1800 1300 1600 2600  800
>     128        4000   400 1800 4000 1200 1100 1100 1200 2700  800
>     129        4100   400 2300 4000  700  200  500  700 4300  900
>     130        1700   200 1700 2000 1100  800 1000  800 3400  900
>     131        4000   100 1600 3900 1100  600  600 1000 2000  900
>     132        2600  1100 1700 3900  900  100  100  800 4600 1000
>     133        2600   500 2400 2500 1200  800  900 1200 4600  900
>     134        3300     0 3200 3500  800  100  100  800 7700  700
>     135        3100   100 2200 4200 1200  400  600 1200 2700  900
>     136        4800   300 1800 3600 1100 1000  900 1000 4100 1200
>     137        2600   100 3700 3100  800  500  600 1200 6600  500
>     138        4100  1000 2100 4500  800  700  700  800 5900  700
>     139        3500   300 2000 5000 1200  700  800 1200 4000 1200
>     140        5000   200 2400 7800 1600 1200 1200 1600 3600 1000
>     141        3400   100 2300 3600 1200  500  800 1200 3000 1000
>     142        6200   400 2200 4200 1200 1600 1300 1300 2700 1000
>     143        4800   100 1700 4000 1400  800  600 1600 2000 1200
>     144        3500  1500 1600 3600  900  200  300  800 2100  300
>     145        4000   600 2000 3900 1300 1000  500 1000 2200  800
>     146        4100   700 2000 3600 1200  800  800 1200 2900  900
>     147        3200   600 2000 2300 1600 1000 1200 1600 2700 1000
>     148        1900   200 3000 4500 1200  900  900 1200 5700 1100
>     149        4100   100 2500 6900 1600  500  500 1200 4700  900
>     150        2700     0 1900 1900 1400 1200  800 1500 5200 1200
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