# INDIVIDUAL COGNITIVE ORGANIZATION IN PERSON PERCEPTION: A MULTIDIMENSIONAL SCALING APPROACH

by

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## Abstract

The purpose of this study was to demonstrate the importance of the cognitive organization of the individual observer in the process of person perception. Twelve Ss served simultaneously as observers and stimulus persons. A metric multidimensional scaling analysis was done of each S's judgments of the differences between the other 11 Ss. An objective interpretation of an individual's dimensions was accomplished through the use of a scale consisting of 30 bipolar, 7-point items. The items were selected to allow the consideration of a larger domain of stimulus person cues than had been considered in most previous research. Results showed the measurement technique to be useful in describing an individual's perception of others. In general, clusters of items having high correlations provided meaningful interpretations. Several types of differences between Ss were found, thus, the importance of studying individual cognitive organization was supported. The results are discussed as they relate to past and future person perception research.

## Acknowledgment

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Person perception or impression formation as approached by various researchers emphasizes perceptual, cognitive, social, or personality variables. One basic question has been identified by Beach and Wertheimer (1961) as, "what kinds of dimensions are used by different kinds of O's (observers) under different kinds of conditions?" This implies an approach to person perception which emphasizes some kind of discriminating and integrating process within the observer. It is this process of discriminating and integrating stimulus person cues which this study investigates. Specifically, it seeks to describe the dimensions which account for the differences between stimulus persons as perceived by individual subjects. Person perception here is conceptualized as the formation of impressions of others through an inferential process similar to Brunswik's probabilistic model. The importance of the cognitive organization of the individual perceiver is demonstrated through the use of a measurement procedure involving multidimensional scaling. The study also stresses the importance of considering a wide domain of stimulus person cues when studying the process of person perception.

## APPROACHES TO PERSON PERCEPTION RESEARCH

Approaches to person perception tend to fall into four categories in which different aspects of person perception are emphasized. These categories are accuracy, process, group, and individual.

### Accuracy

Much of the early work in person perception was concerned with accuracy of person perception. These studies involved tasks such as predicting overall scores on personality inventories (Vernon, 1933), predicting responses to specific items (Dymond, 1949, 1950), and identifying an emotion from a photograph (Woodworth, 1938). In 1955 Cronbach published an analysis of the measurement of accuracy which clearly demonstrated both the complexity of the accuracy problem and the inadequacy of the earlier research in terms of measurement procedures.

Cronbach's work led to a greater awareness and recognition of the complex nature of the person perception phenomenon. In terms of research this had two major effects. The first was a much more sophisticated approach to accuracy (Cline, 1964; Sechrest and Jackson, 1961), and the second was a new and more general interest in the investigation of the process of discrimination and integration involved in the perception of persons.

Process

Two early studies by Asch (1946) and Heider (1944) had already generated some interest in process studies. Each of these has served as the basis for current paths of research. Heider's work led directly to contemporary attribution theory (Jones and Davis, 1965). Ash's work on central traits is directly related to the lines of research which generated the present study.

Using a trait list approach, Asch sought to explain how the various trait characteristics of a person are integrated to form a single impression of the whole person. More specifically, he demonstrated the existance and function of central and peripheral traits. Central traits (i.e. warm - cold) are those traits that have an exceptionally strong influence on the general impression formed, holding all other traits constant. Peripheral traits are those having only a minor influence. In addition to Asch's finding of central and peripheral traits, there are three other important aspects of his conception of the formation of impressions: 1) the central or peripheral quality of a trait is determined by the other stimulus traits included in a list, 2) traits are immediately integrated into a dynamic Gestalt which is difficult to predict based on the individual traits involved, and 3) the impression formed is the basis of further inferences about the stimulus person.

In 1954, Bruner and Tagiuri suggested that individuals have a naive expectations with regard to the implicative relationships between personality traits. This set of expectations has been characterized as an implicit theory of personality. Using the cues available, individuals generate inferences as a result of this theory. The inferences generated from the available cues were believed to be predictable. This was first demonstrated empirically by Bruner, Shapiro, and Tagiuri (1958). They showed that knowledge of the inferences made from single traits yielded accurate predictions of the inferences made from combinations of the traits. This finding conflicts with Asch's position that impressions cannot be predicted, and led Wishner (1960) to conduct a complete reanalysis of the Asch results. Wishner proposed that independently derived inter-trait correlations could explain the Asch findings. The Wishner study seems to have established that at least two aspects of the Asch position are incorrect. First, it is not true that impressions cannot be predicted, as both the Wishner, and the Bruner, et al. studies clearly show. Second, Asch was incorrect in his belief that centrality is a function of the stimulus traits. Wishner demonstrated that the centrality of a stimulus trait depends on the response traits available to the subject.

Prior to Bruner and Tagiuri's (1954) suggestion of the importance of implicit personality theory in the process of person perception, the contribution of the perceiver to trait relationships had usually been treated as error. Even following the Bruner, et al., and Wishner studies, a few researchers continued to interpret ratings as reflecting more about the ratee than the rater. Examples are found in early factor analytic studies (Cattell, 1957; Norman, 1963), in which the trait relationships found were interpreted in terms of the organization of traits among the stimulus persons or ratees.

Other investigations (Levy and Dugan, 1960; Mulaik, 1964; Passini and Norman, 1966; and Norman and Goldberg, 1966) soon followed which supported Bruner and Tagiuri's suggestion of interpreting the trait relationships in terms of the cognitive organization of the perceivers. Passini and Norman (1966), for example, found that the factor structure for subjects rating strangers was almost identical with the factor structure found in the Norman (1963) study, where subjects rated close associates. This finding gave strong support to the possibility that "rating studies in general might ... reflect mainly -- or even entirely -- the 'raters' conceptual factors'," (Norman and Goldberg, 1966, p. 681). While there is some question as to the role of linguistic meaning in these conceptual factors (Mulaik, 1964), in general the importance of cognitive organization has received wide support. In a review of some of the studies mentioned above, Hastorf, et al. conclude

> We are impressed with the underlying thesis implicit in the research we have just discussed, namely that perceivers do develop certain rules regarding the relationships between personality characteristics. It may well be that such rules are heavily influenced by linguistic meaning although this does not appear to be the entire story. What is important is that rules not only exist but almost certainly play a role in structuring our perceptions of other people.
>
> (Hastorf, Schneider and Polefka, p. 48)

With the importance of cognitive organization established, the question arose as to whether an inference system which included only personality traits was sufficient to explain the person perception process. Other stimulus person cues could be as important as traits, and in fact there have been studies which indicate this. Recent research utilizing a free response approach, has shown that in the formation of first impressions (Lyman, et al., in preparation), and in the descriptions of persons known to college students (Beach and Wertheimer, 1961) and to children (Dornbusch,

Hastorf, Richardson, Muzzy, and Vreeland, 1965), subjects are utilizing much more than just personality trait cues. In fact, presenting a filmed stimulus person, Lyman, et al. found that ascribed personality characteristics were cited less frequently than were physical characteristics or observed behaviors, in response to the question, "Why would you like (not like) to get to know this person?" These findings point out that a good deal more is being "conceptually organized" than just personality traits, and that this should be taken into consideration when conducting research into the cognitive aspects of person perception.

Individual vs. Group

An important distinction exists between those studies investigating the average or group person perception process, and those interested in individual subjects. Some examples should help to make this distinction clear.

Using multidimensional scaling, Rosenberg and his associates (1968; 1970; 1972; 1972) have recently contributed a great deal to the personality trait relationship area of the process research. In contrast to the trait-inference approach, Rosenberg allows subjects to describe actual persons. Three separate studies (Rosenberg, et al., 1968; Rosenberg and Olshan, 1970; Rosenberg and Sedlak, 1972) each involving the analysis of the average group response, produced consistent results. Strong dimensions indicating evaluation were found. An evaluative dimension is one in which the central theme of the discrimination described is that of good - bad, pleasant - unpleasant, etc. For the groups investigated in these studies, evaluation is the most important aspect of their judgments.

An exception to this pattern of evaluative dimensions is found in the analysis of character descriptions written by Theodore Dreiser (Rosenberg

and Jones, 1972). This analysis of descriptions made by a single individual showed a marked deviation from those of groups done previously. Evaluation was not important for Dreiser.

The emergence of this difference between the individual and group structures is certainly no surprise. What is surprising is that there has been so little work directed at the individual differences in interpersonal perception. The reason for this has not been a lack of interest or awareness. Cronbach (1955; 1958), Dornbusch, et al. (1965), and Jackson and Messick (1963), have all pointed out the importance of the individual perceiver, and Dornbusch, et al. (1965) have suggested that the individual's cognitive structure is the most important variable in person perception research.

These authors analyzed the categories of interpersonal perception used by children in free response descriptions of other children. They were interested in whether the perceiver or the perceived person had the greater influence on category usage. It was assumed that if the perceiver were the crucial variable, it would be found that a person employs consistent sets of categories (category overlap would be present) in describing several other persons. On the other hand, if the perceived or stimulus person were the crucial variable, then the overlap of category usage would be greater in the descriptions of a single stimulus person made be different perceivers. This means that a single stimulus person would be described in a similar fashion by several different observers.

It was found that the greatest overlap in category usage was within a single observer, not a stimulus person. Descriptions by a common perceiver of two different perceived persons had much more overlap of categories than did descriptions by two different persons of a common perceived person. In fact, descriptions of a common perceived person by two different

perceivers had only slightly more category overlap than did descriptions of different perceived persons by different perceivers. (This latter condition is labeled by the authors "descriptions having a common culture.") The results strongly support the importance of the individual perceiver in person perception research.

## METHODOLOGICAL PROBLEMS -- THE STIMULUS

The selection and presentation of the stimulus in person perception research has created a great deal of difficulty for most researchers. Although an over simplification, a useful dichotomy for the purpose of describing the various modes of stimulus presentation in person perception research is that of indirect vs. direct presentation. In the following discussion of the methodological problems related to the stimulus, direct presentation refers only to those instances in which the observer and the stimulus person are involved in a "live interaction". Direct stimulus presentation results in what will be called 'direct' person perception. All other forms of stimulus presentation are referred to as indirect and result in 'indirect' person perception.

### Indirect Perception

Many of the problems related to the stimuli used in person perception research stem from the fact that most of the work has involved indirect perception. One type of indirect perception results from the use of verbal stimuli. There are several ways of presenting the stimulus verbally, including lists of traits (Asch, 1946), descriptive paragraphs (Boyd and Jackson, 1967), presenting a name to induce the conception or image of a well known person (Warr and Knapper, 1968), or by specifying the role of a significant other (Kelly, 1955). Another type of indirect perception

occurs when non-verbal stimuli are used. Examples of non-verbal stimuli used include photographs (Secord, 1958), drawings (Frijda, 1958), motion pictures (V.B. Cline, 1964), and video tape (Batt, 1970). Non-verbal stimuli have been used extensively, particularly in the study of attraction and the perception of emotion.

These indirect techniques have a number of inadequacies. Verbal stimuli by their very nature are quite limited with regard to their representativeness of the stimulus domain. More specifically, paragraphs and trait lists are too static, and in addition bypass completely the early phases of impression formation. Photographs and drawings inject a physical element, but lack movement and obviously omit much of the information contained in paragraphs or traits. Motion pictures and video tape are major improvements, but these do not allow interaction between the observer and the stimulus person, and they can constitute only a very limited sample of the stimulus domain. The deficiency that all these indirect approaches seem to have in common is an omission of potentially important information. For example, even if in some way the problems mentioned above were avoided, most studies would still suffer from the omission of situational cues, another potentially important source of information (Tagiuri, 1969). In summary, it is suggested from the nature of the shortcomings outlined above, that perhaps the problems related to the presentation of the stimulus in person perception could be named "problems of impoverished stimuli."

In light of these criticisms, it should be noted that cogent arguments have been made in favor of the legitimacy of studying specific categories and levels of person perception corresponding to the various stimulus modes delineated above (Asch, 1946; Boyd and Jackson, 1967; Kelly,

1955; and Warr and Knopper, 1968). It is acknowledged that these different kinds of person perception do occur all the time (e.g., descriptions by third persons, etc.). However, it seems that researchers often are not aware of the type of person perception they are dealing with. The limitations and implications involved are obscured or overlooked, and unwarranted generalizations are made.

Direct Perception

At first, the solution to the problems mentioned above seems to be the study of live interaction. No doubt this would be ideal in that it most closely resembles the "real life" situations which appear to be most important. However, there are major methodological difficulties with this approach. Immediately the experimenter is faced with the fact that no two subjects are exposed to exactly the same stimulus. This results in significant control problems and precludes the replication of any study. These problems do not rule out the possibility of worthwhile inquiry, however, and because of the need to achieve a better understanding of the perception of "live" stimulus persons, and in light of the dearth of research in this area, it seems important that more research of this type be conducted.

## METHODOLOGICAL PROBLEMS -- MEASUREMENT AND INTERPRETATION OF JUDGMENTS

There exist a number of research problems which seem to be primarily aspects of measuring and interpreting the judgment process in person perception. For example, one tradition in the study of the judgment process uses some form of rating scale. With this approach, specific difficulties in measuring an observer's response arise from response sets such as leniency and assumed similarity (Tagiuri, 1969). Also, the construction of scales always creates sampling problems. The major difficulty is in selecting items without placing undesired restrictions on the responses allowed the subject.

Tagiuri (1969) has discussed at length the general difficulty of interpreting the nature of the discrimination required of the subject in the person perception task. Most measurement techniques are simply not powerful enough to provide an adequate model of the person perception process, and any measurement technique imposes its own unique restrictions.

Multidimensional Scaling

A new development in measurement, multidimensional scaling (Torgerson, 1958; Messick, 1956), has shown great promise as a method of getting at the basic nature of the person perception process (Jackson, et al., 1957; Jackson, 1962). Multidimensional scaling (MDS) was developed initially in the area of multidimensional psychophysics (see Torgerson, 1958; Nunnally, 1967), and has proven to be an excellent technique for uncovering the underlying dimensions of complex perceptual tasks. Rather than having subjects respond to stimuli on scales chosen to represent dimensions determined a priori by the experimenter, subjects are simply asked to judge the overall difference or similarity between stimuli. This is done for all possible pairs of the stimuli being studied (N(N-1)/2 judgments for any number, N, of stimuli). The matrix of differences is converted to absolute distances by the estimation of an additive constant. This is followed by a "conversion of the absolute distances to a matrix of scalar products, B*, which is then factored to obtain a matrix F, the rank of which is the dimensionality of the space and the elements of which are the projections of the stimuli on a set of orthogonal axes placed at the centroid of the points," (Messick, 1956). In person perception research, the points in the space (which is assumed to be Eucledean) correspond to the stimulus persons, the dimensions are the ways in which the stimulus persons are perceived to differ, and the projections of the points on a dimension represent the way the stimulus persons are

differentiated along that dimension. The similarity or difference judgment required of the subject is relatively natural, and could be considered a free response approach because little restriction is placed on the response.

The problem with MDS is in trying to interpret the dimensions of the judgment which it uncovers. The traditional approach to interpretation is to rely on known stimulus properties (Torgerson, 1958). This presents few difficulties when operating within the domain of psychophysics, where a great deal is known about the characteristics of the stimuli. However, Jackson, Messick and Solley (1957) found this approach inadequate when people were used as stimuli. The personality and demographic variables, as measured by these authors, did not strongly relate to any aspect of the way "real" people were perceived to differ. The only measure which was clearly useful in interpreting the scaling results was a friendship rating.

There have been several other studies related to person perception using MDS. Abelson and Sermat (1962) analyzed difference judgments of pairs of facial expressions and found two dimensions, pleasant-unpleasant and tension-sleep. Bush (1973) found three dimensions sufficient in explaining the differences between 264 adjectives denoting feeling. These dimensions were interpreted as pleasantness - unpleasantness, level of activation, and level of aggression. Boyd and Jackson (1967) demonstrated that both people and attitude items can be represented in a common multi-dimensional space. Six person-descriptions and eighteen attitude statements served as stimuli for which similarity judgments were collected for all possible pairs and subjected to MDS analysis. Three dimensions resulted which corresponded to hypothesized aspects of the stimuli. Another group of MDS studies, mentioned previously in conjunction with the group vs.

individual question, are those by Rosenberg and his associates (1968; 1970; 1972). These studies emphasized a naturalistic approach to trait relationships and involved the analysis of trait descriptions of actual persons. In two instances (Rosenberg, et al., 1968; Rosenberg and Olshan, 1970) the descriptions were collected by having subjects sort traits preselected by the experimenter. In another study (Rosenberg and Sedlak, 1972), subjects were simply asked to list traits which described persons of the subjects' choice. As was previously reported, these studies of average group responses consistently found evaluative dimensions.

A Measurement Technique

The success of these researchers suggests that a measurement technique utilizing MDS might be developed for studying the individual perceiver in person perception. The MDS of an individual's difference estimations provides a dimensional model of that individual's cognitive structure. The usefulness of this model has already been partially substantiated by the studies cited above. Therefore, it is reasonable to expect the model to advance the understanding of the process of person perception in the individual perceiver.

A common procedure in MDS research for collecting difference judgments is to have subjects respond on a scale ranging from 1 - 9, with "1" indicating no difference and "9" as great a difference as is possible. This technique seems to diminish some of the attractiveness of the MDS approach, as far as the naturalness of the judgment is concerned, and in addition results in only an interval scale. A difference estimating procedure which seems much more attractive in both respects is suggested by Stevens (1968). Stevens has done a great deal of research which indicates that subjects are quite capable of making magnitude estimations which have ratio scale •

properties. What this means for the measurement of person perception is that reliable ratio scale distances are obtainable from individual subjects. It would be possible, therefore, to do a metric multidimensional scaling of each individual's responses. The problem of interpreting the resulting dimensions remains to be solved, however.

It was mentioned above that Jackson, Messick, and Solley (1957), using close acquaintances of the judges as stimulus persons, met with limited success in their attempt to utilize objective measures of stimulus person qualities to aid in the interpretation of the perceivers' dimensions. Friendship ratings did, however, correlate .75 with the second dimension emerging from the analysis, suggesting an interpretation along the lines of social evaluation, attraction, etc. Friendship ratings differ from the other measures used by Jackson, et al. in that rather than reflecting some aspect of the stimulus persons, they represent a type of interpersonal judgment. In other words, a specific type of interpersonal judgment correlated highly with one of several dimensions of a general type of interpersonal judgment. This suggests that direct judgments of "live" stimulus persons might be best interpreted by looking at the relationship between the dimensions of the general judgment and a comparably large number of specific judgments.

A specific judgment involving a rating of stimulus persons on bipolar, seven-point items has proven useful and reliable in a wide variety of person perception studies (Blackburn, 1970; Levy and Dugan, 1960; Warr and Knapper, 1968). Rosenberg (1968; 1970) adds additional evidence supporting the use of bipolar items.

A common criticism of bipolar items is that the relationship between the poles is often nonlinear, and for that reason this type of item does

not fit the multidimensional model of linear dimensions having a common origin. Rosenberg has produced empirical evidence bearing directly on this criticism (Rosenberg, et al., 1968). He looked at the location of antonym trait pairs in the group space and noticed that almost all of these pairs were located in opposite quadrants, and could be joined by straight lines passing very close to the origin. In addition, Rosenberg reported in the same study that nonlinear multiple regression was only very slightly better than linear multiple regression for interpreting the dimensions. The difference was so slight that the nonlinear technique was not used in later studies (1970; 1972). Considering these strong indications, it appears that linearity is a well justified assumption.

There remains the possibility of the poles of different items being unequal psychological distances from the origin. Not enough evidence is available for a decision to be made about this possibility. However, when combined with the other evidence cited in its favor, the conceptual and intuitive appeal of the congruency between the bipolar item and the geometric model of MDS justifies the risk of assuming that the psychological distance is equal for all items.

The use of bipolar items in interpreting dimensions is quite straight forward. First, difference estimations for all pair comparisons of stimulus persons are collected from each subject. Each subject's data are then subjected to a metric MDS analysis. For each subject, the Pearson product moment correlation is computed between the projections of the stimulus persons on a dimension resulting from the MDS analysis, and the responses by that subject to the stimulus persons on a specific item. This correlation will reflect the similarity between the way stimulus

persons are differentiated on a dimension and the way they are differentiated by an item. Correlations between all items and dimensions for a subject are determined in this way.

The strength of this procedure is that it allows a free response for the difference estimations, while using selected items for the interpretation of the dimensions which result. If the chosen items are not appropriate or salient for a given subject, then one should not find high correlations for that subject. On the other hand, if the selected items are useful, and if the two tasks tap cognitively related phenomena, then clusters of high correlations will be found which provide meaningful interpretations of the dimensions. The measurement technique developed will make it possible to test these and other assumptions regarding a model for the process of person perception.

One such assumption is that bipolar ratings can be meaningfully related to the spacial representation of the interstimulus distances. Estimating the difference between stimulus persons and rating stimulus persons on bipolar items are quite different tasks, and one could reasonably expect less than a good fit between the two sets of data. Thus, the prediction that these two types of data will be related is not trivial.

This prediction relies in turn on two additional assumptions. One is that the two tasks tap a common cognitive process or organization. The second is that both measurement procedures are sufficiently sound in the psychometric sense that their representations of the underlying psychological phenomena have sufficient fidelity to assure that the relationship between the two data sets is not obscured.

## The Study

In summary, the present study investigates the cognitive organization

involved in the process of integrating stimulus person cues and differentiating between persons. Primarily exploratory in nature, the research emphasizes the importance of studying the individual perceiver. A multidimensional model is utilized involving MDS, and an objective method of dimension interpretation developed and tested. The interpretation technique considers a wider domain of stimulus person cues than has most previous person perception research.

### The Person Perception Scale

To conduct the research outlined above requires the selection of a limited number of bipolar items from a very large population of possible items. This task is further complicated by the decision to consider a larger domain of stimulus cues than has usually been considered in person perception research. The findings of several researchers (esp. Blackburn, 1970; Levy and Dugan, 1960; Lyman, et al., in preparation; Osgood, Suci, and Tannenbaum, 1957; Passini and Norman, 1966; Warr and Knapper, 1968) figured heavily in the selection of the items to be used. Thirty items were chosen and collectively were named the Person Perception (PP) Scale (see Appendix A). These items satisfy the requirement of being sensitive to a wide domain of cues, and include: 1) various bipolar personality traits found to be important in personality perception research; 2) opposite poles of physical property and appearance continua; 3) opposite poles of behavioral continua; 4) opposite poles of experiential continua; and 5) representative items from the three primary factors found in the semantic differential research.

## METHOD

### Subjects and Stimulus Persons

Twelve (5 men and 7 women) members of a discussion section of an

undergraduate social psychology class at Simon Fraser University served as subjects. Prior to the data collection, the section had been meeting two hours per week for 11 weeks, as well as two hours per week of lecture. Subject ages ranged from 19 to 28, with a mean age of 23.25 years. The 12 members of the group served simultaneously as subjects and stimulus persons. This means that for the PP Scale task each subject responded to 11 stimulus persons, and for the difference estimation task each subject made judgments for all possible pairs ($N(N-1)/2 = 55$) of 11 stimulus persons. Both tasks were completed during the same class period, with the difference estimations done first. Subjects sat facing one another around tables arranged in a rectangle. Each subject was identified as a stimulus person for the other subjects by a letter written on a sign placed in front of her/him.

Difference Estimation Task

Subjects were given 55 page booklets, each page containing two letters identifying the pair of stimulus persons to be compared, and a line on which to write the response. The order within a pair of letters was the same for each booklet, but no letter was the first of more than six nor less than five pairs. The order of the comparisons was determined randomly for each booklet with the restriction that each booklet began with the pair "FC". (for subjects C and F booklets began with "IB")

The specific instructions given the subjects are reported in Appendix B. After reading the instructions subjects were asked if there were any questions. Any unclear aspects of the task were explained and the importance of the "general" nature of the comparison was again emphasized. Subjects were told that there would be no time limitation and were asked to make the comparisons in the order in which they appeared in the booklet. At the completion of the task subjects were asked to check to be sure no comparisons

had been omitted. When all subjects had finished they took a ten minute break before beginning the next task.

Person Perception Scale

The PP Scale consisted of 30 bipolar, 7-point items. The items were ordered randomly and divided into two groups of 15 which appeared on separate pages (see Appendix A). The order within a page was constant. The order of the pages within a two page booklet was random. On the top of each page of a two page booklet was written the letter of one of the stimulus persons. Each subject completed one booklet for each stimulus person. An independent random ordering of stimulus persons was determined for each subject. The instructions for this task are also reported in Appendix B.

Additional Information

Subjects were also asked to rate the stimulus persons on a ten point scale indicating how well they were acquainted with each person. For this scale "0" indicated that the person was "a stranger", and "9" indicated that the subject knew the person "as well as you can know someone -- a very close or intimate relationship". In addition to this, subjects were asked to supply some biographical information.

## ANALYSIS

For each subject there were two distinct stages of analysis consisting of the analysis of the difference estimations and the interpretation of the resulting dimensions. The first stage involved the multidimensional scaling analysis, as well as a dimensionality decision required before any interpretation could be attempted. The analysis was performed on the natural logs of the raw responses. The problem of the number of dimensions was approached by first plotting the eigenvalues for different values of

the additive constant (C). Two different types of plots were made for each subject.

The first type involved plotting the number of the dimension against the magnitude of the eigenvalue. These plots were assessed with regard to the scree test and signs of discontinuity in the curve (Rummel, 1970). For each subject plots were made for several values of C. The second type of plot involved plotting the changes in magnitude of individual roots as functions of C. A typical example is shown in Figure 1, and plots for all subjects are reported in Appendix C. This type of plot proved quite useful both in the dimensionality decision and in the choice of C. The dimensionality in suggested by considering the distances between the lines representing the individual roots. With an idea of the number of dimensions in mind, it is then quite easy to arrive at an eyeball estimate of the average of the rejected roots for various values of C.

Torgerson (1958, pp. 270-271) proposes that the best value of C is that which "results in a B* matrix with the smallest possible number of large positive latent roots (the 'true' dimensions of the system), under the condition that the remaining roots are all small and distributed about zero (the 'error' dimension of the system), provided, of course, that such a value exists." This means that C should be chosen so that the average of the rejected roots is closest to zero. In the example cited in Figure 1, assuming four dimensions, a C of .3 satisfies this criterion. The procedures outlined above were carried out for each subject in arriving at a dimensionality decision. In practice, of course the decisions were not all as clear cut as for subject D, and in questionable cases borderline dimensions were included in the interpretation stage.

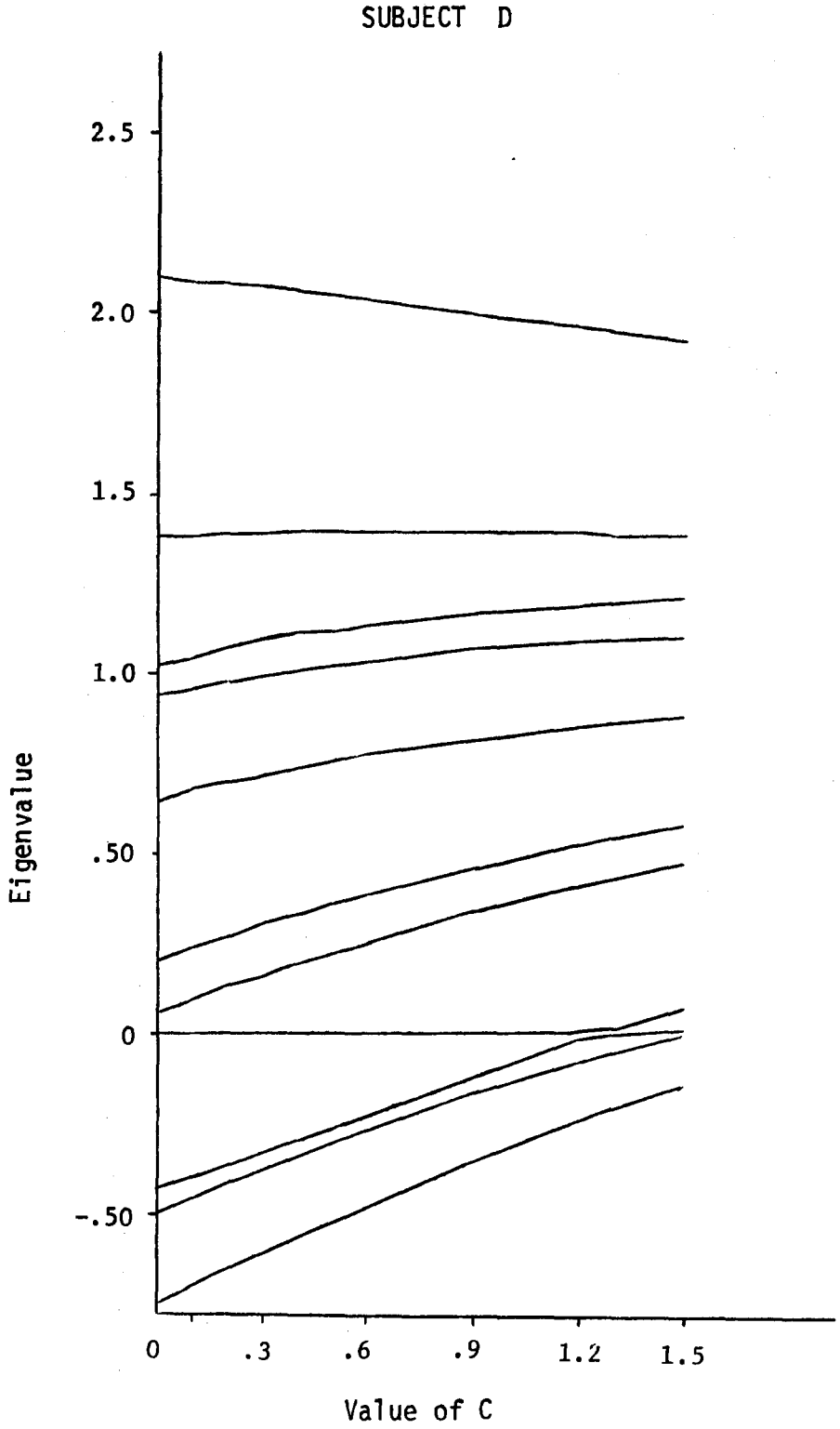


FIGURE 1. CHANGE IN EIGENVALUES AS A FUNCTION OF C (ADDITIVE CONSTANT)

The interpretation stage involved using the PP Scale responses to interpret the dimensions produced by the MDS analysis. This was accomplished by calculating the correlations of the PP Scale responses with each set of dimension loadings for a subject. The acquaintance responses and gender of the stimulus persons were also included as variables in these analyses. The correlations with each dimension were then inspected for clusters of high r's. These clusters were used to interpret the nature of the various dimensions for each subject.

Another analysis was performed on the difference estimation data in addition to the MDS analyses. Each pair of subjects had in common the judgments made for every pair of stimulus persons not involving themselves. The correlations were calculated between these common judgments for every pair of subjects. This was done for both the raw estimations and the log transformations.

## RESULTS AND DISCUSSION

The results for each subject are reported in Appendix D. The amount of variance accounted for by the dimensions of each subject ranged from 86.9% to 98.9%, with a median amount of 92.25%. In general, the measurement procedure proved useful as a means of representing the individual perceiver's cognitive organization of stimulus person cues. Meaningful interpretations are suggested by the clusters of items having high correlations with the dimensions. These correlations were extremely stable with regard to the choice of C.

As predicted, several types of differences between subjects are apparent. The most obvious difference between subjects is the number of dimensions for each subject (Table 1), which ranged form two to seven, with a median and mode of four. This individual difference is possibly related to cognitive

Table 1

Number of Dimensions for Individual Subjects

| Subject | Number of Dimensions |
|---|---|
| A | 6 |
| B | 4 |
| C | 5 |
| D | 4 |
| E | 4 |
| F | 7 |
| G | 3 |
| H | 4 |
| I | 2 |
| J | 4 |
| K | 4 |
| L | 5 |

style or organizational complexity. However, it should be emphasized that this is speculative, and that much more research is necessary in order to ascertain if dimensionality is a reliable individual difference, and to understand its meaning and significance.

A second difference between subjects is the number of items correlating highly with a dimension. The variance here could simply be the result of differential salience to subjects of the available items. This would indicate a sampling error in the selection of items. However, if one assumes that the PP Scale is a representative sample of the domain of stimulus person cues, then the observed differences in the number of items correlating with dimensions could reflect an important subject parameter related to cognitive organization. While this single study provides insufficient evidence to allow any conclusions on this point, it does suggest avenues for future research.

A third type of individual difference is revealed by a comparison between subjects of the clustering of items. For example, comparing dimension II of Subject K with dimension III of Subject E (see Table 1), we find three common items: tense - relaxed, polished - crude, and well-adjusted - maladjusted. However, these subjects applied the item "polished - crude" in different ways, resulting in quite different interpretations of their respective dimensions. Considering only one pole of each dimension we find the cluster "relaxed, crude, well-adjusted" for Subject E, and "relaxed, polished, well-adjusted" for Subject K. Including an additional item for each dimension emphasizes the distinctively different qualities of these two dimensions. Considering again only one pole for each dimension, we find "relaxed, crude, well-adjusted, nonconforming" for Subject E, and "pleasant movement, polished, relaxed, well-adjusted" for Subject K.

Table 2

A Comparison of the Interpretation of
Subject E Dimension III and Subject K Dimension II

| Subject E Dimension III | | | |
|---|---|---|---|
| r | Item | | |
| .71* | tense | -- | relaxed |
| .66* | polished | -- | crude |
| .63 | maladjusted | -- | well-adjusted |
| .62 | conforming | -- | nonconforming |

| Subject K Dimension II | | | |
|---|---|---|---|
| r | Item | | |
| .67 | unpleasant movement | -- | pleasant movement |
| .66 | crude | -- | polished |
| .56* | tense | -- | relaxed |
| .45 | maladjusted | -- | well-adjusted |

* All correlations are reported as positive; an asterisk (*) identifies items which had negative correlations with a dimension and have been reflected to increase conceptual clarity.

An inspection of the dimensions of all the subjects (see Appendix D) reveals many differences of this type.

The example cited above can also serve to illustrate the usefulness of considering a wide range of stimulus person cues. The high r of the item "pleasant movement - unpleasant movement" points out that cues other than traits are important to the subject. In addition, the impact that the item has on the interpretation of the dimension drives home the fact that a great deal is gained by a consideration of this type of stimulus person cue.

Items relating to physical and behavioral cues were apparently important to every subject in this study. These and other results cited above (Beach and Wertheimer, 1961; Dornbusch, et al., 1965; and Lyman, et al., in preparation) indicate that research should be conducted to clarify the roles of different types of cues in person perception. The discovery of the relative importance of cues would constitute not only a significant contribution to theory, but also to applied areas such as clinical judgment and therapist training. In general, however, it seems reasonable to expect that the relative importance of cues will vary across both situations and individuals in a systematic fashion. This implies an interactionist approach to the problem, similar to that recently proposed by Bowers (1973) for personality research.

The source of these various types of differences should be present in the original judgments. To test this the correlations were calculated between the common difference estimation judgments for each pair of subjects (between-subjects correlations). There were 66 correlations computed (all possible pairs of 12 subjects = $N(N-1)/2$). Except for the pairs including Subject I, all correlations were based on 45 common judgments.

The correlations for pairs including Subject I were based on 36 common judgments.

It became apparent that these correlations could be used for another purpose in addition to that of demonstrating the existance of individual differences in the original judgments. Recall that the MDS analysis was executed on the logs of the raw judgments. If the between-subjects correlations were determined for both the raw judgments and their log transformations, these correlations could be compared to assess the effect of the transformation. Thus, two sets of between-subject correlations were calculated, one based on the raw difference estimations (raw r's) and another based on the log transformations of these responses (log r's). These two sets of correlations were then compared. First the root-mean-square was calculated for each set and it was found that the two sets had virtually equal root-mean-squares (raw r = .2533, log r = .2534). In addition, the correlation between the two sets of r's was found to be .89.

Because the two sets are so similar, only the log r's are reported in Table 2. Each correlation reflects a type of similarity between two subjects' sets of judgments. For example, looking at the first column of Table 2 we find that Subjects A and C made quite similar difference estimations (r=.50), Subjects A and J had a moderate degree of similarity of judgment (r=.34), and Subjects A and G made quite dissimilar judgments (r=.06). In summary, the r's ranged from moderately high positive to what appears to be random variation around zero. The root-mean-square of the r's is .253.

Do these results support a position emphasizing the importance of the individual perceiver in person perception research? Consider what has transpired. A reasonably homogeneous group of subjects has been placed

Table 3

Between Subjects Correlation Matrix of

Common Difference Estimations (Log Data)

| Subject | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B | .44 | | | | | | | | | | |
| C | .50 | .36 | | | | | | | | | |
| D | .13 | .17 | .01 | | | | | | | | |
| E | .10 | .23 | .11 | .12 | | | | | | | |
| F | -.06 | .17 | .26 | -.02 | .03 | | | | | | |
| G | .06 | .44 | .18 | .04 | .00 | .35 | | | | | |
| H | .16 | .24 | .17 | .24 | -.03 | .50 | .19 | | | | |
| I | .07 | .12 | .23 | -.10 | .12 | .04 | -.03 | .30 | | | |
| J | .34 | .44 | .11 | .12 | .14 | .34 | .35 | .42 | .19 | | |
| K | .36 | .29 | .18 | -.14 | .24 | .08 | .11 | .05 | .25 | .56 | |
| L | .11 | .22 | .11 | .09 | -.04 | .26 | .51 | .53 | .15 | .33 | .27 |

in a controlled experimental situation. Each member of this group has been presented with a nearly identical set of stimuli. An analysis (MDS) and interpretation of the judgments made under these very similar conditions has yielded results strongly suggesting the presence of individual differences linked to the cognitive organization of individual subjects. Furthermore, a direct comparison of the similarity between common judgments (Table 2) for each pair of subjects indicates that the average degree of similarity is quite low (root-mean-square = .253), and that several subjects have made judgments which are extremely dissimilar (r's near zero).

It seems clear that these data point strongly to the importance of the individual perceiver's cognitive organization in the process of person perception. This factor appears to contribute a great deal to the variance in person perception research, and prediction in this area could be enhanced with a more complete understanding of this contribution.

A Different Perspective

It is possible to view these data from a different perspective. Using a level of abstraction which goes beyond the exact meaning of individual items, one observes a tendency for evaluation in a large proportion of the dimensions of all the subjects. The immediate conclusion is that this is a natural outcome following from the nature of many of the PP Scale items. Many of these items are strongly related to evaluation (ie. "well-adjusted - maladjusted", "good - bad", "sincere - insincere", "attractive eyes - unattractive eyes"). At first glance, therefore, this general tendency toward evaluation would appear to be caused by the choice of items in the PP Scale. In other words, subjects were forced to make evaluative judgments.

This conclusion would be incorrect, for it ignores the nature of the primary task required of the subjects. The major task was the estimation

of differences between stimulus persons. As pointed out above, this task was chosen primarily because it does not restrict or predetermine the dimensions on which stimulus persons may be differentiated by the observer. In addition, the difference estimations were made before the PP Scale was completed by subjects, and therefore the results of the MDS analyses could not have been influenced by the content of the PP Scale.

The implication here is that there is a general tendency to make evaluative differentiations between stimulus persons. This is strongly supported by the fact that for each subject a good fit was present between the two sets of data. The fit between data sets is indicated by the average multiple correlation between a subject's dimensions and each of the PP Scale items. The average squared multiple correlation ($\bar{R}^2$) is reported in Appendix D.[1] The mean $\bar{R}^2$ across all subjects was .550, indicating that the two sets of data have a large amount of common variance, or in other words, a good fit was the general trend. This common variance can be interpreted as an indication that evaluation is an important component of both types of judgment. The multidimensional nature of these judgments suggests that observers are making differential types of evaluative discriminations.

The emergence of evaluative dimensions is not unprecedented in naturalistic person perception research. In a study of perceived personality trait relationships using actual people as stimulus persons, Rosenberg and Sedlak (1972) reported that all dimensions were highly correlated with evaluation. Another naturalistic study (Jackson, et al., 1957), described

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[1] The shrunken $\bar{R}^2$ for each subject was not computed because the sampling problem is not analogous to the usual case in which cross validation samples from a population of people result in shrinkage. In the present study, complete analyses are done for each subject individually, with the items and stimuli being the samples. Shrinkage is not expected to occur because of the nature of the judgment tasks, the use of individual analyses, and the restrictions on samples imposed by the experimental procedures and domain of research.

previously, can be similarly interpreted. One dimension is clearly related to friendship, a second appears related to the intelligence of the stimulus persons, and the third dimension is interpreted by the authors as a status dimension associated with school class (freshman, sophomore, etc.).

These data as well as the present study, suggest that evaluation may play a much larger part in the perception of others than many individuals might care to accept. It seems reasonable to speculate that if asked, many people would claim first that they are able to differentiate individuals in a non-evaluative fashion, and second that they value highly this ability. It may very well be that while generally highly valued, this type of non-evaluative interpersonal perception may actually have a very low base rate in the general population.

Implications

This research has demonstrated the importance of considering individual differences with regard to cognitive organization in the person perception process. The cognitive organization of stimulus person cues differed among observers with respect to the number of dimensions found in their judgments. It also differed in terms of the connotative meaning of the cues themselves, which is apparent from the differential clustering of items found by the interpretation procedure. The study also illustrates that more naturalistic approaches to person perception research are both feasible and fruitful.

One implication of these findings for person perception research is the possibility that an observer's sensitivity to subtle cues is related to the number of dimensions in his or her judgments. High levels of sensitivity may be reflected by a more complex (more dimensions) cognitive organization. Another possibility is that social interaction may be influenced by both the dimensionality of judgments and the connotative

meanings of cues to individual observers. Interaction patterns and interpersonal styles might be studied as functions of the individual differences found in the present research. In addition, implications for clinical judgment are present in terms of cue utilization and judgmental strategies. It is possible that the type of individual differences found may account for variance in clinical acumen and sensitivity. Variability in therapy outcome may also be explained to the degree that outcome is related to these types of clinical skills. These and other possible implications of this research clearly indicate the value of further research of this type.

# APPENDIX A

## PERSON PERCEPTION SCALE

active___:___:___:___:___:___:___passive

simple___:___:___:___:___:___:___complex

conforming___:___:___:___:___:___:___nonconforming

small___:___:___:___:___:___:___large

not physically attractive___:___:___:___:___:___:___physically attractive

erratic___:___:___:___:___:___:___predictable

friendly___:___:___:___:___:___:___hostile

insensitive___:___:___:___:___:___:___sensitive

maladjusted___:___:___:___:___:___:___well-adjusted

gestures frequently___:___:___:___:___:___:___does not gesture

good___:___:___:___:___:___:___bad

attractive eyes___:___:___:___:___:___:___unattractive eyes

tense___:___:___:___:___:___:___relaxed

strong___:___:___:___:___:___:___weak

smiles___:___:___:___:___:___:___frowns

---

crude___:___:___:___:___:___:___polished

unpleasant movement___:___:___:___:___:___:___pleasant movement

not materialistic___:___:___:___:___:___:___materialistic

old___:___:___:___:___:___:___young

unresponsive___:___:___:___:___:___:___responsive

reality oriented___:___:___:___:___:___:___spiritual

sincere___:___:___:___:___:___:___insincere

rational___:___:___:___:___:___:___irrational

do not like facial expressions___:___:___:___:___:___:___like facial expressions

supportive___:___:___:___:___:___:___self-interested

responsible___:___:___:___:___:___:___irresponsible

submissive___:___:___:___:___:___:___self-assertive

angular___:___:___:___:___:___:___rounded

talkative___:___:___:___:___:___:___quiet

good-natured___:___:___:___:___:___:___irritable

# APPENDIX B

## INSTRUCTIONS

Instructions for the difference estimation task:

The purpose of this test is to measure how different you judge people to be. The task is to assign numbers in such a way that they will reflect your subjective impression of the difference between persons. For example, you may feel that the difference between persons A & B is best expressed by the number 10. If two other people (C & D) seem twice as different, assign the number 20. If they seem one fifth as different, assign a number one fifth as large (2), and so forth. Use fractions, whole numbers, or decimals, but make each assignment in this way. Assign the numbers on the basis of the persons' overall difference, rather than on any particular characteristics. In other words, assign numbers on the basis of your general impression of how different the people are.

For practice, try comparing types of fruit:

APPLE - ORANGE _____

LEMON - LIME _____

BANANA - PEACH _____

PEACH - LEMON _____

Instructions for completing Person Perception Scale:

The purpose of this test is to measure the ways in which people perceive other people, by having them rate one another on a series of descriptive scales. One booklet (2 pages) is to be completed for each person you are asked to rate. The person is identified by a letter at the top of each booklet. You are to do the scales in order, and complete all the scales (1 booklet) before going on to the next person. In taking this test, please make your judgments on the basis of what the people mean to you.

Here is how you use the scales:

If you feel that the person at the top of the page is very closely related to one end of the scale, you should place your check-mark as follows:

active _x_:___:___:___:___:___:___ passive

active ___:___:___:___:___:___:_x_ passive

or

If you feel that the person is quite closely related (but not extremely) to one or the other end of the scale, you should place your mark as follows:

tense ___:_x_:___:___:___:___:___ relaxed

tense ___:___:___:___:___:_x_:___ relaxed

or

If the person seems only slightly related to one side as opposed to the other (but is not really neutral), then you should check as follows:

old ___:___:___:___:_x_:___:___ young

old ___:___:_x_:___:___:___:___ young

or

The direction toward which you check, of course, depends upon which of the two ends of the scale seems most characteristic of the person you are rating.

If you consider the person to be neutral on the scale, both sides of the scale equally associated with the person, or if the scale is completely irrelevant, unrelated to the person, then you should place your check-mark in the middle space:

rational ___:___:___:_x_:___:___:___ irrational

IMPORTANT: (1) Place your check-marks in the middle of spaces, not on the boundaries:

THIS NOT THIS
___:_x_:___:___:__x__:___

(2) Be sure you check every scale for each person - do not omit any.

(3) Never put more than one check-mark on a single line.

Do not try to remember how you marked an item for a previous person. Make each item a separate and independent judgment. You may look at the person you are rating as often as is necessary. Work at fairly high speed through this test. Do not worry or puzzle over individual items. It is your first, or immediate response or "feelings" about the items that we want. On the other hand, please do not be careless, because we want your true impressions.

Open, accurate response on your part is crucial to this research. We wish to emphasize, therefore, that all results will be kept completely confidential. Your identify will not even be known by the experimenter. The procedures for assuring confidentiality will be explained before you begin.

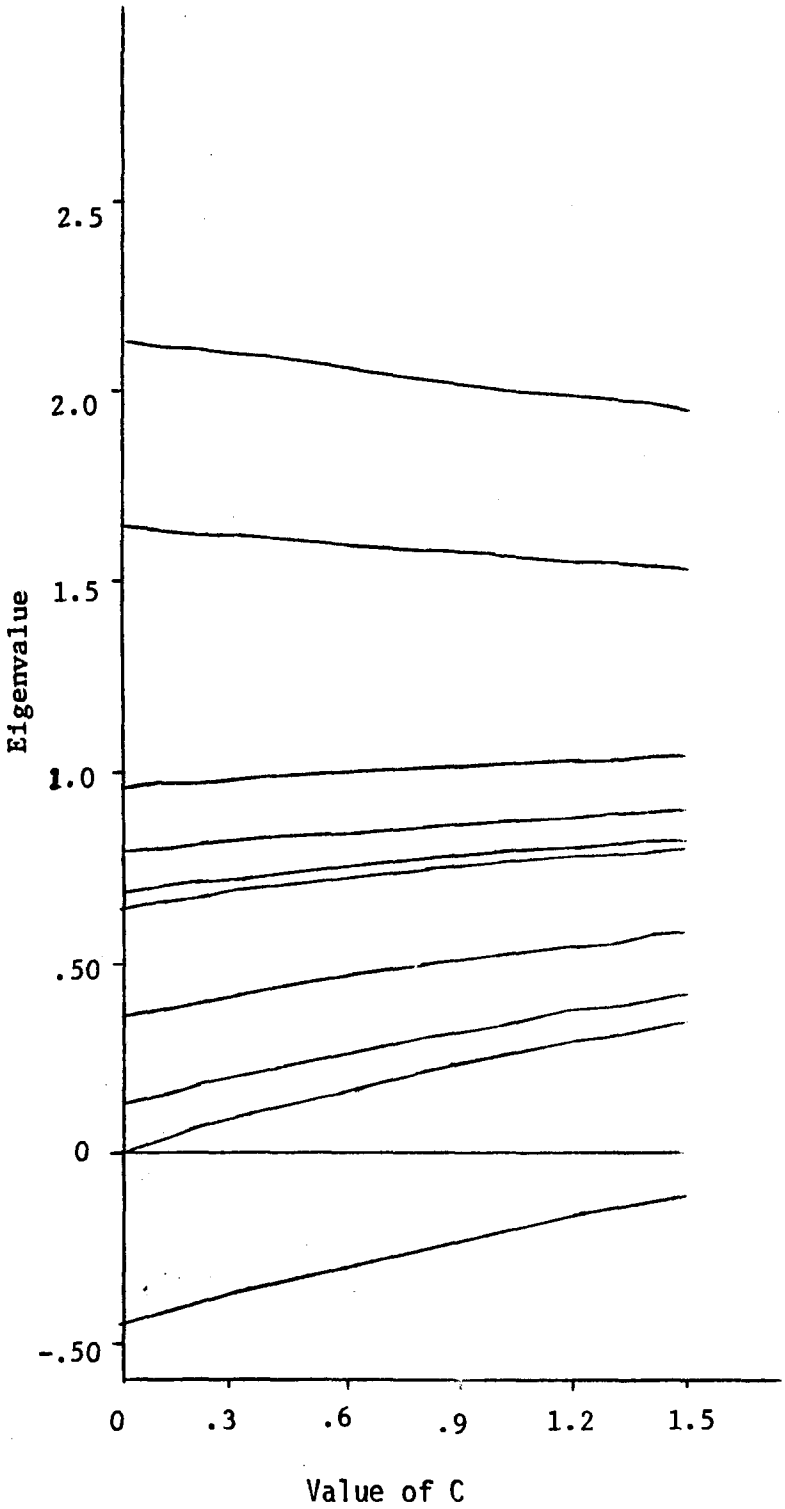
# APPENDIX C

## Plots of Change in Eigenvalues as a Function of C (additive constant)

CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

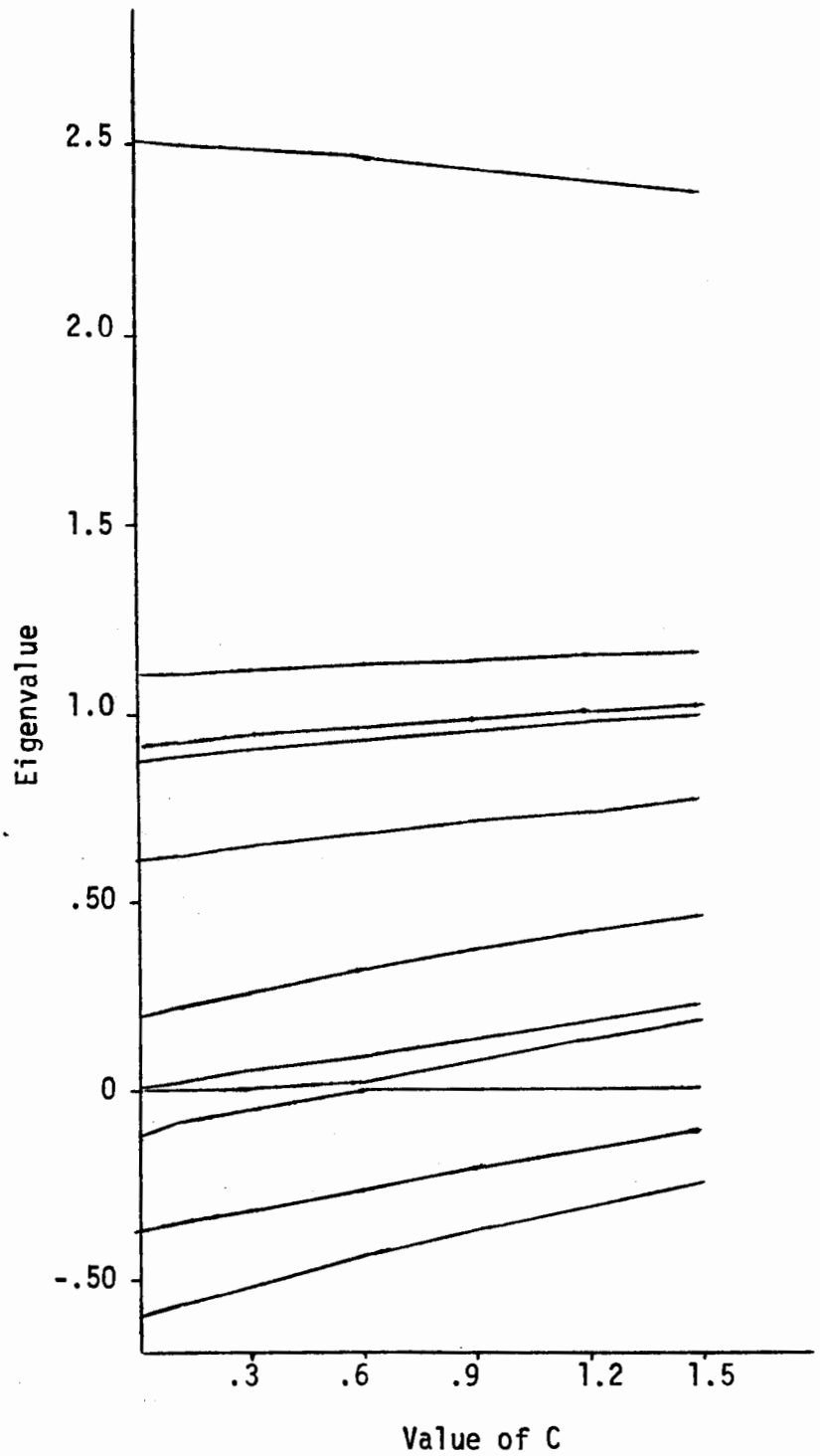
SUBJECT A



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

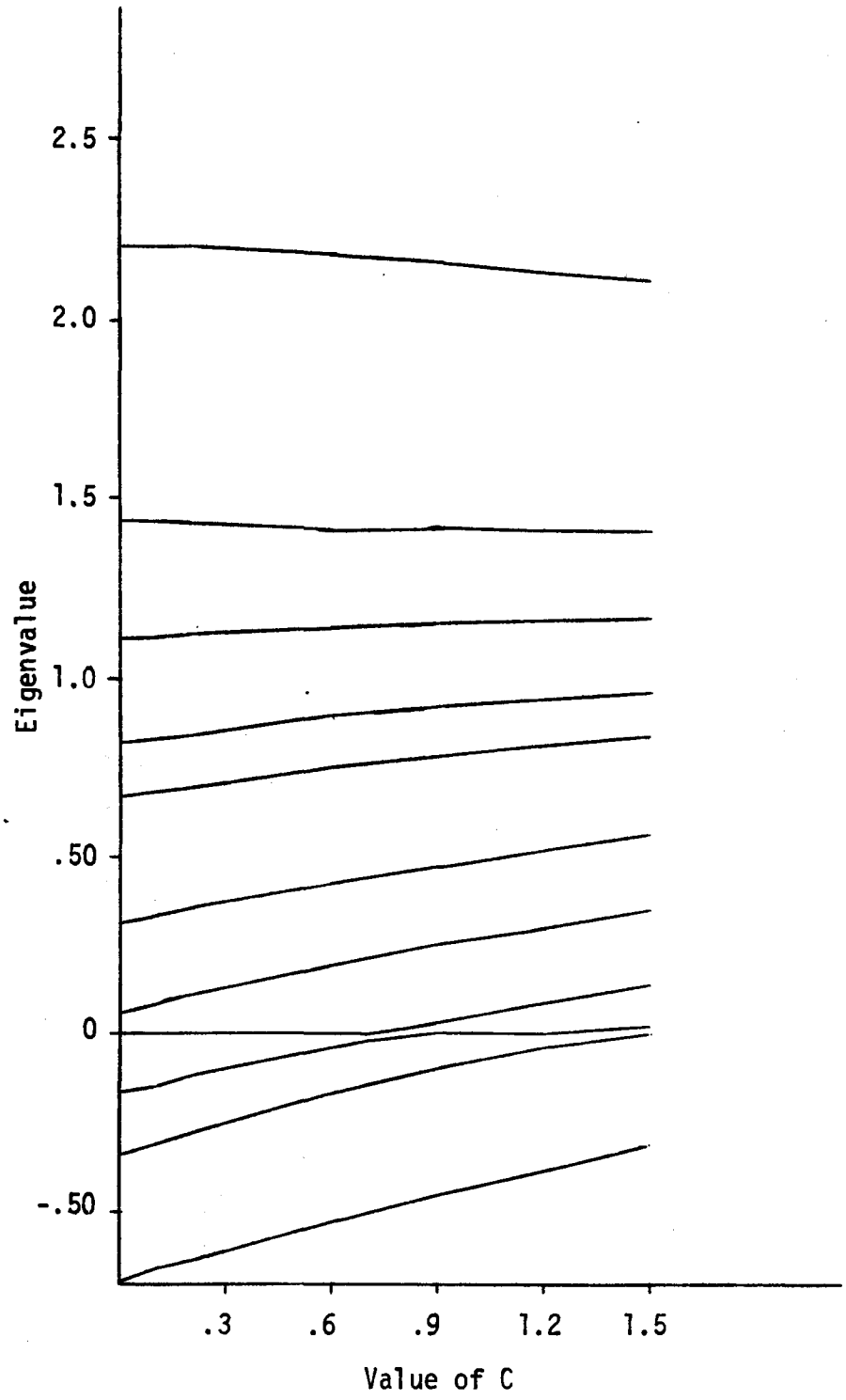
SUBJECT B



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

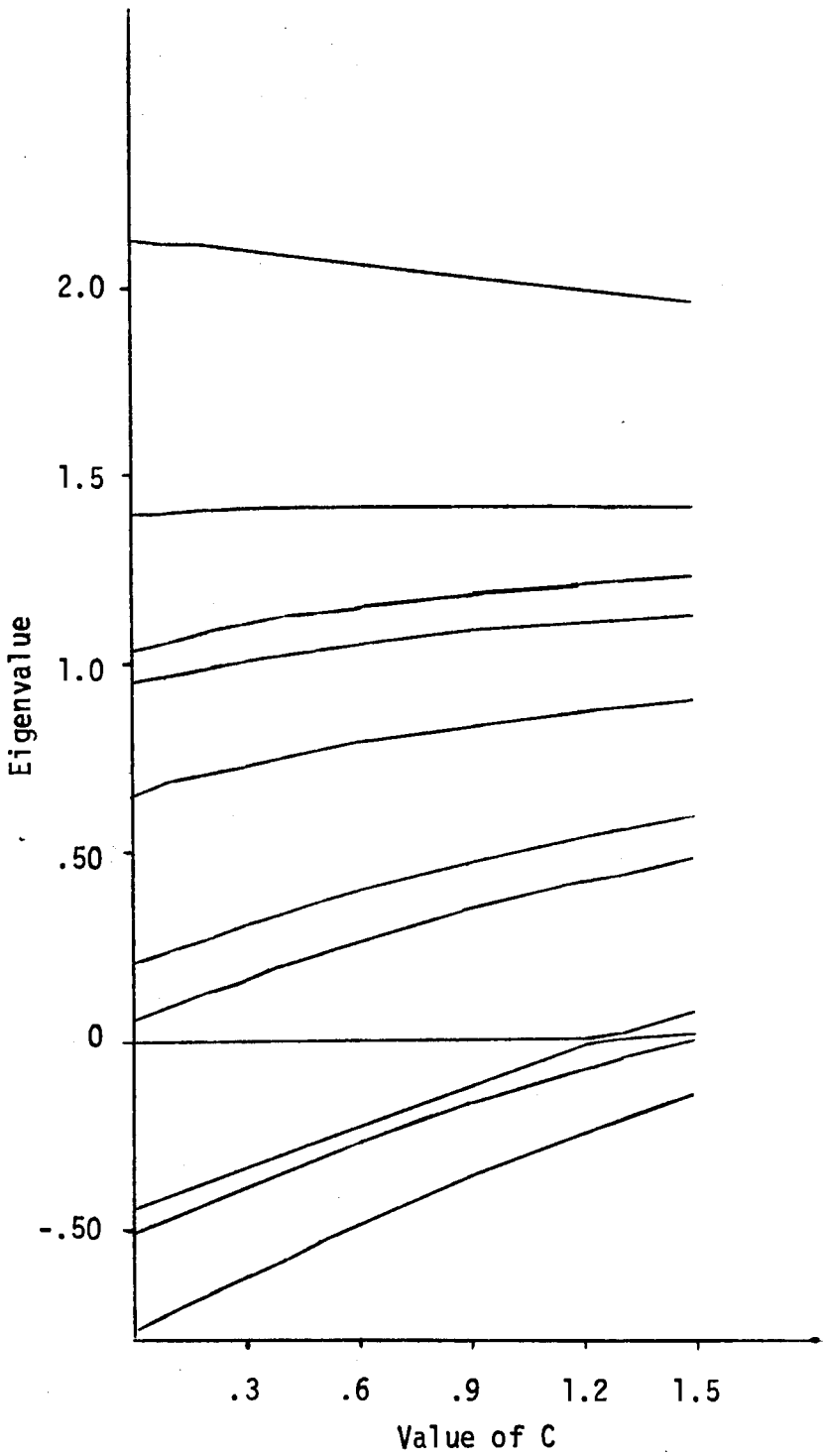
SUBJECT C



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

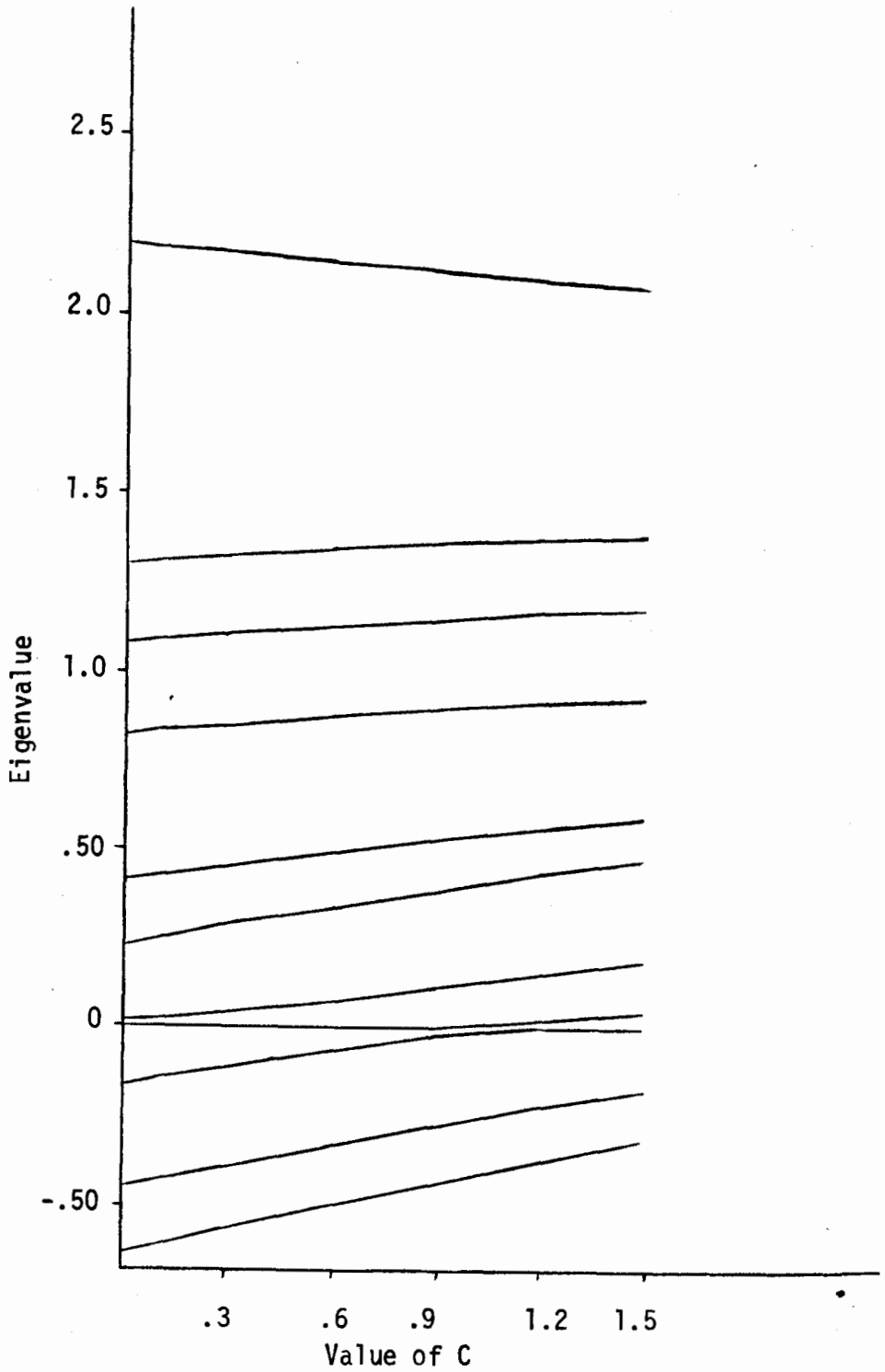
SUBJECT D



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

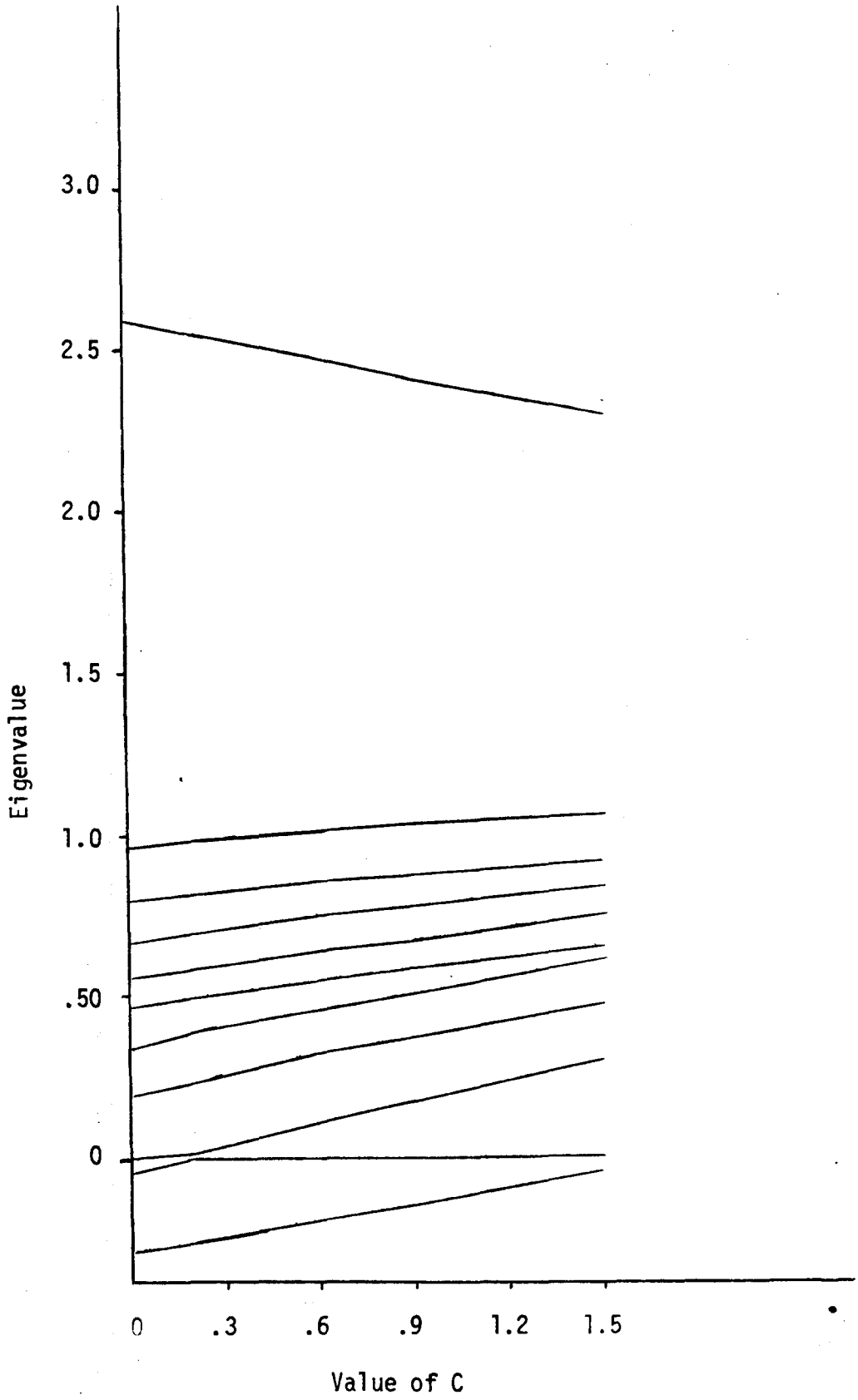
SUBJECT E



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

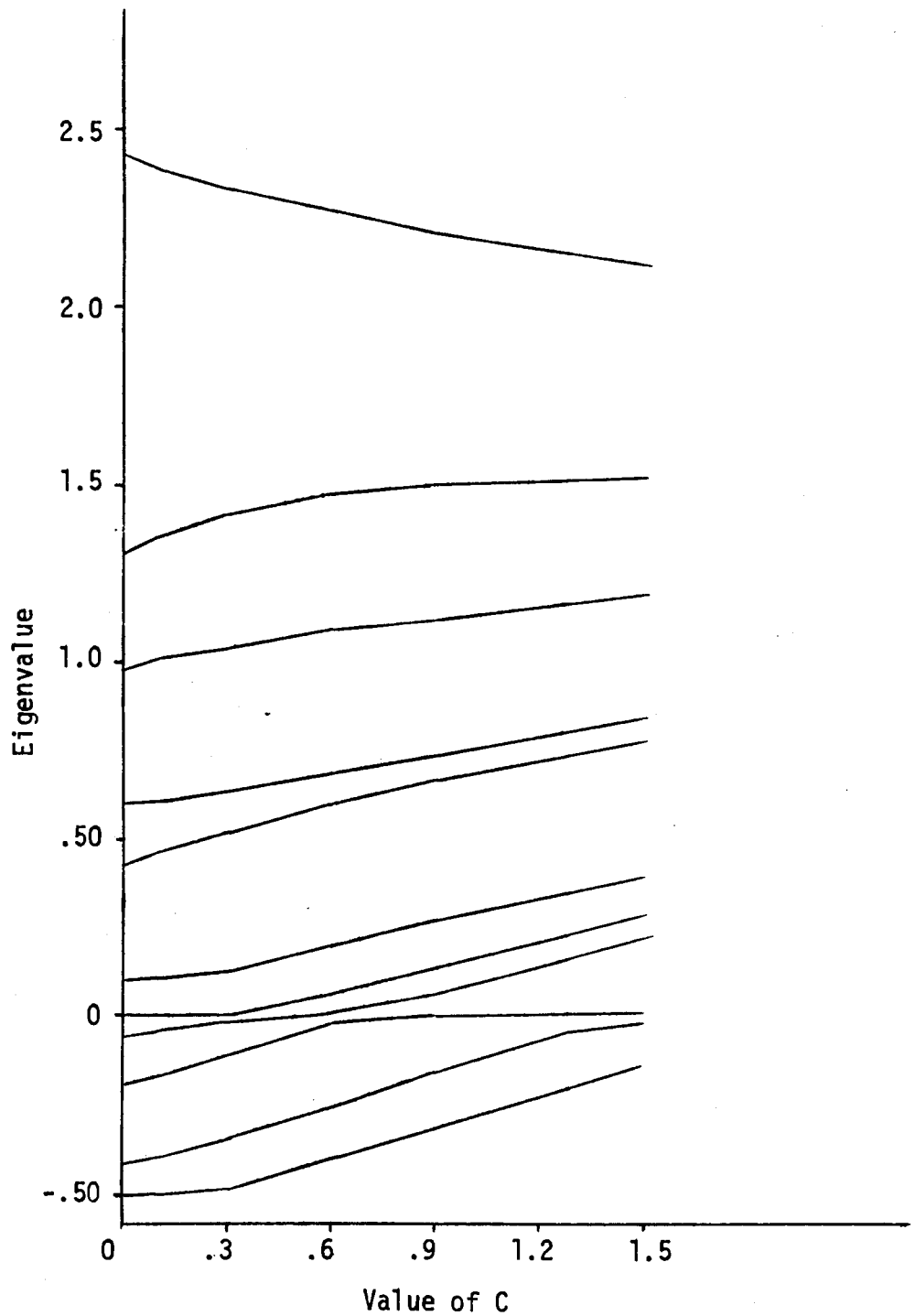
SUBJECT F



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

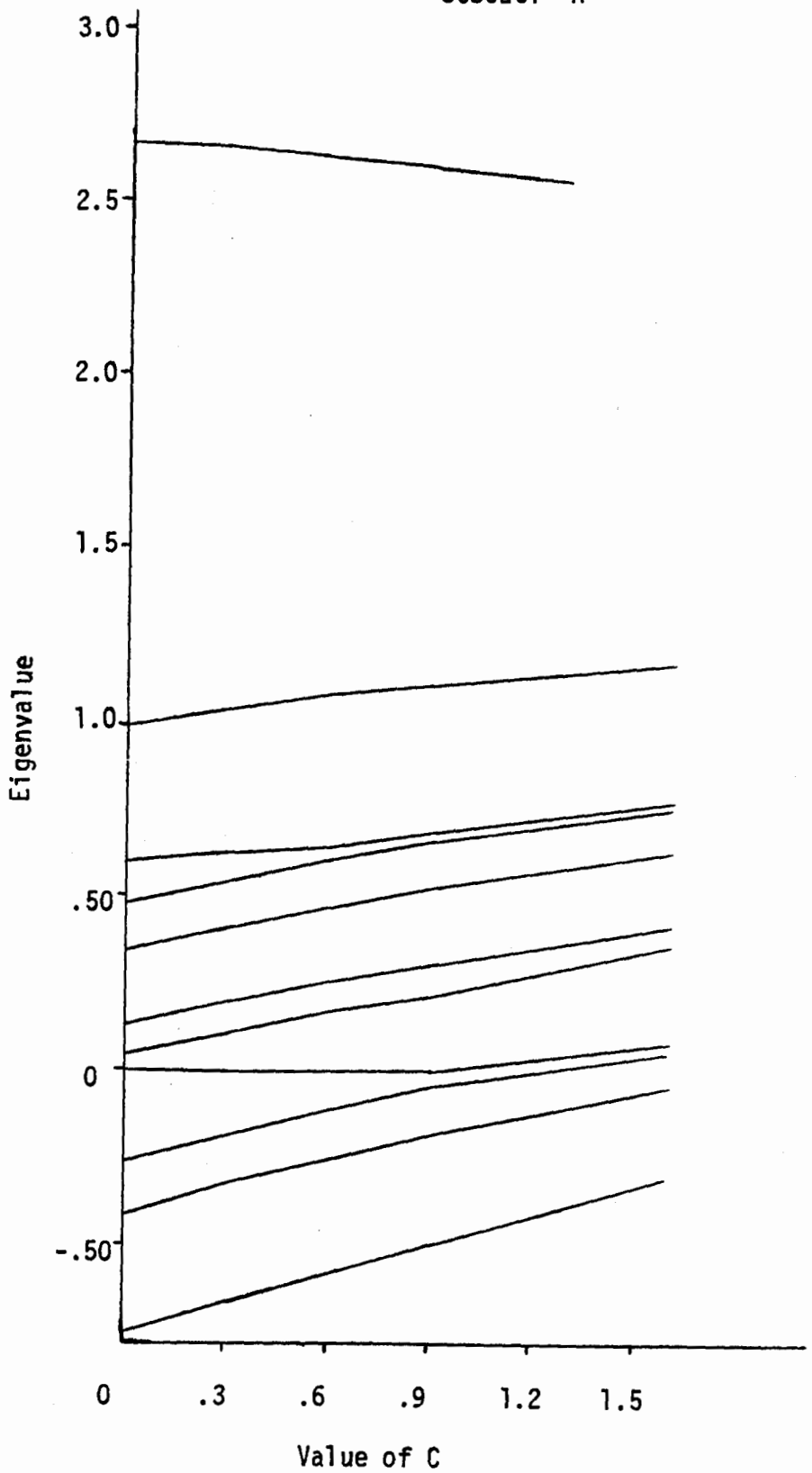
SUBJECT G



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

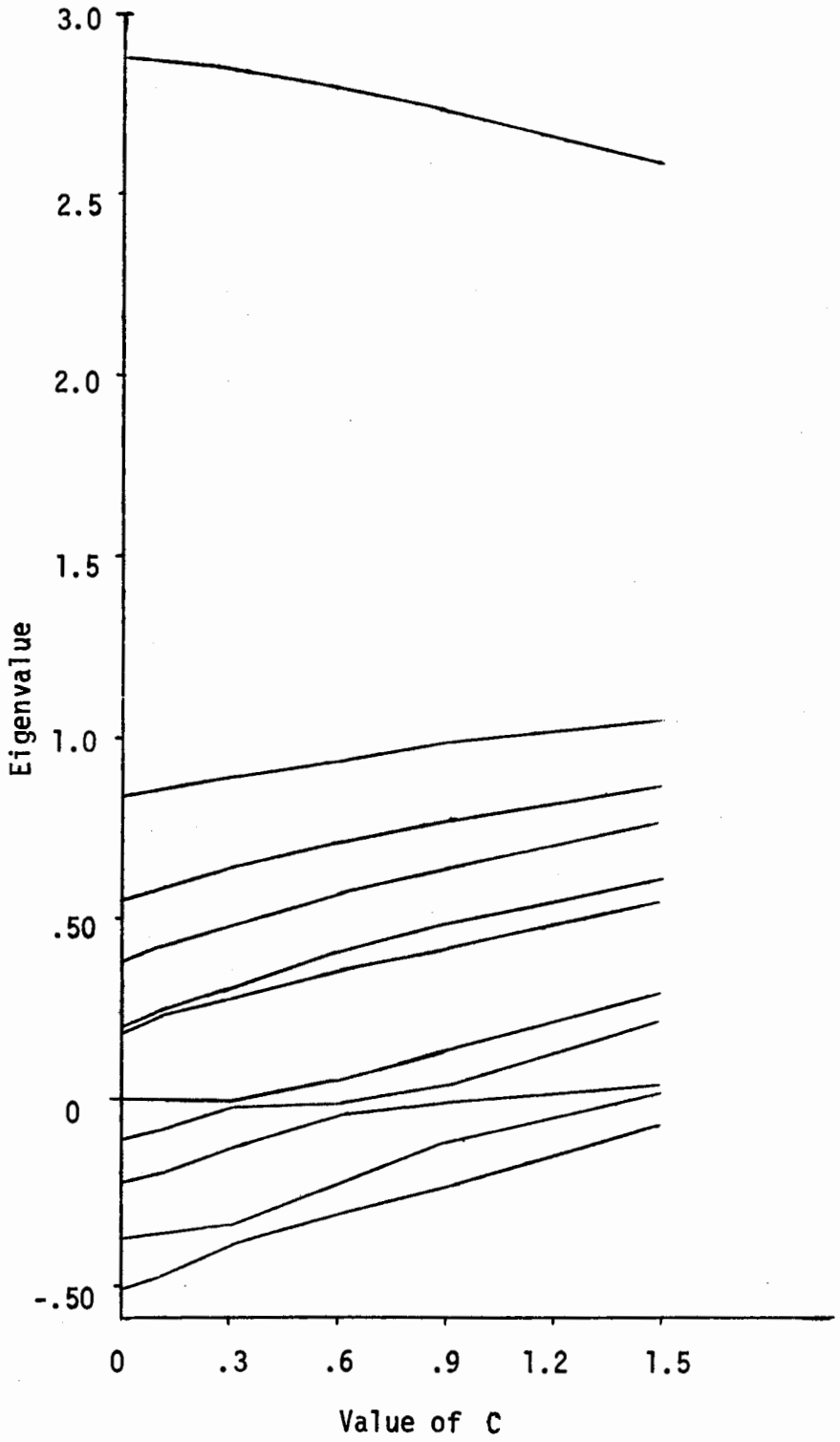
SUBJECT H



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

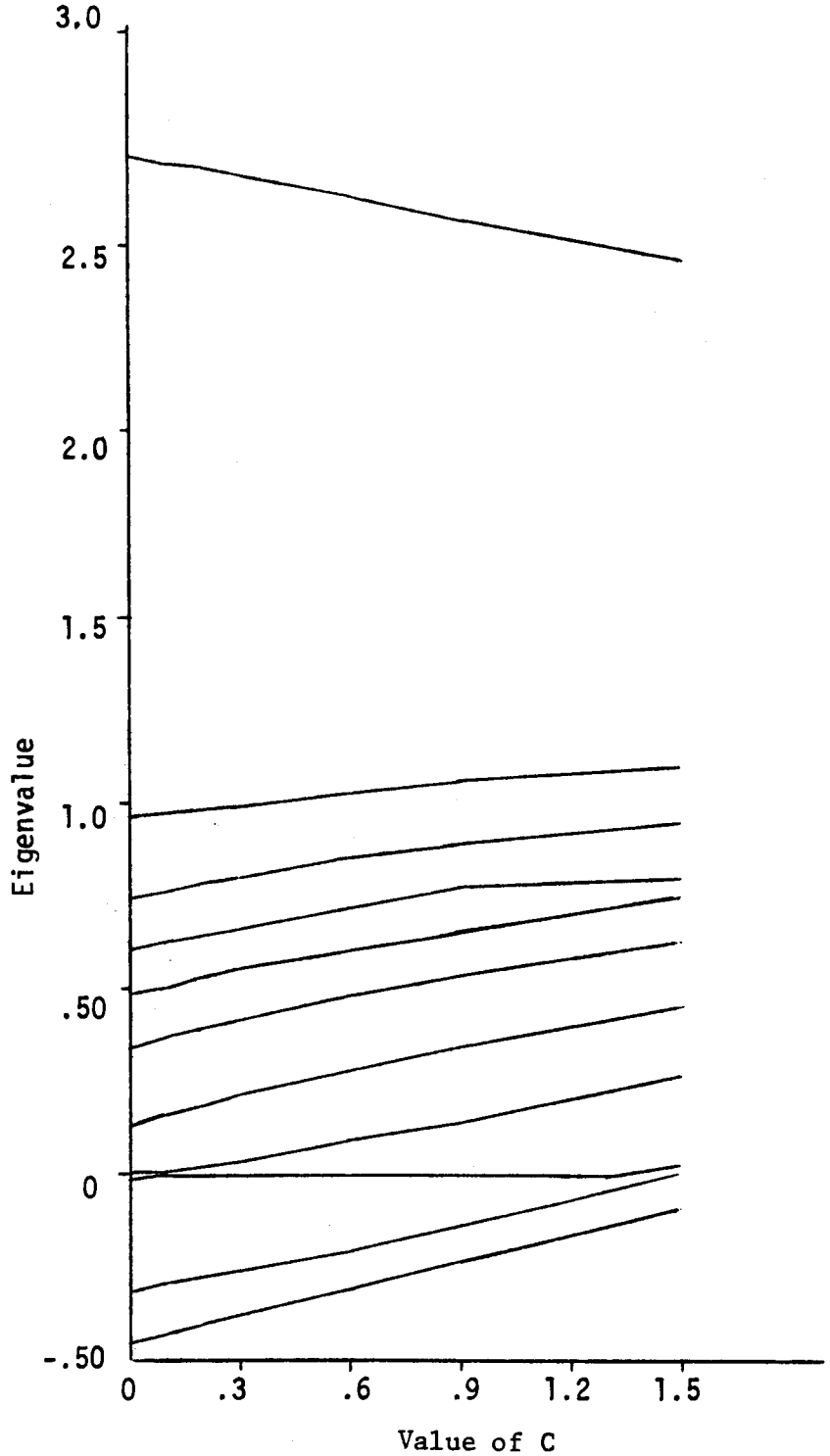
SUBJECT I



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

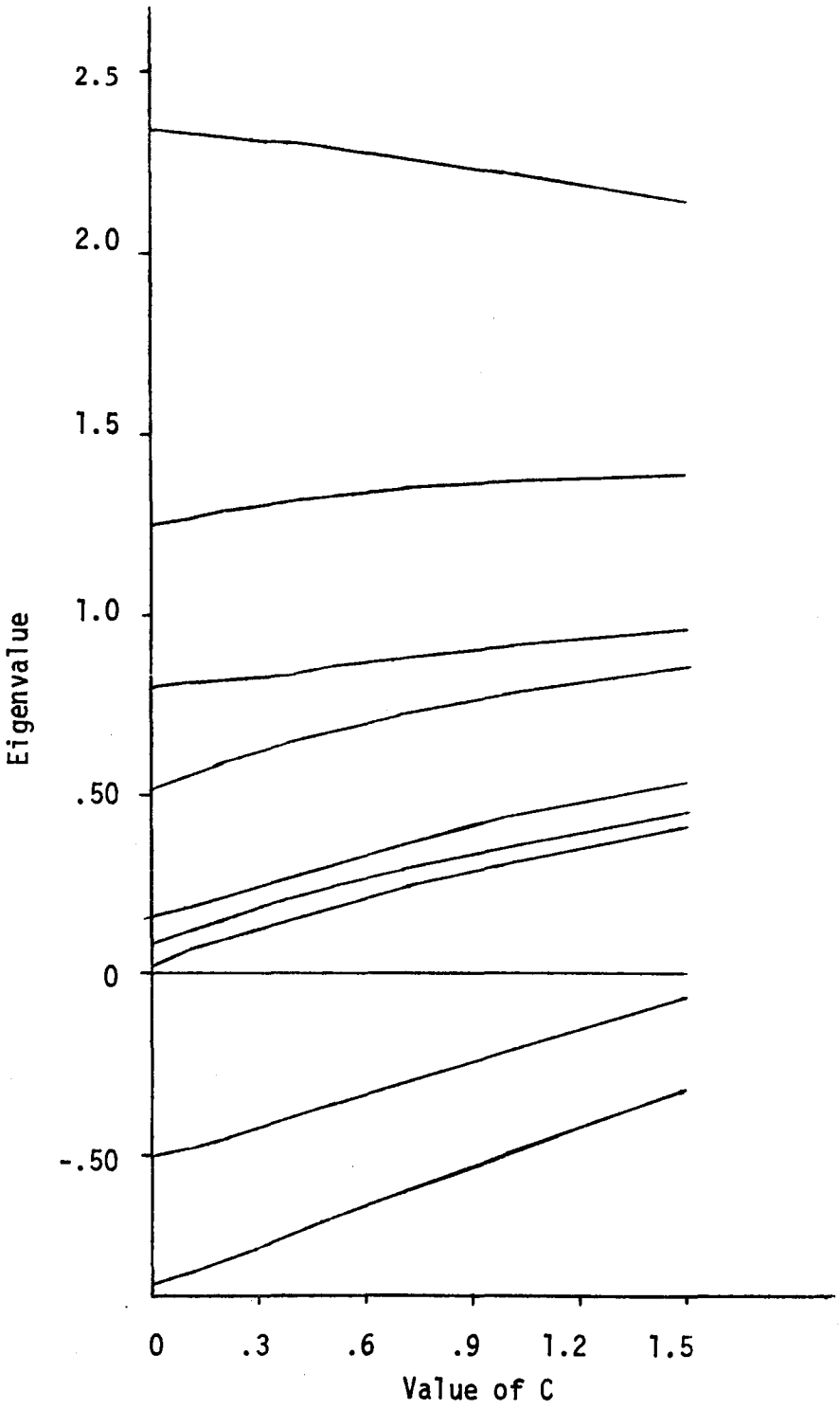
SUBJECT J



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

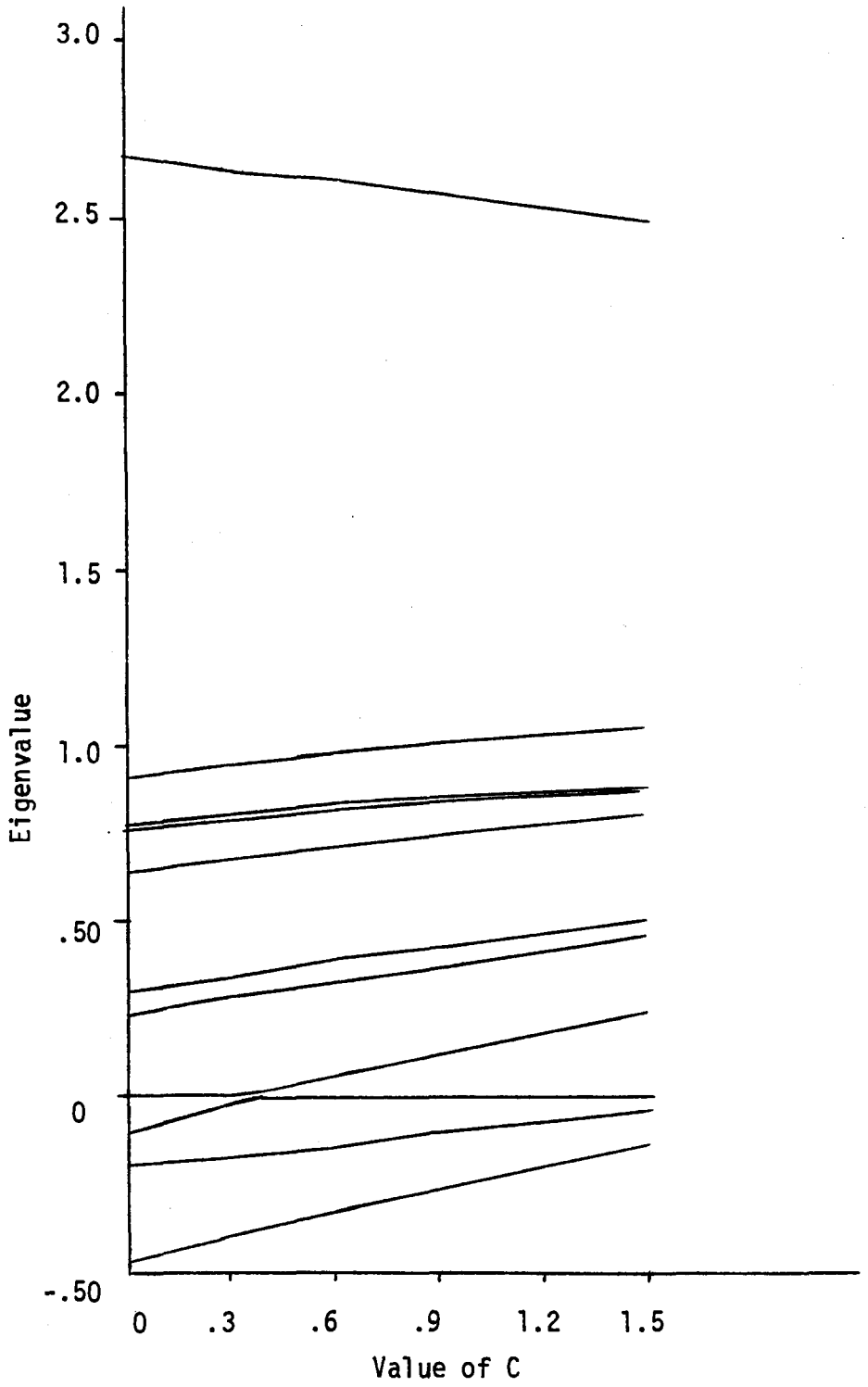
SUBJECT K



CHANGE IN EIGENVALUES AS A FUNCTION

OF C (ADDITIVE CONSTANT)

SUBJECT L



## Appendix D

### Results For Individual Subjects

Note: For interpretation purposes all the items with r's > criterion r for .05 level of significance are reported. In those cases where fewer than six items met this criterion, the six items with highest r's are reported, with the restriction that no item with an r < .30 is reported.

To provide the greatest conceptual clarity in interpreting the meaning of dimensions, items with negative correlations have been reflected and thus all r's are reported as positive. The reflected items have been identified with an asterisk (*).

$\bar{R}^2$ is the mean of the multiple correlations between a subject's dimensions (predictors) and each of the 30 PP Scale items (criterion). This is an index of the common variance for the two judgmental tasks (difference estimation & bipolar ratings) completed by each subject.

Subject A

MALE AGE: 23

C= 0

$\bar{R}^2$=.663

Criterion r for .05 level of significance = .602 (df=9)

Six dimensions accounting for 96.6% of the variance

Dimension I (relative eigenvalue = 2.13)

| r | Item | | |
|---|---|---|---|
| .91* | polished | -- | crude |
| .84* | physically attractive | -- | not physically attractive |
| .77* | predictable | -- | erratic |
| .75* | pleasant movement | -- | unpleasant movement |
| .64 | passive | -- | active |
| .63* | attractive eyes | -- | unattractive eyes |

Dimension II (relative eigenvalue = 1.64)

| r | Item | | |
|---|---|---|---|
| .76* | female SP | -- | male SP |
| .62* | rounded | -- | angular |
| .61 | small | -- | large |
| .61* | responsive | -- | unresponsive |
| .55 | simple | -- | complex |
| .49 | stranger | -- | intimate relationship |

Dimension III (relative eigenvalue = .96)

| r | Item | | |
|---|---|---|---|
| .64 | reality oriented | -- | spiritual |
| .63* | responsible | -- | irresponsible |
| .63* | strong | -- | weak |
| .61* | sincere | -- | insincere |
| .54* | friendly | -- | hostile |
| .50 | relaxed | -- | tense |

Dimension IV (relative eigenvalue = .79)

| r | Item | | |
|---|---|---|---|
| .47 | gestures frequently | -- | does not gesture |
| .43 | erratic | -- | predictable |
| .43 | materialistic | -- | not materialistic |
| .41 | small | -- | large |
| .34* | rounded | -- | angular |
| .33* | friendly | -- | hostile |

Dimension V (relative eigenvalue = .69)

| r | Item | | |
|---|---|---|---|
| .51* | good-natured | -- | irritable |
| .43 | talkative | -- | quiet |
| .43* | supportive | -- | self-interested |
| .42* | self-assertive | -- | submissive |
| .41* | friendly | -- | hostile |
| .38* | well-adjusted | -- | maladjusted |

Dimension VI (relative eigenvalue = .64)

| r | Item | | |
|---|---|---|---|
| .75 | gestures frequently | -- | does not gesture |
| .51 | talkative | -- | quiet |
| .48* | good-natured | -- | irritable |
| .47* | smiles | -- | frowns |
| .45* | self-assertive | -- | submissive |
| .39 | simple | -- | complex |

Subject B

MALE AGE: 19

C=.25

$\bar{R}^2$=.490

Criterion r for .05 level of significance = .602 (df=9)

Four dimensions accounting for 91.6% of the variance

Dimension I (relative eigenvalue = 2.50)

| r | Item | | |
|---|---|---|---|
| .80* | physically attractive | -- | not physically attractive |
| .79* | polished | -- | crude |
| .69* | pleasant movement | -- | unpleasant movement |
| .67 | conforming | -- | nonconforming |
| .58 | good | -- | bad |
| .55 | smiles | -- | frowns |

Dimension II (relative eigenvalue - 1.11)

| r | Item | | |
|---|---|---|---|
| .78* | quiet | -- | talkative |
| .56 | male SP | -- | female SP |
| .52* | sincere | -- | insincere |
| .52* | sensitive | -- | insensitive |
| .51* | supportive | -- | self-interested |
| .51* | responsible | -- | irresponsible |

Dimension III (relative eigenvalue = .93)

| r | Item | | |
|---|---|---|---|
| .64* | attractive eyes | -- | unattractive eyes |
| .51* | good natured | -- | irritable |
| .50* | like facial expressions | -- | do not like facial expressions |
| .48* | nonconforming | -- | conforming |
| .47* | good | -- | bad |
| .46* | physically attractive | -- | not physically attractive |

Dimension IV (relative eigenvalue = .90)

| r | Item | | |
|---|---|---|---|
| .49 | angular | -- | rounded |
| .46* | not materialistic | -- | materialistic |
| .44* | self-assertive | -- | submissive |
| .42* | tense | -- | relaxed |
| .41 | irritable | -- | good natured |
| .41* | nonconforming | -- | conforming |

Subject C

MALE AGE: 24

C=.7

$\bar{R}^2$=.593

Criterion r for .05 level of significance = .602 (df=9)

Five dimensions accounting for 92.8% of the variance

Dimension I (relative eigenvalue = 2.21)

| r | Item | | |
|---|---|---|---|
| .72* | physically attractive | -- | not physically attractive |
| .62* | attractive eyes | -- | unattractive eyes |
| .62* | like facial expressions | -- | do not like facial expressions |
| .62* | well-adjusted | -- | maladjusted |
| .60* | rational | -- | irrational |
| .56* | sincere | -- | insincere |

Dimension II (relative eigenvalue = 1.43)

| r | Item | | |
|---|---|---|---|
| .65 | irritable | -- | good-natured |
| .62 | maladjusted | -- | well-adjusted |
| .62 | irresponsible | -- | responsible |
| .62 | simple | -- | complex |
| .59 | insensitive | -- | sensitive |
| .56 | unattractive eyes | -- | attractive eyes |

Dimension III (relative eigenvalue - 1.11)

| r | Item | | |
|---|---|---|---|
| .72* | does not gesture | -- | gestures frequently |
| .51 | small | -- | large |
| .47* | sincere | -- | insincere |
| .46* | tense | -- | relaxed |
| .40* | intimate relationship | -- | stranger |
| .37 | submissive | -- | self-assertive |

Dimension IV (relative eigenvalue = .82)

| r | Item | | |
|---|---|---|---|
| .82 | hostile | -- | friendly |
| .60 | frowns | -- | smiles |
| .63 | self-interested | -- | supportive |
| .62 | angular | -- | rounded |
| .53 | erratic | -- | predictable |
| .53* | polished | -- | crude |

Dimension V (relative eigenvalue = .67)

| r | Item | | |
|---|---|---|---|
| .56 | bad | -- | good |
| .56 | reality oriented | -- | spiritual |
| .54 | male SP | -- | female SP |
| .53 | relaxed | -- | tense |
| .53 | insensitive | -- | sensitive |
| .46 | materialistic | -- | not materialistic |

Subject D

FEMALE AGE: 28

C=.3

Criterion r for .05 level of significance = .602 (df=9)

$\bar{R}^2$=.557 Four dimensions accounting for 86.9% of the variance

Dimension I (relative eigenvalue - 2.11)

| r | Item | | |
|---|---|---|---|
| .72* | complex | -- | simple |
| .71* | does not gesture | -- | gestures frequently |
| .71 | self-interested | -- | supportive |
| .66* | large | -- | small |
| .63* | quiet | -- | talkative |
| .62 | angular | -- | rounded |

Dimension II (relative eigenvalue = 1.41)

| r | Item | | |
|---|---|---|---|
| .85 | insensitive | -- | sensitive |
| .82 | unresponsive | -- | responsive |
| .79 | do not like facial expressions | -- | like facial expressions |
| .76 | insincere | -- | sincere |
| .69 | bad | -- | good |
| .68 | hostile | -- | friendly |
| .62 | irresponsible | -- | responsible |
| .62 | talkative | -- | quiet |

Dimension III (relative eigenvalue - 1.11)

| r | Item | | |
|---|---|---|---|
| .61 | not physically attractive | -- | physically attractive |
| .59 | unattractive eyes | -- | attractive eyes |
| .54 | crude | -- | polished |
| .50* | not materilistic | -- | materialistic |
| .50 | old | -- | young |
| .42* | spiritual | -- | reality oriented |

Dimension IV (relative eigenvalue - 1.01)

| r | Item | | |
|---|---|---|---|
| .52* | smiles | -- | frowns |
| .52 | simple | -- | complex |
| .52* | young | -- | old |
| .44 | not physically attractive | -- | physically attractive |
| .34 | gestures frequently | -- | does not gesture |

Subject E

FEMALE AGE: 23

C=.6

$\bar{R}^2$=.473

Criterion r for .05 level of significance = .602 (df=9)

Four dimensions accounting for 92.4% of the variance

Dimension I (relative eigenvalue = 2.29)

| r | Item | | |
|---|---|---|---|
| .92 | talkative | -- | quiet |
| .62* | friendly | -- | hostile |
| .53* | smiles | -- | frowns |
| .48 | irresponsible | -- | responsible |
| .45* | large | -- | small |
| .43* | responsive | -- | unresponsive |

Dimension II (relative eigenvalue = 1.37)

| r | Item | | |
|---|---|---|---|
| .90* | intimate relationship | -- | stranger |
| .80* | attractive eyes | -- | unattractive eyes |
| .74* | like facial expressions | -- | do not like facial expressions |
| .71* | predictable | -- | erratic |
| .61* | good | -- | bad |
| .50* | sincere | -- | insincere |

Dimension III (relative eigenvalue = 1.15)

| r | Item | | |
|---|---|---|---|
| .71* | tense | -- | relaxed |
| .66* | polished | -- | crude |
| .63 | maladjusted | -- | well-adjusted |
| .62 | conforming | -- | nonconforming |
| .60* | responsible | -- | irresponsible |
| .59 | small | -- | large |

Dimension IV (relative eigenvalue = .89)

| r | Item | | |
|---|---|---|---|
| .51 | male SP | -- | female SP |
| .48* | not materialistic | -- | materialistic |
| .45 | irresponsible | -- | responsible |
| .43 | angular | -- | rounded |
| .42 | crude | -- | polished |
| .42 | relaxed | -- | tense |

Subject F

FEMALE AGE: 22

C=.3

Criterion r for .05 level of significance = .602 (df=9)

$\bar{R}^2$=.857 Seven dimensions accounting for 98.9% of the variance

Dimension I (relative eigenvalue = 2.60)

| r | Item | | |
|---|---|---|---|
| .94* | strong | -- | weak |
| .91* | rational | -- | irrational |
| .90* | well-adjusted | -- | maladjusted |
| .87 | reality oriented | -- | spiritual |
| .85* | good-natured | -- | irritable |
| .85* | good | -- | bad |
| .85* | predictable | -- | erratic |
| .85* | attractive eyes | -- | unattractive eyes |
| .84* | self-assertive | -- | submissive |
| .84* | physically attractive | -- | not physically attractive |
| .82* | active | -- | passive |
| .82* | like facial expressions | -- | do not like facial expressions |
| .80* | smiles | -- | frowns |
| .75 | insensitive | -- | sensitive |
| .75 | self-interested | -- | supportive |
| .66 | relaxed | -- | tense |
| .65* | friendly | -- | hostile |

Dimension II (relative eigenvalue = 1.02)

| r | Item | | |
|---|---|---|---|
| .50 | materialistic | -- | not materialistic |
| .49 | gestures frequently | -- | does not gesture |
| .45 | irresponsible | -- | responsible |
| .44 | talkative | -- | quiet |
| .41* | young | -- | old |
| .39 | unpleasant movement | -- | pleasant movement |

Dimension III (relative eigenvalue = .85)

| r | Item | | |
|---|---|---|---|
| .49 | unresponsive | -- | responsive |
| .44 | hostile | -- | friendly |
| .39 | conforming | -- | nonconforming |
| .38 | unattractive eyes | -- | attractive eyes |
| .31 | relaxed | -- | tense |

Dimension IV (relative eigenvalue = .73)

| r | Item | | |
|---|---|---|---|
| .58* | polished | -- | crude |
| .55 | male SP | -- | female SP |
| .43* | active | -- | passive |
| .41 | materialistic | -- | not materialistic |
| .40 | self-interested | -- | supportive |
| .36 | angular | -- | rounded |

Dimension V (relative eigenvalue = .62)

| r | Item | | |
|---|---|---|---|
| .59 | insincere | -- | sincere |
| .58 | angular | -- | rounded |
| .48* | does not gesture | -- | gestures frequently |
| .47* | young | -- | old |
| .46 | irresponsible | -- | responsible |
| .43* | polished | -- | crude |

Dimension VI (relative eigenvalue = .52)

| r | Item | | |
|---|---|---|---|
| .80* | large | -- | small |
| .71 | simple | -- | complex |
| .60* | rounded | -- | angular |
| .46 | gestures frequently | -- | does not gesture |
| .40 | reality oriented | -- | spiritual |
| .37 | frowns | -- | smiles |

Dimension VII (relative eigenvalue = .42)

| r | Item | | |
|---|---|---|---|
| .47 | old | -- | young |
| .42* | quiet | -- | talkative |
| .42* | pleasant movement | -- | unpleasant movement |
| .41 | relaxed | -- | tense |
| .39 | stranger | -- | intimate relationship |
| .34* | does not gesture | -- | gestures frequently |

Subject G

MALE AGE: 26

C=.05

$\bar{R}^2$=.467

Criterion r for .05 level of significance = .602 (df=9)

Three dimensions accounting for 89.2% of the variance

Dimension I (relative eigenvalue = 2.46)

| r | Item | | |
|---|---|---|---|
| .85* | pleasant movement | -- | unpleasant movement |
| .82* | like facial expressions | -- | do not like facial expressions |
| .79* | physically attractive | -- | not physically attractive |
| .79 | materialistic | -- | not materialistic |
| .76* | good-natured | -- | irritable |
| .76* | attractive eyes | -- | unattractive eyes |
| .73* | polished | -- | crude |
| .71* | friendly | -- | hostile |
| .68* | sincere | -- | insincere |
| .68* | intimate relationship | -- | stranger |
| .66* | smiles | -- | frowns |
| .65* | young | -- | old |
| .63* | strong | -- | weak |
| .62* | responsive | -- | unresponsive |
| .61* | good | -- | bad |

Dimension II (relative eigenvalue = 1.36)

| r | Item | | |
|---|---|---|---|
| .54* | quiet | -- | talkative |
| .47* | well-adjusted | -- | maladjusted |
| .45* | friendly | -- | hostile |
| .41 | simple | -- | complex |
| .41 | relaxed | -- | tense |
| .39* | sensitive | -- | insensitive |

Dimension III (relative eigenvalue = 1.01)

| r | Item | | |
|---|---|---|---|
| .66 | gestures frequently | -- | does not gesture |
| .54* | good | -- | bad |
| .49 | male SP | -- | female SP |
| .48* | intimate relationship | -- | stranger |
| .42* | responsive | -- | unresponsive |
| .40* | nonconforming | -- | conforming |

## Subject H

FEMALE AGE: 21

C=.6

$\bar{R}^2$=.462

Criterion r for .05 level of significance = .602 (df=9)

Four dimensions accounting for 92.1% of the variance

Dimension I (relative eigenvalue = 2.68)

| r | Item | | |
|---|---|---|---|
| .82* | physically attractive | -- | not physically attractive |
| .82* | responsible | -- | irresponsible |
| .80 | materialistic | -- | not materialistic |
| .80* | attractive eyes | -- | unattractive eyes |
| .79 | conforming | -- | nonconforming |
| .79 | reality oriented | -- | spiritual |
| .74* | polished | -- | crude |

Dimension II (relative eigenvalue = 1.10)

| r | Item | | |
|---|---|---|---|
| .80 | angular | -- | rounded |
| .55 | irritable | -- | good-natured |
| .50* | tense | -- | relaxed |
| .47 | small | -- | large |
| .47 | conforming | -- | nonconforming |
| .45* | intimate relationship | -- | stranger |

Dimension III (relative eigenvalue = .66)

| r | Item | | |
|---|---|---|---|
| .71* | good-natured | -- | irritable |
| .55* | smiles | -- | frowns |
| .52* | sincere | -- | insincere |
| .50 | relaxed | -- | tense |
| .44* | active | -- | passive |
| .38* | well-adjusted | -- | maladjusted |

Dimension IV (relative eigenvalue = .62)

| r | Item | | |
|---|---|---|---|
| .64 | erratic | -- | predictable |
| .56* | smiles | -- | frowns |
| .46* | spiritual | -- | reality oriented |
| .44* | active | -- | passive |
| .39* | complex | -- | simple |
| .34* | nonconforming | -- | conforming |

## Subject I

MALE AGE: 25

C=0

$\bar{R}^2$=.381

Criterion r for .05 level of significance = .602 (df=9)

Two dimensions accounting for 90.7% of the variance

Dimension I (relative eigenvalue = 2.88)

| r | Item | | |
|---|---|---|---|
| .87* | predictable | -- | erratic |
| .82* | does not gesture | -- | gestures frequently |
| .77 | conforming | -- | nonconforming |
| .75 | insincere | -- | sincere |
| .75 | simple | -- | complex |
| .73 | stranger | -- | intimate relationship |
| .70 | do not like facial expressions | -- | like facial expressions |
| .66 | submissive | -- | self-assertive |
| .63 | irritable | -- | good-natured |
| .62 | unattractive eyes | -- | attractive eyes |
| .62 | passive | -- | active |
| .60 | reality oriented | -- | spiritual |

Dimension II (relative eigenvalue = .88)

| r | Item | | |
|---|---|---|---|
| .84 | angular | -- | rounded |
| .74* | physically attractive | -- | not physically attractive |
| .59 | male SP | -- | female SP |
| .58* | polished | -- | crude |
| .53 | conforming | -- | nonconforming |
| .52* | smiles | -- | frowns |

Subject J

FEMALE AGE: 21

C=0

$\bar{R}^2$=.564

Criterion r for .05 level of significance = .602 (df=9)

Four dimensions accounting for 93.4% of the variance

Dimension I (relative eigenvalue = 2.74)

| r | Item | | |
|---|---|---|---|
| .87* | responsive | -- | unresponsive |
| .87* | responsible | -- | irresponsible |
| .84* | attractive eyes | -- | unattractive eyes |
| .83* | like facial expressions | -- | do not like facial expressions |
| .77* | sincere | -- | insincere |
| .76* | active | -- | passive |
| .76* | intimate relationship | -- | stranger |
| .72* | well-adjusted | -- | maladjusted |
| .72* | polished | -- | crude |
| .71* | pleasant movement | -- | unpleasant movement |
| .70* | rational | -- | irrational |
| .66* | sensitive | -- | insensitive |
| .66* | physically attractive | -- | not physically attractive |
| .62* | strong | -- | weak |
| .61* | supportive | -- | self-interested |

Dimension II (relative eigenvalue = .96)

| r | Item | | |
|---|---|---|---|
| .77* | predictable | -- | erratic |
| .66 | conforming | -- | nonconforming |
| .51 | small | -- | large |
| .38* | supportive | -- | self-interested |
| .38 | simple | -- | complex |
| .38* | tense | -- | relaxed |

Dimension III (relative eigenvalue = .74)

| r | Item | | |
|---|---|---|---|
| .60 | relaxed | -- | tense |
| .58 | angular | -- | rounded |
| .47* | strong | -- | weak |
| .43* | spiritual | -- | reality oriented |
| .38* | physically attractive | -- | not physically attractive |
| .37* | good | -- | bad |

Dimension IV (relative eigenvalue = .60)

| r | Item | | |
|---|---|---|---|
| .44 | frowns | -- | smiles |
| .36* | large | -- | small |

## Subject K

FEMALE AGE: 21

C=.7

$\bar{R}^2$=.562

Criterion r for .05 level of significance = .632 (df=8)

Four dimensions accounting for 91.9% of the variance

Dimension I (relative eigenvalue = 2.27)

| r | Item | | |
|---|---|---|---|
| .90 | do not like facial expressions | -- | like facial expressions |
| .85 | passive | -- | active |
| .85 | hostile | -- | friendly |
| .84 | insincere | -- | sincere |
| .83 | irritable | -- | good-natured |
| .75 | conforming | -- | nonconforming |
| .69* | tense | -- | relaxed |

Dimension II (relative eigenvalue = 1.35)

| r | Item | | |
|---|---|---|---|
| .67 | unpleasant movement | -- | pleasant movement |
| .66 | crude | -- | polished |
| .56* | tense | -- | relaxed |
| .45 | maladjusted | -- | well-adjusted |
| .41 | simple | -- | complex |
| .38 | passive | -- | active |

Dimension III (relative eigenvalue = .88)

| r | Item | | |
|---|---|---|---|
| .69 | reality oriented | -- | spiritual |
| .64 | unresponsive | -- | responsive |
| .52* | strong | -- | weak |
| .50 | bad | -- | good |
| .42* | smiles | -- | frowns |
| .42* | responsible | -- | irresponsible |

Dimension IV (relative eigenvalue = .72)

| r | Item | | |
|---|---|---|---|
| .66 | simple | -- | complex |
| .60 | frowns | -- | smiles |
| .60 | irresponsible | -- | responsible |
| .58 | maladjusted | -- | well-adjusted |
| .51 | not physically attractive | -- | physically attractive |
| .41 | submissive | -- | self-assertive |

Subject L

FEMALE AGE: 26

C=0

Criterion r for .05 level of significance = .602 (df=9)

$\bar{R}^2$=.533 Five dimensions accounting for 95.9% of the variance

Dimension I (relative eigenvalue = 2.68)

| r | Item | | |
|---|---|---|---|
| .90* | polished | -- | crude |
| .81* | physically attractive | -- | not physically attractive |
| .80 | materialistic | -- | not materialistic |
| .76* | responsible | -- | irresponsible |
| .75* | attractive eyes | -- | unattractive eyes |
| .74* | pleasant movement | -- | unpleasant movement |
| .69 | conforming | -- | nonconforming |
| .69* | like facial expressions | -- | do not like facial expressions |
| .63* | good-natured | -- | irritable |
| .60* | sincere | -- | insincere |

Dimension II (relative eigenvalue = .91)

| r | Item | | |
|---|---|---|---|
| .59* | supportive | -- | self-interested |
| .53* | self-assertive | -- | submissive |
| .52* | strong | -- | weak |
| .43* | sensitive | -- | insensitive |
| .40* | smiles | -- | frowns |
| .37* | female SP | -- | male SP |

Dimension III (relative eigenvalue = .77)

| r | Item | | |
|---|---|---|---|
| .58 | male SP | -- | female SP |
| .52 | relaxed | -- | tense |
| .49 | strange | -- | intimate relationship |
| .48* | attractive eyes | -- | unattractive eyes |
| .46 | unresponsive | -- | responsive |
| .43 | passive | -- | active |

Dimension IV (relative eigenvalue = .76)

| r | Item | | |
|---|---|---|---|
| .65* | well-adjusted | -- | maladjusted |
| .39 | frowns | -- | smiles |
| .39 | erratic | -- | predictable |
| .39 | unpleasant movement | -- | pleasant movement |
| .34 | relaxed | -- | tense |
| .33* | supportive | -- | self-interested |

Dimension V (relative eigenvalue = .64)

| r | Item | | |
|---|---|---|---|
| .63 | small | -- | large |
| .60 | irritable | -- | good-natured |
| .58 | erratic | -- | predictable |
| .58* | does not gesture | -- | gestures frequently |
| .45* | quiet | -- | talkative |
| .44 | hostile | -- | friendly |

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