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The cognitive representation of everyday situations ;: a multidimensional study.

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THE COGNITIVE REPRESENTATION OF EVERYDAY SITUATIONS: A MULTIDIMENSIONAL STUDY

A Thesis Presented

By

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ABSTRACT

The dimensions underlying individual cognitive representations of everyday situations were investigated. Nine subjects recorded descriptions of situations they had experienced for two separate weekly periods. Later, the subjects rated the similarity of each situation to all other situations on a nine point scale. A multidimensional scaling analysis was performed on these similarity judgments. The results indicated that three dimensions were sufficient to characterize the spaces of all subjects but one, who required a four dimensional solution. For all subjects a dimension related to evaluative judgments was identified. Aside from this dimension there appeared to be little commonality among subjects. The results were discussed in terms of the advantages and disadvantages of nomothetic and idiosyncratic research methods. It was concluded that, in future research, a design employing aspects of both methods would be necessary, in order to adequately assess individual differences in cognitive structure.

CHAPTER I

INTRODUCTION

One of the more important issues within the realm of modern personality theory and research is the "person versus the situation" controversy. The essence of this controversy is whether it is more fruitful to construe the person or the situation as the main determinant of human behavior. The most recent flurry of debate on this long-standing dispute began with the publication of Walter Mischel's textbook on personality in 1968. In this book and in a later article (Mischel, 1969), Mischel attacked those personality theories espousing a person-oriented view of behavior on two major grounds.

First, in correlational research, as early as that of Hartshone and May (1928), consistently small correlations have been obtained between individual difference measures and actual behavior.

Secondly, a number of more recent studies, employing an analysis of variance technique, have investigated the relative quantitative contributions of persons, situations and their interactions to the total amount of variance and, on the whole, persons typically accounted for less variance than situations or the person x situation interaction (e.g., Rausch, Ditman and Taylor, 1965; Endler and Hunt, 1966, 1968 and 1969; Moos, 1968 and 1969).

Since then a number of cogent arguments have been leveled against Mischel's critique. First, it has been pointed out (Bowers, 1973; Wachtel, 1973) that Mischel has, in fact, overlooked a number of studies

in which persons accounted for a greater proportion of the variance than did situations, that Mischel's methods for estimating relative proportion of variance were incorrect, and that, in actuality, the person x situation interaction, not the situation itself, generally has accounted for the greatest proportion of variance. More importantly, some psychologists (Bowers, 1973; Harré and Secord, 1972; Endler, 1973; and Wachtel, 1973) have suggested that the basic experimental method employed to date, and the analysis of variance techniques which usually accompany it, have been specifically structured to exaggerate treatment or situation effects and that other methodologies and statistical techniques can be constructed to emphasize the importance of person-oriented variables.

The "person versus the situation" controversy is far from over. Indeed, the number of participants grows with each new issue of the major journals relevant to personality research. However, it is not the purpose of the present paper to extensively chronicle all the details of the dispute, but only to note that unlike many debates in psychology, the "person versus the situation" controversy has been productive, for it has broadened the conceptual frameworks of a number of major theoretical outlooks. Hence, it now appears that a number of psychologists who started out on different sides of the controversy are coming to similar conclusions about the nature of an adequate theory and method for the study of human action. Indeed, three major theoretical and methodological implications for future research can

be seen as emerging from this debate.

First, an increasing number of psychologists are proposing that an interactionist approach to understanding human behavior is appropriate--that emphasis should be on the interaction of the person and the situation, rather than on the person per se or the situation per se (e.g., Bowers, 1973; Endler, 1973; Argyle and Little, 1972; and Mischel, 1973).

Secondly, there has been a growing recognition of the importance of cognitive mediators in influencing human behavior--that is, a recognition that the meaning of a stimulus and the representational structure in which this meaning is embedded are of the utmost importance in understanding how humans act (e.g., Mischel, 1973; Bandura, 1971; Argyle and Little, 1972; Cattell, 1971; Bowers, 1973; Pervin, 1968; and Bem and Allen, 1974).

Third, there is evidence of a shift toward the view that studies based on a more idiographic data base can provide more fruitful and realistic information than the more common nomothetic studies (Mischel, 1973; Endler, 1973; Bem and Allen, 1974; and Endler and Hunt, 1966). A corollary of this view is that it also may be more productive for an individual under study to generate his own constructs for characterizing those particular aspects of himself and his social world which are of interest and also to allow him to determine which behaviors and situations are implied by these constructs (Bem, 1972; Bem and Allen, 1974).

Parallelling the reemergence of the "person versus the situation" controversy within psychological circles, there has been a rapid increase of interest in environmental and ecological issues within the entire community. This increased interest in ecology has been reflected in psychology by the development of an entirely new area of research--environmental psychology (cf. Craik, 1970, or Wohlwill, 1970 for an exposition of this development). As psychological research related to the ecological perspective progressed, it soon became apparent that an adequate framework for conceptualizing differing environments was a needed prerequisite for the development of a systematic program of research in the area and, indeed, for many other areas of psychological research as well. Thus, the development of environmental psychology for the first time brought widespread attention and interest to a conceptual need which was critical to all of psychology and, in particular, to any personality theory which endeavors to provide a basis for a full understanding of human behavior.[1] Of course, it is obvious that an adequate framework for construing situations is directly relevant to many issues within the "person-situation" controversy. For instance, Ekehammar (1974) has noted that, while our vocabulary is rich in terms useful for classifying persons, there are few terms or phrases immediately applicable to the description of situations. Because of

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[1] A number of earlier psychologists (e.g., Brunswik, 1956; Miller, 1963; Sells, 1963) had, on occasion, pointed out the need for such a framework, but their viewpoints did not seem to produce prolonged or widespread interest on this topic.

this fact, one often gets the impression from reading the work of those who speak of the effects of "the situation" per se that "the situation" is some monolithic entity with strange powers to reach out and direct human behavior. Clearly, a more sophisticated and discriminating language for describing situations would provoke more meaningful discussion on this topic.

Since the initial recognition of the need for a framework for construing situations or environments, a number of conceptual schemes have been proposed. Most have focussed on such characteristics as the physical properties of the environment, architectural design, sociological variables, or behavioristic analyses (see Moos, 1973, for a review of this literature). However, there has been relatively little done to assess the psychological or cognitive representational structures individuals use to construe different environments or situations. The purpose of the present experiment was to explore empirically the merits of one type of representational construct (a multidimensional spatial representation) as a model for the cognitive structure of situations. Furthermore, and equally important, the experiment attempted to implement, to some degree, the three imperatives for future personality research that were seen as emerging from the "person-situation" controversy as reviewed in the preceding paragraphs. Thus, the experiment (a) was based on an idiographic data base, (b) investigated cognitive representational structures, (c) construed these representational structures in manner congruent with an interactionist approach.

However, before discussing the experiment in more detail, brief consideration must be given to an examination of past conceptual frameworks for classifying situations which have emphasized a cognitive or psychological approach, and to the implications that this research has had for the design of the present study.

One of the earliest expressions of the cognitive orientation to situations was by Koffka (1935) in his book PRINCIPLES OF GESTALT PSYCHOLOGY. In his concept of the "behavioral environment," Koffka defined the environment not in physical terms, but in terms relevant to the situation as it was perceived and experienced. He maintained that the relationship between behavior and the geographical environment would remain obscure unless the mediation of the "behavioral environment" was taken into account.

This approach was further expanded by Lewin's (1936) field theory conception of a life space. Lewin, who was one of the first modern psychologists to espouse an interactionist point of view, proposed that behavior (or mental events) may be represented by the formula

$$B = f(PE)$$

indicating that behavior (B) is a function of the person (P) and the environment (E). Lewin regarded the components in the organism-environment system, not as independent elements, but as mutually dependent units. For Lewin also, behavior was not a function of a world of objective, physical, stimulus properties but of a world transformed into an "inner world" (psychological environment) by a cognizing

organism. Another noteworthy facet of Lewin's theory was his suggestion that the same conceptual constructs be used in the description of persons and of situations (Lewin, 1951). Besides being parsimonious such a mechanism allows for an easy transition in shifting focus from one domain to the other.

Within the Lewinian frame of reference, Henry Murray (1938) developed his "need-press" theory, a theory which again stressed the view that all human behavior was a function of a person-situation interaction.

> . . . for these reasons, the organism and its milieu must be considered together, a single creature-environment interaction being a convenient short unit for psychology. (Murray, 1938, pp. 39-40)

According to Murray, a person may be represented in terms of needs, which are organizational tendencies that seem to give unity and direction to a person's behavior, while the environment may be defined in terms of presses which are self-reported perceptions or interpretations of need satisfaction and need frustration. The concept of press thus provides an external parallel to the inner needs of the person. Murray, like Lewin, strove to represent both person and situation in commensurate terms. Ekehammer (1974), in a review of interactionist theories of behavior, has pointed out that such a conceptual arrangement has been an integral feature of many interactionist theories, particularly those with a cognitive orientation.

At the empirical level, George Stern and his associates have sought to implement Murray's conceptualization of the environment in a number

of studies on American collegiate environments (Pace and Stern, 1958; Stern, 1962; Stern, 1963; Stern, 1970; and Pace, 1967). To accomplish this, Stern developed the College Characteristics Index (CCI) which was constructed to represent Murray's (1938) listing of thirty kinds of presses in terms that were applicable to college environments. The basic rationale behind the CCI is that press may be inferred from consensual or aggregated perceptions of the environment. Each item on the CCI measures the extent to which an individual endorses an activity, attitude, procedure, impression, etc. associated with a particular press. The CCI has now been administered to over 100,000 students and studies have been performed attesting to its reliability, validity, and general heuristic value (cf. Walsh, 1973, for a review of research employing the CCI). Saunders (1969) has examined the factorial structure of the CCI using a principal components equamax solution. His study indicated that eleven first-order factors were present in the CCI and that when these were submitted to a second-order factor analysis, three factors were obtained which were labelled intellectual climate, nonintellectual climate and impulse control.

In another series of studies on collegiate environments (Pervin, 1967; Pervin, 1968), students at various colleges were asked to rate a number of concepts deemed important to college life (faculty, administration, students, etc.) on an inventory of bipolar adjectives which were chosen, a priori, on the basis of their relevance to students in college. Lilly (1965) completed a factor analysis on Pervin's

inventory. Five environmental factors were derived from the analysis which were termed practicality, community feeling, awareness, propriety, and scholarship.

At this point, it seems worthwhile to call attention to a number of critical flaws inherent in the research of Pervin and of Stern and his associates, since their method typifies an approach which is characteristic of many of the studies conducted within the growing field of environmental psychology. First, this research is based on aggregated perceptions of the environment and, therefore, cannot provide the kind of idiographic information that would be necessary for examining individual cognitive structures or organizational tendencies. Secondly, it is important to recognize that the characterizations of collegiate environments that were obtained, each strongly depends on the extent to which the items on a particular test are representative of the activities, attitudes, etc. that naturally occur in college life. The items on the inventories were all chosen on an a priori basis by the experimenter. It is possible that there may be major discrepancies in what the experimenter has deemed as relevant and what the actual participants in the environment would deem as relevant. Furthermore, since the items on a particular inventory were chosen on the basis of their applicability to a specific type of environment (e.g., colleges), it seems unlikely that the factorial structures, that were obtained with a given inventory, could be extended to other sorts of environments. Thirdly, in all of this re-

search a person is presented with items pertaining to various attributes of an environment. However, in no case is the person presented with the entire environment per se. It seems likely that research conducted with the entire environment or situation would be more meaningful and, in addition, might produce results which are substantially different from the elementary analyses.

Finally, most of the research of this type has focussed on a very molar conceptualization of the environment, examining such large scale environments as "a college." In fact, this research seems to equate the notion of environment with the notion of a locality or physical location. If the concept "environment" is to have this particular definition, perhaps it is necessary to distinguish it from the concept of "a situation." Many events, occurrences, human actions, etc. can take place at one particular physical location. These more microcosmic happenings may be defined as situations. At an intuitive level this sort of conceptualization seems closer to the common notion of "a situation" and to the notion of a situation which is implied in the "person versus the situation" controversy, described above. Research conducted at the more molar environmental level has obvious value in providing information on questions pertinent to particular localities. However, the importance of research conducted at the more molecular or situational level cannot be underemphasized since it does not seem prudent to go from knowledge about the average characteristics of a physical location to a direct attempt to predict human action in that locality. Thus, knowledge of "the situation" rather than "the

environment" seems necessary and indispensable to areas of psychology concerned with more situationally oriented questions, such as personality theory, clinical psychology, etc.

A method for studying the dimensions underlying situations, which uses entire situations as stimuli, has been proposed by Magnusson (1971) and Magnusson and Ekehammar (1973). Instead of estimating similarity between situations by measures of correlation over scales or individuals, they suggested that measures of similarity for each pair of situations could be obtained as direct estimates from subjects. Then, to find the underlying main structure, the similarity matrices could be analyzed by a multidimensional scaling algorithm.

With such an approach in mind, Magnusson (1971) contrived a number of situations, all involving academic concerns (e.g., have passed an examination with top marks) and presented them to three university students to obtain the direct estimates of similarity, mentioned above. Each of the individual similarity matrices was analyzed by a multidimensional scaling algorithm developed by Ekman (1954), an algorithm which bears a close resemblance to a principal components analysis.[2]

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[2]There are two major theoretical models for multidimensional scaling algorithms--the "distance" model and the "vector" model. The distance model is by far the most popular. In fact, the vector model has had little usage outside the University of Stockholm where it was developed. In a recent article comparing the two models, Sjoberg (1975) has demonstrated that the vector model has many disadvantages in comparison to the distance model in spite of many attempts to improve its weaknesses.

An examination of the results indicated, that while there were some individual differences, for the most part, all individuals were found to have the same five factor structure. The five factors were: a positive factor, a negative factor, a social factor, a passive factor, and a factor involving active intellectual activity. Examples of situations with high factor loadings on these five factors are listed in TABLE 1.

Magnusson, observing that there was only a small amount of evidence for individual differences, in two later studies (Ekehammar and Magnusson,

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PRESENT TABLE ONE HERE

1973; Magnusson and Ekehammar, 1973) obtained similarity judgments from larger groups of subjects and averaged their judgments into one average similarity matrix which was then analyzed by Ekman's algorithm. In both of these later studies the same five factors found in the original study were obtained.

In another study, employing a different multidimensional algorithm, Wish, Kaplan and Deutsch (1973) investigated the dimensions underlying people's perceptions of different kinds of interpersonal relations. There were three groups of subjects in the experiment. The first group was asked to make pairwise similarity judgments between certain interpersonal relationships (e.g., between guard and prisoner, between close friends, between patient and psychotherapist) within the context

TABLE 1

SAMPLE SITUATIONS FROM MAGNUSSON'S (1971) STUDY WITH HIGH FACTOR LOADINGS ON THE FIVE FACTORS (GREATER THAN .50)

POSITIVE FACTOR	NEGATIVE FACTOR
RECEIVE PRAISE FOR A REPORT DURING GROUP WORK	HAVE JUST RECEIVED A LAB REPORT WITH NEGATIVE CRITICISM
ABLE TO ANSWER A DIFFICULT QUESTION DURING A LECTURE	CANNOT ANSWER A SIMPLE QUESTION DURING A LECTURE
HAVE JUST PASSED AN EXAMINATION WITH TOP MARKS	HAVE JUST FAILED AN EXAMINATION

ACTIVE INTELLECTUAL FACTOR	PASSIVE FACTOR
SIT ALONE AT HOME AND DO HOMEWORK	WAIT ON LAB SUBJECTS COMPLETING QUESTIONNAIRE
SIT ALONE AT HOME AND WRITE LAB REPORT	REST DURING A BREAK IN LECTURES
SIT ALONE AT HOME AND PREPARE AN ORAL REPORT	SIT IN STUDENT UNION AND READ A PAPER

SOCIAL FACTOR	
CARRY OUT A JOINT GROUP TASK TOGETHER WITH FELLOW STUDENTS	
PLAN A LAB EXPERIMENT WITH SOME FELLOW STUDENTS	
EAT LUNCH WITH FELLOW STUDENTS	

of a number of different situations (e.g., talking at a large social gathering). The second group made similarity judgments on the situational contexts alone, while the third group made similarity judgments on the interpersonal relations alone. The similarity matrices for the three groups were analyzed by means of a multidimensional procedure known as INDSCAL which was developed by Carrol and Chang (1970). The Carrol and Chang model is a variant of the "distance" school of multidimensional scaling. Unlike most multidimensional scaling techniques, it has incorporated within it a measure of individual differences. The model assumes that all individuals perceive the stimuli in terms of the same basic set of dimensions but that these dimensions have differing saliency or weighting in the perception of different individuals. Thus, it is possible to look at the weighting or relative importance each subject gives to each of the dimensions of the final or group spatial representation. In the Wish, et al. (1973) study, a four dimensional solution best characterized the spatial solutions of all three groups and the same four dimensions were found to underlie the spaces of subjects who were presented with the situational contexts alone and of subjects who were presented with the interpersonal relationships within the context of the situations. The four dimensions were: cooperative and harmonious versus competitive, task oriented versus socially oriented, productive versus destructive, and intense versus superficial. Significant differences were found in the perceptual salience of the dimensions between subjects, according to biographical and psychological characteristics such as sex, religion,

political orientation, and family size.

The present experiment, like that of Magnusson (1971) and Wish, et al. (1973), employed a multidimensional scaling method to explore the structure of the cognitive representation of situations. However, unlike these studies, it did not use contrived situations but used actual real life situations that a particular individual had experienced. There were three major advantages in using these real life situations.

First, in providing a more realistic data base, it was likely that the power to examine idiosyncratic organizational structures would be strengthened, the importance of which has been mentioned above. The contrived situations that were used in the previous studies were abstract, often only mentioning one particular action which might take place in a real situation (e.g., talking at a large social gathering). Many of the characteristics of a situation which are most likely to represent idiosyncratic organization, such as emotional content, idiosyncratic response sets, etc. were excluded. Therefore, it is not surprising that the earlier studies, such as Magnusson's (1971), found only slight evidence for individual differences.

Secondly, because real life situations were used in the present study, it was necessary to have each subject describe his situations in his own language, which is a major step toward the Bem and Allen (1974) concept of allowing each subject to use his own construct system in personality research.

A third advantage of the use of real life situations was that it alleviated a potential problem that is inherent in any use of multidimensional scaling techniques. When using these techniques, it is essential that the elements to be scaled are representative of the domain under investigation in order to be able to make meaningful statements about the underlying dimensional structure of that domain. One has to wonder how representative truncated descriptions of situations contrived by an experimenter are of the situations any single individual has experienced. Using real life situations seemed to be a likely way to increase such representativeness.

Because real life situations were used, each subject experienced a completely different set of situations. Hence, it was necessary to perform a separate multidimensional analysis for each subject. It was not possible to use INDSCAL, which is the multidimensional algorithm most commonly used in studies of individual differences since it requires that the similarity matrix obtained for each subject pertain to a commonly experienced set of stimuli. Therefore, a separate MDSCAL multidimensional analysis, which is a general purpose nonmetric multidimensional algorithm based upon the formulations of Kruskal (1964), was performed on the situational domain of each subject.

The present research attempted to address a number of questions important for the development of a framework for conceptualizing situations. First, what are the major dimensions underlying individual conceptions of different situations, and how many of these dimensions

are necessary in order to adequately represent individual spaces? It was expected that some of these major dimensions would be similar to dimensions obtained in previous research involving the multidimensional scaling of contrived situations (Wish, et al., 1973, and Magnusson, 1971). Therefore, a direct attempt was made to see how well specific dimensions obtained in the earlier studies fit each of the individual spaces. However, it was also expected that the usage of real life situations would generate a number of additional dimensions idiosyncratically organized within individual subjects. This hypothesis is congruent with a theoretical construct of George Kelly (1955) known as the commonality principle. It is based on the obviously commonsensical notion that each individual will have some cognitive constructs in common with other individuals and at the same time will have some relatively unique cognitive organization.

The second question addressed by this research was: Do the proposed multidimensional scaling methods produce results which are consistent over time? To ascertain the answer to this question the following procedure was used. Each subject recorded three situations a day for a six day period. At the end of this period, he performed the pairwise ratings of similarity necessary for a multidimensional scaling analysis. The subject then repeated this procedure for a second week. About five days after the second week, he made pairwise similarity judgments on all of the situations from both weeks together. This final combined similarity matrix provided the opportunity for examin-

ing the consistency of a subject's judgments of similarity since correlations could be obtained between the similarity judgments made for each week separately, and the same similarity judgments made within the context of the combined matrix. Furthermore, a third and separate spatial solution was found for the combined similarity matrix. As a second measure of consistency product moment correlations were obtained for the distances between the situational points in the original weekly space and the corresponding distances in the combined space.

Since the dimensions that were obtained from the multidimensional scaling analyses were only the most general dimensions underlying an individual's cognitive structure and since the time span between intra-individual analyses was not greater than two weeks, a fairly high degree of consistency was expected. This is not to imply that an individual's cognitive representational structure should be construed as being invariant over time. An individual's representational structure should change as he encounters experiences invalidating their value as organizational constructs and heuristic devices. However, the more general higher-order constructs, which are the focus of the present study, should be expected to change more slowly and only with a great deal of evidence for their lack of utility.

C H A P T E R I I

METHOD

Subjects

There were nine subjects in the experiment, six females and three males. Subjects were solicited through the use of sign-up sheets situated in appropriate locations throughout the psychology department. All subjects were paid $2.00 for each hour of participation in the study.

Procedure

Upon agreement to participate, the subject was briefed thoroughly about the experimental procedure. He was informed that he would be required to sit down at the end of each day and record the three situations from that day which "stick out the most in your mind." To help him accomplish this, the subject was asked to pretend he was writing a diary in which he was only allowed to describe three situations. In order to guard against possible recency effects, the subject was instructed to try and remember when he got up in the morning, and then to mentally go through the situations he experienced during the day before choosing three situations for description.

After the subject finished describing a situation, he was instructed to record whether or not he felt any emotion in the situation, and if he did, to describe it with one main word and any additional words he felt were necessary to fully delineate his emotional state. He also recorded the intensity of this emotional state (on a zero to eight

scale), what other persons (if any) were meaningfully involved in the situation, and the type of relationship these persons had with him (e.g., father, friend, etc.). This supplemental information was used as an aid in interpreting the multidimensional spatial representations that were later obtained. A complete copy of the subject's instructions for recording this information can be found in Appendix A.

The subject repeated this procedure for six nights, starting on a Wednesday night and ending on a Monday night. On the following Wednesday, the subject presented the 18 situations and the accompanying data to the experimenter and then made judgments on the similarity of each of the situations to one another. To obtain all the necessary judgments for 18 situations, 153 pair wise comparisons are needed. When performing these comparisons, the subject was required to rate the similarity of one situation to another on a one to nine scale (one --not at all similar, and nine--very similar) and was reminded not to base his ratings of similarity on such attributes as the physical characteristics or location of the situation, the particular length of the description, etc., but rather to focus on more psychological aspects of the situation. A copy of these instructions may be found in Appendix B.

After the subject had finished making the pairwise comparisons, he was instructed to sort the situations which he felt belonged together into groups, using as many groups as he wanted. He was then asked to state in what way the situations within each group were

similar. When he finished, the subject was required to repeat the sorting task, this time using different groupings. These data were also used as important supplemental information in helping to identify the dimensions resulting from the multidimensional scaling analyses.

On that same night, the subject began a second week of participation in the study and followed a procedure identical to the first week. Five days after the subject completed the ratings of similarity for the situations from the second week, he began to make pairwise judgments on all 36 of the situations together (18 from each week). This combined matrix of similarity judgments provided the data necessary for the two measures of consistency that were employed. Since the combined matrix required a large number of comparisons (630), the subject performed only one half of the comparisons on this day and completed the other half on the next day.

When all the subjects had completed the experiment, an examination was made of the three multidimensional spaces that were obtained for each subject (two original weeks and the combined presentation), and an effort was made to interpret the dimensions in each of the spatial solutions. In order to corroborate these interpretations, scales were developed to measure relevant situational characteristics. In developing these scales consideration was given, not only to the experimenter's estimates of the dimensional attributes based upon his examination of groupings of situations in the individual spaces, but also to the supplemental information subjects provided about other persons involved in the situation and the attending emotional states. Special atten-

tion was given to the sortings subjects made on each week of situations and to the terminology they used to describe the common characteristics of situations within the groupings of these sorts. In addition, scales relevant to dimensions obtained in previous studies involving a multi-dimensional analysis of situations (Magnusson, 1971; Magnusson and Ekehammar, 1973; and Wish et al., 1973) were included.

On the basis of the above information, 37 bipolar scales were chosen to be presented to all subjects. A list of these scales may be found in Appendix C. Apart from the scales pertaining to previous studies, a scale was chosen for inclusion if there was evidence for its presence in the relevant information for two or more subjects. For instance, if two subjects both described a group of situations in the sorting task as having in common the attribute "communicating well to others," then this attribute was included. For the most part, such a procedure exhausted the characteristics which appeared to be relevant to each of the individual spaces--that is, most of the characteristics were shared by at least two subjects. However, there was evidence that five of the subjects might be employing some additional characteristics that were completely unique, so special scales were developed for these subjects. These additional scales are presented in Appendix D.

When the selection of scales was completed, the subjects were recalled and asked to examine their descriptions of each of the

situations and to rate them on the bipolar scales.[3] The ratings of the situations were extended over three one-hour sessions on separate days. Later, the "fit" of these scales to each of the individual multidimensional spaces was measured by means of a computer program (described below) specifically designed for this purpose.

Multidimensional Scaling Procedures

MDSCAL, a nonmetric multidimensional scaling algorithm developed by Kruskal and Shepard (1967), was used to analyze the individual similarity matrices of each subject. Broadly speaking, the purpose of this algorithm is to find N points in a space whose interpoint distances match, in some sense, the psychological dissimilarities of N stimuli (objects). The objects under study are represented by points in a spatial model in such a way that the significant features or attributes of the objects are revealed in the geometrical relations among the points. Briefly, it accomplishes this by the following method. Given a measure of similarity or proximity, S_{ij}, for every two objects (i and j) in some set of objects, N, a configuration of n points in a Euclidean space is sought, such that to an acceptable degree of approximation the resulting interpoint distances, D_{ij}, are monotonically related to the given proximity data, in the sense that $D_{ij} < D_{kl}$, whenever $S_{ij} < S_{kl}$. A measure of the departure from monotonicity is obtained and an interative method is then employed

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[3]Unfortunately, delays in obtaining copies of appropriate computer programs caused a six month delay between the time subjects completed the ratings of similarity on the 36 situations in the combined presentation and the time they rated the situations on each of the bipolar scales.

in which the coordinates of points in the geometric space are adjusted in the direction of a "better fit," until a minimum value for the measure of the departure from monotonicity is reached. This measure, called "stress," is based upon the sum of squared discrepancies between the actually reconstructed distances (D_{ij}) and a set of numbers, E_{ij}, that are monotonically related to the original similarity data, S_{ij}. Stress can loosely be interpreted as a measure of the amount of variance left unaccounted for by the final solution. The program outputs a spatial representation of the original stimuli in t dimensions (specified beforehand), along with their t dimensional coordinates, and the amount of stress present in the final solution.

Measurement of the "Fit" of Each of the Properties to Individual Spaces

While multidimensional scaling procedures, such as MDSCAL, provide a spatial representation of the relations present in a set of similarity judgments, other methods must be devised to determine the psychological nature of the dimensions that underlie this representation. One obvious method is to rely on the intuitive interpretations of the investigator. However, in a number of situations it would seem desirable to obtain corroborating evidence for these interpretations. For instance, in a higher dimensional solution, it becomes extremely hard for an investigator to simply examine a space and observe a pattern of relationships, especially in light of the fact that most multidimensional algorithms (including MDSCAL) are subject to both rotation and reflection about the origin.

To overcome this problem one method that has been used quite often

is to obtain ratings of the objects on relevant unidimensional scales. These scales can then be "fitted" to the multidimensional space. PROFIT (Carrol and Chang, 1969) is a computer program which has been specifically designed to perform such fitting procedures. Given the coordinates of n objects in a t dimensional space and a set of independently determined measures (properties), the program will find, for each property, a vector or direction in the t dimensional space such that the projections of the n points on that vector correspond optimally to the given property values. It accomplishes this by a method equivalent to a multiple linear regression analysis in which each property plays the role of a dependent variable while the coordinates of the points within the multidimensional space are treated as independent variables. The program will output direction cosines of the fitted vector for each property in the original space,. cosines of angles between fitted vectors of properties, and the maximum correlation between each given property and its fitted vector.

Measures of Consistency

During the first week of the study the subject made judgments of similarity between each of the first 18 situations. During the second week he made judgments of similarity between the final 18 situations. In the combined situational presentation the subject repeated the original judgments of similarity he had made earlier, comparing each of the situations from the first week with one another, and each of the situations of the second week with one another. In addition, he also

compared each of the situations from the first week to each of the situations from the second week. With such information, it was possible to explore two slightly different notions of the concept of consistency.

First, a product moment correlation was obtained between the judgments of similarity among the first 18 situations made during the first week and the corresponding similarity judgments made during the combined presentation. A similar analysis was conducted with the similarity judgments among the final 18 situations. These correlational statistics measure the extent to which the subject makes the same relative pattern of similarity judgments when presented with the identical task at two different points in time.

Secondly, a multidimensional scaling analysis was performed on the data from the combined presentation, as well as on the data from the two original weeks. A product moment correlation analysis was conducted for the distances between the points representing the first 18 situations in the original spatial representation and the distances between the same 18 situations in the combined spatial representation. A similar analysis was performed on the two sets of distances for the final 18 situations. Correlational analysis between distances in differing spatial representations has often been used to assess the degree of relationship between two different multidimensional spatial representations of the same set of objects (e.g., Green and Rao, 1972). This procedure was used in the present experiment to get at a somewhat different notion of consistency than that implied by the

correlational measures between similarity judgments that were described above. This second set of correlations measures the degree to which the distances between the situations in the two original spaces match the distances between situations in the combined space. It is important to remember that, in the combined space, situations from the first week were compared to situations from the second week, in addition to the within-week comparisons. Thus, to some degree, these second measures of correlation measure the extent to which the distances between the situations remain the same when placed within a larger context of situations. This is valuable information since it is possible that the 18 situations from each week are not truly representative of the total domain of situations of each subject--that the spatial representations which resulted are peculiar to the specific situations, that were selected. If this were the case, one would expect the distances between the situations to fluctuate when placed within a different context and the corresponding correlations to be low. Thus, the second set of product moment correlations provides a rough measure of the representativeness of the situational samples.

C H A P T E R I I I

RESULTS

The results are presented in five sections. The first section contains the two measures of consistency used in the experiment. The second section examines the methods for selecting the appropriate dimensionality for the individual spaces. The third section contains the interpretation of the multidimensional spaces, while the fourth section is devoted to a more extensive interpretation of the multidimensional space of one individual subject. Finally, the fifth section examines the similarities and differences between the situational representations of all subjects.

Measures of Consistency

Product moment correlations of similarity judgments. Product moment correlations were obtained between the subject's judgments of similarity for the first 18 situations made during the first week of experimentation and his judgments of similarity for the same 18 situations made during the combined presentation. Since there were 18 situations there were 153, i.e., n(n-1)/2, judgments of similarity within each set of situations. Similar correlations were obtained between the two sets of similarity judgments for the final 18 situations. The results of these analyses are presented in TABLE 2.[4]

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[4]Other correlational measures (Spearman's Rho, Kendall's Tau) were also applied to this set of data. However, since the results were similar to the product moment correlations, they have not been presented here.

PRESENT TABLE 2 HERE

Overall, the average intercorrelation between the initial judgments of similarity among a set of situations and the same judgments of similarity in the combined presentation is .60. It is clear from TABLE 2, that for all but Subject Two there is a fair degree of consistency between the same judgments of similarity made at two different points in time.

Product moment correlations between distances in differing situational spaces. Distances were calculated between each of the points representing the first 18 situations in the spatial representation resulting from the similarity data of the first week. To obtain the distance between two points in the multidimensional spaces, the standard Euclidean distance formula was employed. Again, since there are 18 situations (points), 153 separate distances could be calculated. The distance between the same 18 situations in the spatial representation resulting from the combined presentation was calculated in a similar manner. Product moment correlations were computed between the two separate sets of distances that had been obtained for this first group of situations. A similar procedure was followed for the two sets of distances for the final 18 situations. The results are presented in TABLE 3. The average overall product moment correlation between the distances between the situa-

TABLE 2

PRODUCT MOMENT CORRELATIONS BETWEEN SIMILARITY JUDGMENTS

ON SEPARATE OCCASIONS FOR BOTH GROUPS OF SITUATIONS (n=153)

SUBJECT	WEEK ONE SITUATIONS ALONE WITH WEEK ONE SITUATIONS IN THE COMBINED PRESENTATION	WEEK TWO SITUATIONS ALONE WITH WEEK TWO SITUATIONS IN THE COMBINED PRESENTATION	AVERAGE CORRELATION FOR SUBJECT
1	.596	.686	.64
2	.174	.203	.19
3	.474	.845	.70
4	.714	.398	.57
5	.783	.780	.78
6	.754	.681	.72
7	.679	.496	.60
8	.664	.402	.55
9	.423	.538	.48
Average	.60	.61	.60

PRESENT TABLE 3 HERE

tional points in different spaces is .90. The results of TABLE 3 show that there was a consistently high relationship between the distances between the situations in the original spaces and the corresponding distances in the combined space. These correlations may be interpreted as evidence that the psychological distance between a set of situations remained fairly stable when placed within the context of a larger sample of situations. These findings, along with the results of the first set of correlational measures, provide encouraging evidence indicating that individuals do have a stable cognitive organizational structure for situations.

Choice of Appropriate Dimensionality

The three similarity matrices (first week, second week, and combined presentation) of each subject were scaled in one, two, three, and four dimensions using the MDSCAL program. In order to chose what dimensional solution best represents a given set of data in a multidimensional analysis, Kruskal (1964) and Shepard, Romney, and Newlove (1972) have suggested that attention be given to the following considerations:

1. The residual departure from monotonicity (i.e.stress) should not be too large, or still more pertinently, should not drop too abruptly as further dimensions are added.

"Ideally, if stress is plotted against number of dimensions,

TABLE 3

PRODUCT MOMENT CORRELATIONS BETWEEN DISTANCES IN THE SEPARATE SPACES FOR BOTH GROUPS OF SITUATIONS (n=153)

SUBJECT	WEEK ONE SITUATIONS ALONE WITH WEEK ONE SITUATIONS IN THE COMBINED PRESENTATION	WEEK TWO SITUATIONS ALONE WITH WEEK TWO SITUATIONS IN THE COMBINED PRESENTATION	AVERAGE CORRELATION FOR SUBJECT
1	.851	.879	.87
2	.900	.891	.90
3	.902	.929	.91
4	.921	.900	.91
5	.916	.889	.90
6	.897	.897	.89
7	.920	.856	.89
8	.886	.929	.91
9	.887	.913	.90
Average	.90	.90	.90

> the number of dimensions chosen should correspond to an elbow, where the curve first approaches zero and then only declines slowly thereafter."(Shepard, Romney, and Nerlove, 1972, pg. 9)

2. The representation should be interpretable. If a t dimensional solution is interpretable, but a t+1 dimensional solution is not, the t dimensional solution should be chosen.

3. The representation should be statistically reliable.

> "In particular, if solutions are obtained separately for two independent sets of data (or for two independent subsets of the same set of data)...then the n points should project in essentially the same orders on corresponding axes of these two representations." (Shepard et al. 1972, pg. 9)

In choosing the appropriate dimensionalities in the present experiment primary reliance was on the first consideration and to some degree on the second consideration. Measures of reliability were obtained only after dimensionalities had been chosen according to the first two criteria. However, as was stated above, these measures indicate that reliability was fairly good, thus supporting the correctness of the particular dimensionalities that were chosen. The number of dimensions chosen for the three representations of each subject are presented in TABLE 4, along with the corresponding stress values for those solutions. It is evident from this table that the

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PRESENT TABLE 4 HERE

TABLE 4

NUMBER OF DIMENSIONS CHOSEN FOR THE THREE REPRESENTATIONAL SOLUTIONS OF EACH SUBJECT AND CORRESPONDING STRESS VALUES

SUBJECT	WEEK ONE		WEEK TWO		COMBINED PRESENTATION	
	DIMENSIONALITY CHOSEN	STRESS VALUE	DIMENSIONALITY CHOSEN	STRESS VALUE	DIMENSIONALITY CHOSEN	STRESS VALUE
1	3	.058	3	.090	3	.200
2	4	.082	4	.077	4	.158*
3	3	.100	3	.054	3	.113
4	3	.087	3	.090	3	.094
5	3	.038	3	.015	3	.183
6	3	.068	3	.025	3	.071
7	3	.080	3	.207*	3	.077
8	3	.084	3	.105	3	.142
9	3	.196*	3	.010	3	.034
Average		.087		.074		.118

*secondary approach used

dimensionality of the solutions was constant across all three representations for each subject and furthermore, that a 3 dimensional solution was appropriate for all subjects but one (Subject Two) where a 4 dimensional space was more appropriate. The average overall stress value for all of the solutions is .090.

At present, there is no available means for "testing the significance" of a particular stress value. However, based upon actual experience with real data, Kruskal (1964) provided the following guidelines for evaluating the goodness of fit of various stress values.

FIT	STRESS VALUE
POOR	.200
FAIR	.100
GOOD	.050
EXCELLENT	.025
PERFECT	.000

The statistical properties of stress have not been fully explored. (cf. Klahr, 1969; Sherman and Young, 1968; and Stenson and Knoll, 1969 for some initial work in this area.) However, it is known, that the interpretation of stress can be greatly affected by such parameters as the number of stimuli and the number of dimensions. In particular, it is now evident from Stenson and Knoll (1969), that one should be willing to accept stress values higher than Kruskal's guidelines as the number of dimensions increase (especially if greater than five) and/or the number of stimuli increase (especially if greater than 30). Furthermore, stress is also affected by the particular

method used to treat tied similarity judgments when performing the monotone regression analyses throughout the successive iterations of the MDSCAL algorithm. There are two basic methods for handling this problem, the primary method and the secondary method. In the primary method, no restriction is placed on the fitted regression values corresponding to a group of equal data, while in the secondary method, these fitted values are required to be equal (cf. Kruskal, 1964 for a more detailed exposition of this distinction). In general, the primary method is used since the secondary method tends to artificially inflate stress values. In the present experiment, the primary method was used for all spatial representations but three (marked by stars in TABLE 4). It was necessary to use the secondary method in these cases because the MDSCAL program, with its iterative procedure, was "stuck in a local minimum" (cf. Kruskal, 1964 for an explanation of this phenomenon), and the use of the secondary method allows one to circumvent this problem. It is important to remember that the secondary method inflates stress values as does a large number of stimuli (greater than 30- in the combined presentation there were 36 situations). Taking these things into consideration, the stress values that were obtained indicate moderately good fits for the data.

Interpretation of the Multidimensional Spaces.

Both measures of consistency indicate that there is a moderately

high degree of correspondence between the spatial representations of each of the original weeks and the combined spatial representation. Therefore, for ease of presentation only the interpretation or characterization of the dimensions of the combined space of each subject are presented here. In this section the primary emphasis will be on the more abstract aspects of the interpretative process. In the next section, the spatial representation of one subject will be extensively examined and interpreted in order to provide a more explicit presentation of the methods of analysis and the kinds of results that were obtained.

While multidimensional scaling procedures, such as MDSCAL, provide a spatial representation of the relations present in a set of similarity judgments, other methods must be devised to determine the psychological nature of the dimensions that underlie this representation. To be more specific, MDSCAL provides information both on the distances between the elements in a spatial representation and on the number of dimensions which are most appropriate for representing the relationships underlying a set of similarity judgments; however, it provides no information on which of the infinite vectors in a multidimensional space should be selected to represent these dimensions since the multidimensional solutions obtained by MDSCAL remain invariant when subjected to both rotation and reflection of the axes. For example, from the results of the MDSCAL analyses presented in the preceding section, we know that three dimensions are sufficient to rep-

resent the situational space of Subject One. As a result of the MDSCAL algorithm, we also have a spatial representation for this subject's situational domain; however, MDSCAL did not provide us with any information on exactly where the three vectors underlying this space should be drawn or what their psychological nature might be. In fact, it is possible and legitimate to chose any three orthogonal vectors to characterize this space. Because of this inherent weakness in the MDSCAL algorithm, it was necessary to develop additional procedures for interpreting each situational space. These procedures will be discussed in the next section.

Procedures for the selection of vectors for characterizing individual spaces. As was stated above, 37 bipolar scales were chosen to aid in the interpretation of the spatial representations of all subjects, in addition to those scales (listed in Appendix D) which were deemed necessary for particular subjects. The entire set of properties for each subject was fitted to his combined space by means of the PROFIT program. Given measurements on an external property scale, this program seeks to find a vector in a given multidimensional spatial configuration such that the correlation between the projections of the stimulus points on this vector and the scores on the original property scale is maximized. Once this vector is obtained, the program then calculates the product moment correlation between the projections of the points along this vector and the scores on the original property scale. Thus, this correlation can be em-

ployed as a rough measure of the degree to which a given property "fits" a particular subject's combined space, meaning that it measures the degree to which a given property is related to one vector of the infinite number of vectors present in a multidimensional space.

At this point, it may be worthwhile to state explicitly what goal the interpretation phase of these analyses sought to accomplish. Given the information provided by MDSCAL, that N dimensions were sufficient to represent the situational space of a subject, it seemed beneficial or advantageous to be able to characterize or roughly interpret N psychological dimensions in the MDSCAL space that were orthogonal, or more realistically "nearly" orthogonal to one another. In order to obtain a characterization of this sort for the situational space of each subject, the property scales for each subject were rank ordered according to how well their projected vectors fit the combined space, using the product moment correlations provided by PROFIT as a measure of goodness of fit. Then, the direction vectors corresponding to these properties were normalized and the cosine of the angle between each of these vectors was determined. Once these vectors are normalized, the cosine between any two vectors is equal to the correlation between them.

The best fitting property was taken or accepted as the first dimension of a subject's multidimensional space. Then, after having found this property, the next best fitting property was sought which met the criterion of being "minimally correlated with" or "nearly

orthogonal to" this first dimension. The criterion employed was .25. That is, the next best fitting property was sought that had a correlation of .25 or less with the first dimension. In this way, it was possible to characterize two dimensions for each subject. Given these two dimensions, a third dimension was sought which had a correlation of .25 or less with both of the first two dimensions. Using .25 as a criterion, it was not possible to find a third dimension meeting this particular criterion of "near orthogonality" for some of the subjects. Therefore, in these cases .05 was added to the existing criterion (.25) and a new criterion was obtained (.30). Then, the search for the next best fitting property which met the new criterion of "near orthogonality" was conducted. If a third dimension was still not found, .05 was added to the criterion and the search was conducted again. This procedure was continued until a third dimension was found. Finally, in the case of Subject Two, who had a four dimensional solution, the next best fitting property was sought which had a correlation of .25 or less with the first three dimensions. Since no property was found meeting this criterion, the process of adding .05 to the criterion and conducting the search again was continued until a fourth dimension was found.

An Example of the Interpretation of One Subject's Space

At this point, it may be beneficial to examine in detail the situational space of one subject (Subject One) in order to provide specific examples of each phase of the interpretative process. When

the property scales for this subject were rank ordered according to how well they "fit" her combined space, it was found that the "good-bad" dimension was the best fitting (r for degree of fit=.84). Accepting this dimension as the "first" dimension of the subject's space, the next best fitting property was sought which met the criterion of having a correlation of .25 of less with the "good-bad" dimension. The property meeting these requirements was "thoughts and feelings under control--thoughts and feelings not under control" (r for degree of fit=.60). Finally, the next best fitting property was sought which met the criteria of having a correlation of .25 or less with each of the first two dimensions.

TABLE 5 contains the full descriptions of 28 of the 36 situations of Subject One while Figures 1, 2, and 3 depict the various two dimensional viewpoints of her situational space with the vectors chosen to characterize this space drawn in the appropriate directions.

PRESENT TABLE 5 AND FIGURES 1, 2, AND 3 HERE

Now that the procedures underlying the selection of the three properties chosen to characterize this subject's space have been stated, it is possible to attempt a "fuller" interpretation of these properties based upon an extensive examination of the relationships of these properties to specific situations in her situational domain.

TABLE 5

SAMPLE OF SITUATIONS FOR SUBJECT ONE

1. Walked into room, wanting to study for big exam but couldn't, (roommate) had a friend in and I entertained him while she was on the phone. Was bored with him.

2. Met (friend) and ate lunch with her. Had a good talk about last year's retreat. Felt lonely today--made me feel good.

3. Got up this morning and roommate ignored me. Had overslept too so in a bad mood. (roommate) ate breakfast but didn't offer me anything.

4. After studying many hours, walked into Anthro. exam and noticed a number of kids had found out the questions to the test. Was very mad especially since I didn't do well and it was Halloween night so I was missing out on the fun.

5. Very late at night and I lost my key. Had to wake up (roommate) to get in room. She didn't say anything which made me feel worse.

6. Halloween night; quiet get-together in (friend's) room. Listened to records and talked.

8. Saw (distant friend) at the bus station so was forced to sit with her. Hadn't wanted to. Wanted this time to think. We both ended up sleeping the whole way.

9. (friend) drove me home from work. Stopped by (another friend's) and ended up staying until 2:00 A.M. so was anxious to get home. Felt very tired.

10. Went to see (pastoral counselor) to talk over problems with Dad. Anxious about going and felt awkward at first. Very deep discussion, however.

13. Almost missed bus back to school because I had forgotten my keys. Felt especially anxious as (friend) was also trying to catch a bus to Boston.

14. Went to visit (friends) but felt rather unwanted. It was obvious that they wanted to study. Left relatively early.

TABLE 5 (continued)

SAMPLE OF SITUATIONS FOR SUBJECT ONE

16. Had to show slide project to (classmates and friends). Felt very good because they all really liked it.

17. Went to see (friends) for dinner. There was a misunderstanding so I had to eat alone. Felt very lonely but kid next to me was friendly.

18. (friend) drove me back to UMASS. Told me he had been thinking of me as he wrote his thing on hope. Wanted me to read it next Tues. at Mass.

19. Overslept an 8:00 class. Rushed around to get there because I had borrowed (friend's) notebook. Ran all the way and she was relieved to see me come in.

20. Saw (friend) at library. Studied 6 hours together. Being able to periodically joke with each other made it easier. Felt very satisfied at getting so much studying done and also in the warmth of her person.

21. Met girl in psych. class. We got off very well and talked to each other periodically between studying. Seems even my type.

22. Took a psych experiment on death. Made me really start thinking about childhood and how I saw my own death.

23. Went to finance office and found out I have no hope for financial aid next semester. Was counting on something. So disappointed. Girl at desk wasn't too sympathetic.

24. Talked with (friend) at her room. Sensed her disappointment and resentment toward things that were happening to her at UMASS.

26. Saw friend during breakfast. Didn't want her to see me cause I felt like eating alone. Said hi but walked right by her.

28. Saw (friend) at FIC for the first time. He said something about party. I didn't know what to say but wanted to say something that set things straight. Didn't and was disappointed in myself.

29. Went to NRBQ concert. Felt lost in the mob but music was good. (brother) made me feel a part of it as we danced. Still, felt out of it.

TABLE 5 (continued)

SAMPLE OF SITUATIONS FOR SUBJECT ONE

30. Came back to school, first thing roommate said was "we're changing bunkbeds." Was very tired and was sick of her unfriendliness.

31. At Search meeting and had to go over my committee. Was lost for words. Felt inadequate. Got no response from people so don't know how I did.

33. (friend) got sick and went home. Was very shorthanded and busy. Had to really rush around. Customers seemed slightly peeved no matter what.

34. Stopped into (friend's) room because didn't want to go back to my own. Was surprised to see the room full with kids. Felt a little apprehensive at first, but after a while started to have a really good time.

35. Went to see (friends) for dinner but they weren't there. Saw (friend). Ate with her until she left.

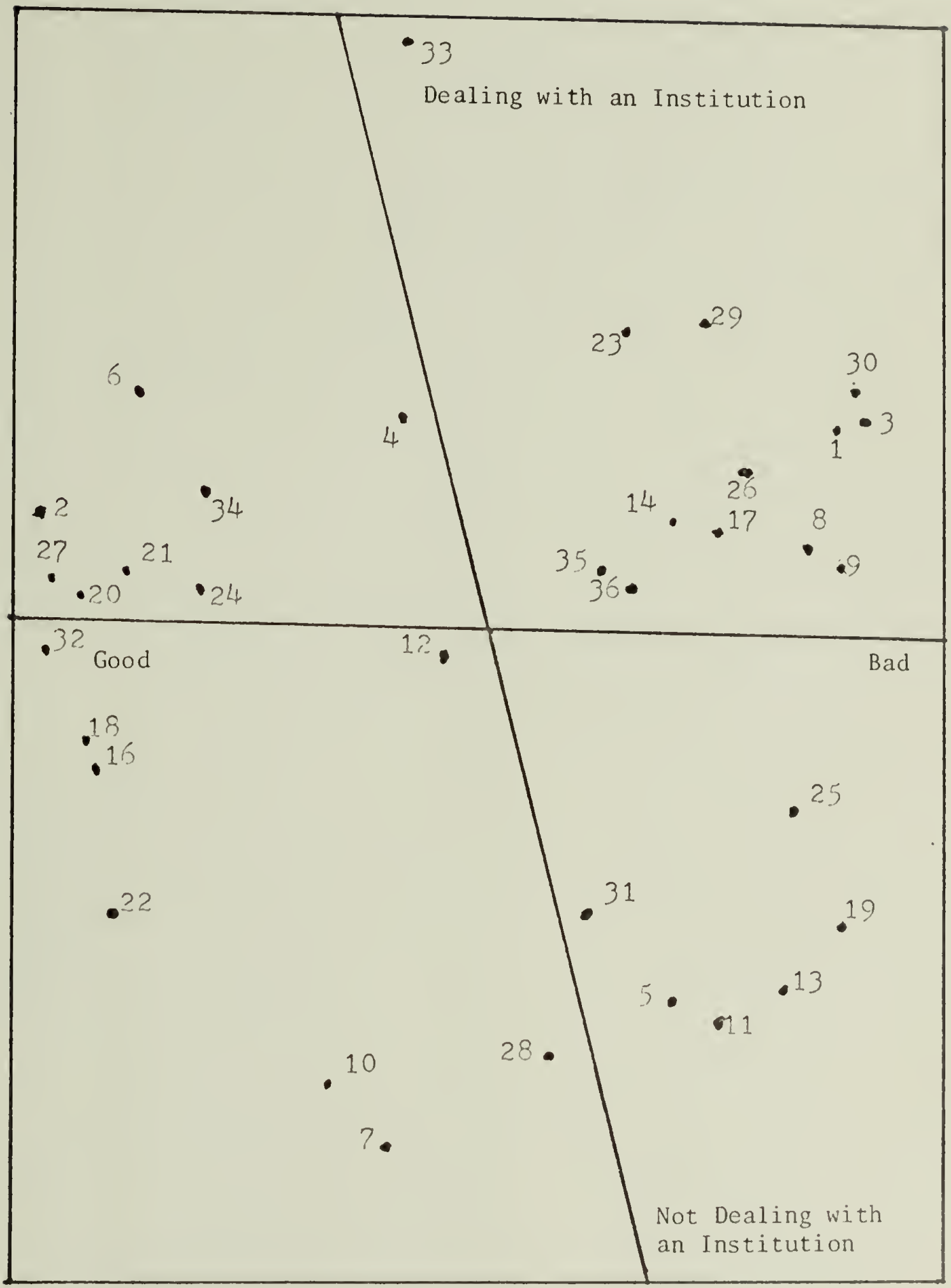

FIGURE I

The first and second vectors chosen to characterize the space of subject one drawn in the appropriate directions in the MDSCAL solution.

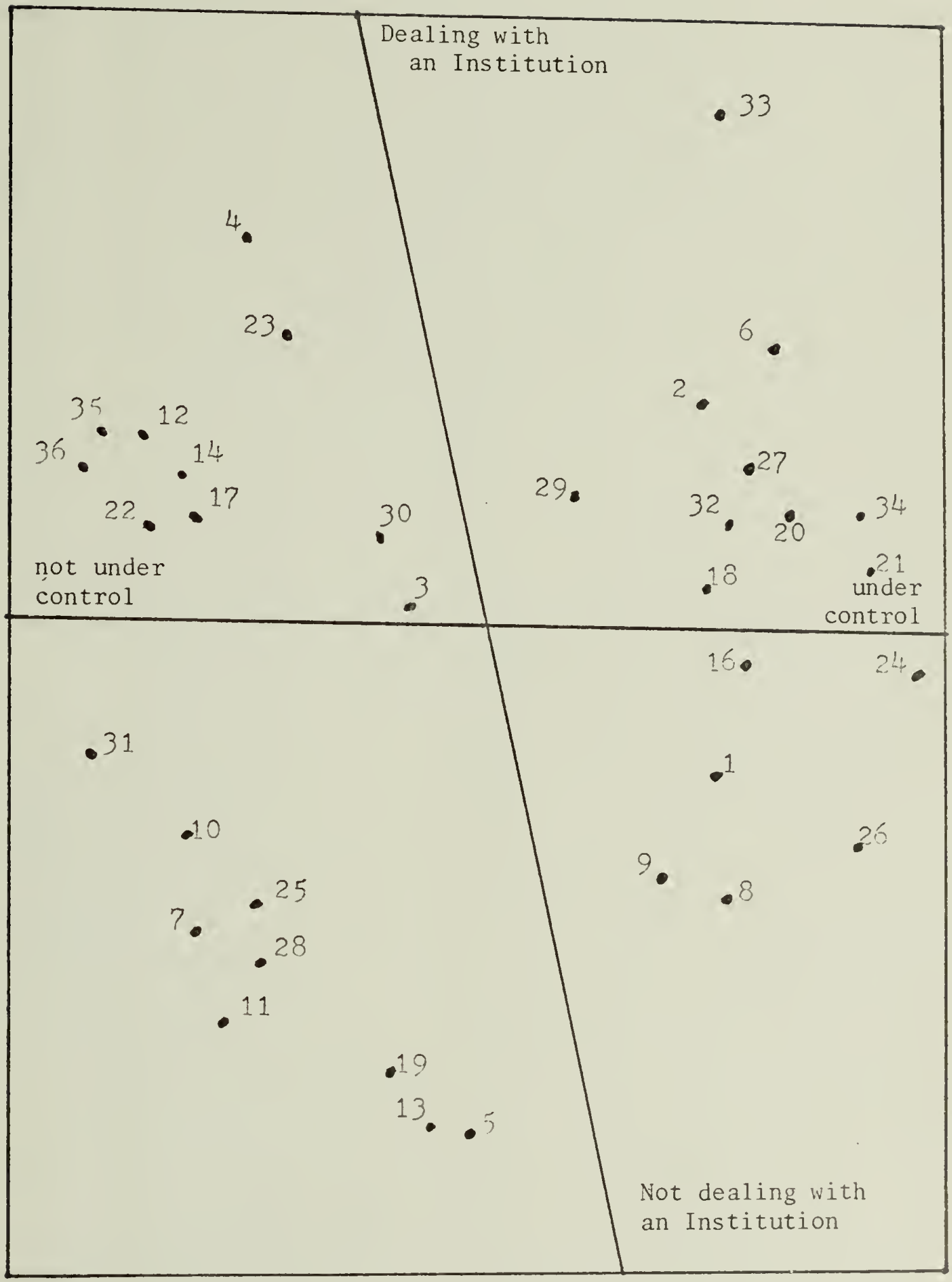

FIGURE 3

The second and third vectors chosen to characterize the space of subject one drawn in the appropriate directions in the MDSCAL solution.

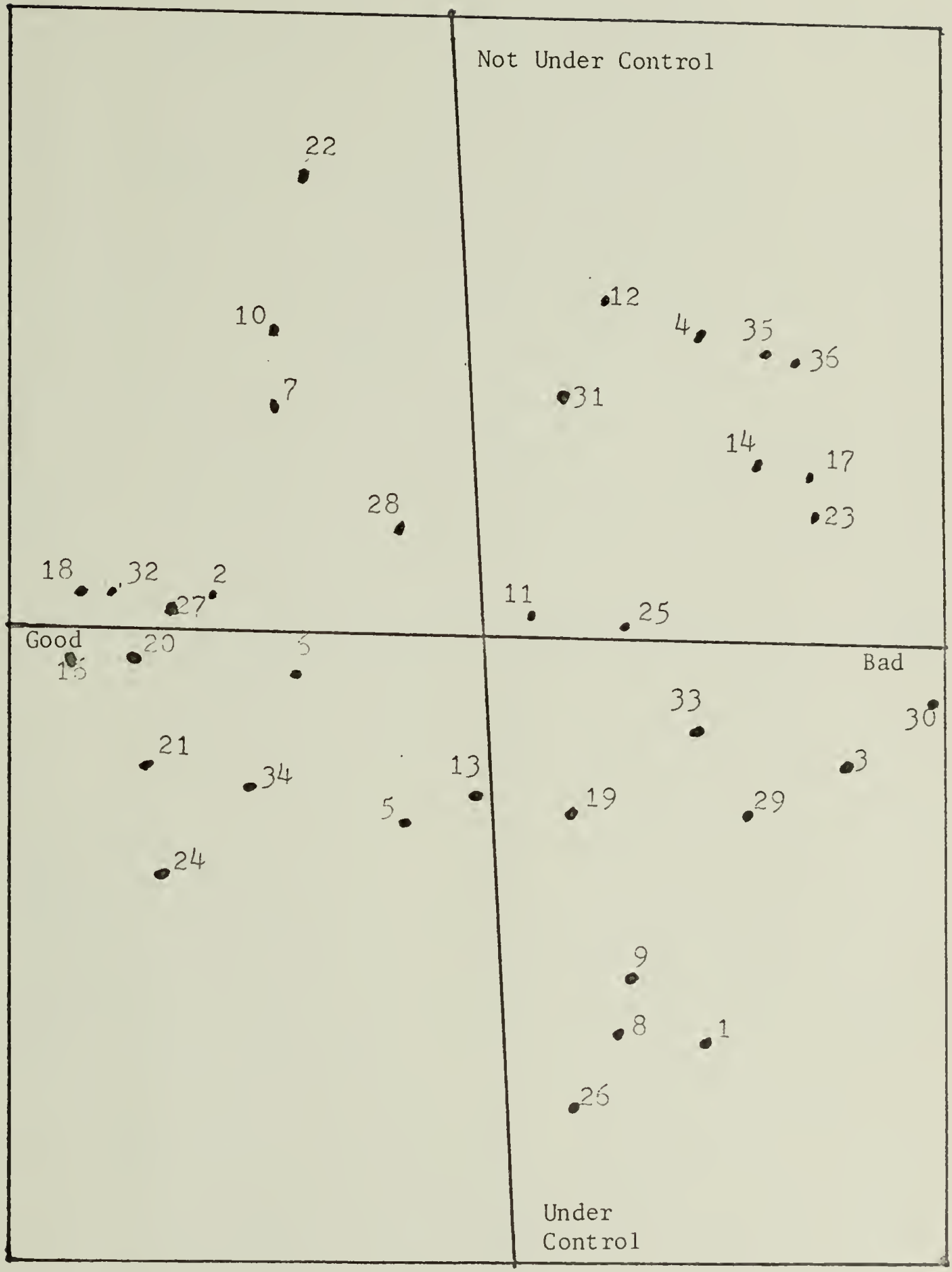

FIGURE 2

The first and third vectors chosen to characterize the space of subject one drawn in the appropriate directions in the MDSCAL solution.

The first vector chosen to fit this subject's space was the "good-bad" dimension. For this subject the kinds of situations that were considered "good" (that is, those situations which fell at the extreme of the "good" end of this vector) involved such things as being appreciated by others (situations 16 and 18), communicating one's thoughts well to others (20 and 21), and relaxing and socializing with friends (34 and 6). It is interesting to note that certain situations, which in and of themselves might be considered "bad" by an external observer witnessing them are considered "good" by the subject. For instance, in Situation 22 the subject participates in an experiment on death and pensively begins to entertain reflections on her own death. Such a situation might have been considered "good" by the subject because it induced her to critically review her current state of affairs and in so doing allowed her to attain a more extensive and adequate cognitive framework for organizing her own life. A similar process, of negative states leading to reflection and a resulting "good" evaluation, may be seen as occurring in Situations 2 and 10.

In situation 24, the subject felt sympathetic and sad for a friend who was undergoing a number of difficulties. Again, the subject considered this rather bad feeling state to be a "good" situation when all things were considered, perhaps, because she had acted in a manner which was congruent with her ideal self--a self which was construed as being warm, sensitive, understanding, etc. The fact that a seemingly negative state can be considered to be a "good" situation has a number

of implications for the development of a framework for conceptualizing situations. First, it again underscores the importance of obtaining information on the cognitive organization of situations--on the manner in which a subject himself construes a situation. Secondly, it points out the necessity of placing the interpretation of any given situation within the framework of a self system, a system which has the capacities to reflect on itself, to anticipate the future and to view a situation in terms of its long term goals, ideals, etc. Thirdly, it suggests that it may be desirable to enlist specifically the subject's help in interpreting the situational space and/or to obtain more extensive background information on subjects, perhaps through detailed, structured, post-experimental, interview sessions.

Some of the kinds of situations that were considered to be "bad" (falling at the "bad" end of this vector) were: experiencing unfriendliness from a roommate (3 and 30), feeling disappointed at not saying what was on her mind (28), feeling incompetent or inadequate (31 and 33), experiencing anxiety about being late (13 and 19), and feeling unwanted or neglected by friends (14 and 17). An example of a situation that might be considered "good" by an external observer but was considered "bad" by the subject was Situation 29. Here, the subject was attending a rock concert of a group she enjoyed and was dancing to the music. Yet, she somehow "felt out of it" and was unable to enjoy what should have been a pleasurable experience.

Before continuing, a few points about some "structural" aspects

of the situational spaces should be made. First, from an examination of this subject's situational spaces, it appeared that there was an extensive amount of clustering or grouping among the situations.[6] It may be that it was membership in these clusters and the fact that these clusters, themselves, were organized along dimensional axes and not the ratings of the situations along underlying dimensions per se which accounted for the positioning of situations within a space. Secondly, it should also be stressed that there is no statistical reason to consider the origin of the space represented in Figures 1, 2 and 3 as the zero point of an underlying dimension, as the point at which a dimension is perfectly balanced between opposing poles.

The second dimension chosen to characterize Subject One's space was "thoughts and feelings under control--thoughts and feelings not under control." The kinds of situations lying at the "not under control" end of this vector were: reflections on death (22), a deep discussion with a counselor (10), feeling angry (35 and 4), feeling incompetent (31 and 33), feeling lonely and unwanted (17 and 14). At the other end of this vector, the "under control" end, the kinds of situations were: being with people one doesn't like and also perhaps feels superior to (1, 26, and 8), successfully communicating to a friend (21), ex-

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[6]Johnson's hierarchal clustering algorithm (Johnson, 1967) was later applied to each situational space. The results of these analyses indicated that there was an extensive amount of clustering (discrete groupings) among the situations of each subject and that these clusters were congruent with the location of situations in the multidimensional space.

periencing sympathy for a friend's problems (24), feeling tired (9), and socializing with friends (34).

The third vector chosen to characterize this subject's space was "dealing with an institution--not dealing with an institution." Situations at the extreme "dealing with an institution" end of this dimension took place in such settings as a dormitory room (6), university finance office (23), a restaurant where the subject worked (33), and a classroom (4), whereas in situations at the extreme of the other end of this scale specific settings were not mentioned (28 and 31), or involved situations which seemed to range over a variety of settings (5, 13, 19 and 10). It may be that this vector is implicitly related to the extent to which a specific setting connected with a social institution is judged to limit the subject's range of behaviors in the situation. A more detailed description of a situation and a more explicit statement of the implications of this dimension would be needed to interpret a dimension capable of being used to make these more subtle distinctions.

Similarities and Differences Among Spatial Representations

Having examined in detail the cognitive structure of a single individual, we may now consider what similarities and differences exist among the spatial representations of all nine subjects. TABLE 6 lists the properties chosen to characterize the dimensions of the space of each subject as a result of the interpretation process which was described earlier. In addition, it lists the product moment correlation (r) between the projections on the fitted property vector and the scores

on the original property scale. As was stated above, these correlations were used to measure how well a particular property fitted a subject's space. Finally, those cases when properties were selected on the basis of criteria other than the initial .25 criterion are also indicated in this table.

PRESENT TABLE 6 HERE

Examining TABLE 6 it appears that there is a noticeable amount of commonality among subjects in the dimensions that were chosen to characterize their individual spaces. For instance, four of the subjects have a dimension characterized as "good-bad," while three of them have a dimension characterized as "academic-nonacademic." On the other hand, glancing at TABLE 6 there might also appear to be some degree of idiosyncratic organization and patterning among the dimensions characterizing individual subject spaces.[7] However, there are some potential problems in making such an inference. For instance, looking at these tables one might conclude that Subject One and Subject Five have no underlying dimensions in common. However, it should be remembered that the first dimension for each of these subjects (accepted-rejected for Subject Five and good-bad for Subject One) were chosen simply because they were the

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[7]Part of the reason for the poorness of fit of some of the properties may be due to the fact that the ratings on the property scales were made six months after the ratings of similarity, which were used to produce the MDSCAL spaces, were made.

TABLE 6

THREE BEST FITTING PROPERTIES FOR THE COMBINED SPACE OF SUBJECTS ONE THRU FOUR MEETING THE CRITERIA OF "NEAR ORTHOGONALITY"

SUBJECT	DIMS	PROPERTY	R
1	1	(1) ON THE WHOLE WAS GOOD-ON THE WHOLE WAS BAD	.84
	2	(7) HAD MY THOUGHTS AND FEELINGS UNDER CONTROL-DID NOT HAVE MY THOUGHTS AND FEELINGS . . .	.60
	3	(11) INVOLVED DEALING WITH AN ESTABLISHED SOCIAL INSTITUTION-DID NOT	.55
2	1	(15) DIRECTLY REFLECTED ON MY ABILITY TO RELATE TO OTHERS-DID NOT	.64
	2	(17) WAS ROUTINE-WAS COMPLETELY UNIQUE	.46
	3	(3) FELT COMFORTABLE-FELT UNCOMFORTABLE AND ILL AT EASE	.27
	*4	(12) FELT MYSELF BEING EVALUATED IN SOME WAY-DID NOT	.20
3	1	(1) ON THE WHOLE WAS GOOD-ON THE WHOLE WAS BAD	.87
	2	(14) INVOLVED INTENSE INTERACTIONS WITH OTHERS-INVOLVED SUPERFICIAL INTERACTIONS WITH OTHERS	.51
	**3	(6) FELT I COULD CONTROL WHAT HAPPENED IN THE SITUATION-FELT POWERLESS	.26
4	1	(1) ON THE WHOLE WAS GOOD-ON THE WHOLE WAS BAD	.71
	2	(10) INVOLVED ACADEMIC CONCERNS-INVOLVED NONACADEMIC CONCERNS	.68
	3	(8) FELT A SENSE OF OBLIGATION OR DUTY-DID NOT	.44

* -- criteria = .55
** -- criteria = .30

Note: The numbers in the parentheses are simply used to identify a particular property. They will be referred to in a later section.

TABLE 6 (continued)

THREE BEST FITTING PROPERTIES FOR THE COMBINED SPACE OF SUBJECTS FIVE THRU NINE MEETING THE CRITERIA OF "NEAR ORTHOGONALITY"

SUBJECT	DIMS	PROPERTY	R
5	1	(5) FELT LOVED AND ACCEPTED-FELT REJECTED	.80
	2	(10) INVOLVED ACADEMIC CONCERNS-INVOLVED NONACADEMIC CONCERNS	.33
	3	(17) WAS ROUTINE-WAS COMPLETELY UNIQUE	.17
6	1	(4) DRAWN TOWARD OTHERS-DRAWN AWAY FROM OTHERS	.80
	2	(2) HAD ROMANTIC IMPLICATIONS-DID NOT	.55
	*3	(16) WAS A MAIN PARTICIPANT AND INITIATOR OF ACTION-WAS MAINLY AN OBSERVER	.41
7	1	(13) HAD ROMANTIC IMPLICATIONS-DID NOT	.69
	2	(4) DRAWN TOWARD OTHERS-DRAWN AWAY FROM OTHERS	.59
	***3	(9) FELT SELF CONSCIOUS-DID NOT	.30
8	1	(1) ON THE WHOLE WAS GOOD-ON THE WHOLE WAS BAD	.73
	2	(10) INVOLVED ACADEMIC CONCERNS-INVOLVED NONACADEMIC CONCERNS	.53
	**3	(12) FELT MYSELF BEING EVALUATED IN SOME WAY-DID NOT	.48
9	1	(3) FELT COMFORTABLE-FELT UNCOMFORTABLE AND ILL AT EASE	.78
	2	(15) DIRECTLY REFLECTED ON MY ABILITY TO RELATE TO OTHERS- DID NOT	.51
	*3	(2) INVOLVED COOPERATION AND HARMONY-INVOLVED CONFLICT AND COMPETITION	.46

* -- criteria = .55
** -- criteria = .30
*** -- criteria = .45

properties best fitting the situational spaces of these two subjects. However, it is possible that within both (or one) of these subjects these particular properties might be highly intercorrelated and therefore the conclusion that these two subjects have no dimensions in common would seem unwarranted. Of course, the same problem would apply to other dimensions and other subjects.

To provide some information relevant to this problem the correlations among the 17 properties listed in TABLE 6 were calculated across all 36 situations for each subject. The average intercorrelations among these 17 properties for all nine subjects were then determined. They are presented in TABLE 7.

PRESENT TABLE 7 HERE

It is evident from this table that there are a number of moderate (.40-.60) average intercorrelations among these 17 properties indicating that individual situational spaces might not be as unrelated or as idiosyncratic as TABLE 6 seems to indicate. For instance, there are a number of properties, all moderately related to one another, which seem to be tapping into a dimension involving evaluative judgments. They are listed as properties one to five in TABLE 7 (good-bad, cooperation-conflict, comfortable-uncomfortable, drawn toward others-drawn away from others, accepted-rejected).[8] Reexamining TABLE 6, which lists the vec-

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[8]Properties 6, 7, 8 also appear to be related to the first five properties. However, the degree of their relationship does not seem to be as strong.

TABLE 7 (continued on next page)

AVERAGE INTERCORRELATIONS AMONG THE PROPERTIES CHOSEN TO CHARACTERIZE INDIVIDUAL SUBJECT SPACES

1. ON THE WHOLE WAS GOOD-ON THE WHOLE WAS BAD
2. INVOLVED COOPERATION AND HARMONY-INVOLVED CONFLICT
3. FELT COMFORTABLE-FELT UNCOMFORTABLE
4. DRAWN TOWARD OTHERS-DRAWN AWAY FROM OTHERS
5. FELT LOVED AND ACCEPTED-FELT REJECTED
6. FELT I COULD CONTROL WHAT HAPPENED IN THE SITUATION-FELT POWERLESS
7. HAD THOUGHTS AND FEELINGS UNDER CONTROL-DID NOT
8. FELT A SENSE OF OBLIGATION OR DUTY-DID NOT
9. FELT SELF-CONSCIOUS-DID NOT
10. INVOLVED ACADEMIC CONCERNS-DID NOT
11. INVOLVED DEALING WITH ESTABLISHED INSTITUTIONS-DID NOT
12. FELT MYSELF BEING EVALUATED-DID NOT
13. HAD ROMANTIC IMPLICATIONS-DID NOT
14. INVOLVED INTENSE INTERACTIONS WITH OTHERS-DID NOT
15. DIRECTLY REFLECTED ON MY ABILITY TO RELATE TO OTHERS-DID NOT
16. WAS A MAIN PARTICIPANT AND INITIATOR OF ACTION-WAS MERELY AN OBSERVER
17. WAS ROUTINE-WAS UNIQUE

TABLE 7

AVERAGE INTERCORRELATIONS AMONG THE PROPERTIES CHOSEN TO CHARACTERIZE INDIVIDUAL SUBJECT SPACES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	1.0																
2	.60	1.0															
3	.59	.55	1.0														
4	.55	.50	.52	1.0													
5	.52	.48	.52	.53	1.0												
6	.46	.47	.57	.35	.46	1.0											
7	.43	.43	.53	.32	.37	.44	1.0										
8	.36	.30	.45	.31	.28	.36	.53	1.0									
9	.33	.29	.45	.29	.37	.34	.32	.27	1.0								
10	.11	.13	.16	.18	.23	.11	.14	.26	.14	1.0							
11	.14	.19	.16	.24	.24	.24	.12	.24	.12	.56	1.0						
12	.22	.20	.33	.23	.24	.29	.38	.24	.38	.18	.24	1.0					
13	.16	.16	.11	.21	.22	.09	.17	.11	.17	.13	.14	.13	1.0				
14	.27	.27	.16	.32	.23	.15	.10	.22	.10	.28	.27	.24	.24	1.0			
15	.29	.30	.20	.32	.25	.16	.13	.14	.14	.12	.27	.13	.37	.37	1.0		
16	.34	.32	.29	.16	.24	.35	.20	.13	.20	.14	.23	.16	.13	.20	.18	1.0	
17	.19	.18	.17	.19	.13	.20	.16	.23	.16	.20	.14	.10	.13	.19	.13	.13	1.0

tors chosen to characterize each situational space, in terms of this more general dimension, it appears that for all nine subjects an evaluative dimension was chosen to characterize one of their dimensions. Thus, on a more general level, it would seem that all of the subjects seem to employ a dimension related to evaluative judgments in cognitively organizing the situations of daily life. It should be noted that the finding of an evaluative dimension is a common occurrence in personality research employing judgments scales of this sort. (cf. Osgood, Suci, and Tannenbaum, 1957)

There is also a high average intercorrelation between the properties, "dealing with an institution-not dealing with an institution" (11) and "academic-nonacademic" (10). From a reexamination of TABLE 6 it is evident that, for four subjects, one of these two dimensions was chosen to characterize a dimension of their situational space. There does not appear to be any readily observable patterns of intercorrelations among the remaining properties of TABLE 7.

At this point, it might seem that a factor analysis (or a multidimensional scaling analysis) would be appropriate for obtaining more substantive information on the structural relationships among these properties. However, the fact that there were 37 properties and only 36 situations for each subject prohibited such an analysis.

Finally, it should be noted that the fact that each subject experienced a completely different set of situations also severely limits the possibility of a clear examination of individual differences. Be-

cause of this aspect of the design of the present experiment, any differences between subjects which were found could be attributed to differences in the situations which were experienced and need not necessarily be viewed in terms of differences in underlying cognitive structures. In the following section, the general notions of idiosyncratic patterning, individual differences, and commonality will be discussed in terms of their application to cognitive structural representations.

CHAPTER IV

DISCUSSION

Two measures of consistency were employed in the experiment, one designed to measure the constancy of judgments of similarity and another designed to measure the constancy of distances between situational points in the spatial representations. The results have indicated that, for all subjects but one, there was moderately high consistency between assessments made at two different points in time. This consistency is impressive, given the "richness" or complexity of the data--unstructured descriptions of situations from everyday life. When faced with the task of making similarity judgments on data as complex as this, there are obviously a multitude of dimensions or attributes that could be construed as relevant by the subject. The consistency that was obtained in the present study indicates that the subject does indeed have a predominant representational structure for conceptually organizing the situations of daily life. This structure allows him to deal with the complexities of such rich data by initially focussing only on those aspects of a situation which are relevant to this more basic representation. This is not to say that the subject can not (or does not) make distinctions along other dimensions, once a situation's position along these basic dimensions have been determined.

An attempt was made to see how well particular dimensions obtained in earlier multidimensional studies of contrived situations (Magnusson, 1973; and Wish et al, 1973) fit the individual spaces of the present

study. Examining TABLE 6, which lists the properties chosen to characterize the dimensions of individual subjects, it is apparent that the most frequently occurring dimension ("good-bad") roughly corresponds to two of Magnusson's (1971) factors (the positive factor and the negative factor), while other dimensions could probably be construed as being similar to Magnusson's other factors (active, passive, and social). It also should be noted that the "good-bad" dimension was found to be a member of a general cluster of dimensions all related to evaluative judgments, one of which appeared in each of the nine subject spaces.

Two of the dimensions found in TABLE 6 ("intense-superficial" and "cooperation-competition") are similar to dimensions found by Wish et al. (1973) in their study of interpersonal relationships. The "cooperation-competition" dimension is also a member of the general cluster of evaluative dimensions. Some of the other dimensions in TABLE 6 appear to be somewhat similar to the two other dimensions found in the Wish et al. study ("task oriented-socially oriented" and "productive-unproductive"). In summary then, there is some degree of correspondence between the results of the previous studies and the present study.

It was predicted that the psychological interpretation of the dimensions of individual subjects would yield results congruent with Kelly's commonality principle - that there would be some dimensions common to many of the subjects and some patterning of dimensions that would be relatively unique to individual subjects. There did seem to be some tentative evidence supporting the essential notion of Kelly's prin-

ciple. All of the subjects seemed to have a basic evaluative dimension in common (which is perhaps typified by the "good-bad" dimension) and small groups of subjects could be construed as having other (non-evaluative) dimensions in common. There also appeared to be some degree of idiosyncratic organization and patterning among individual subjects.

However, it seems likely that the design of the present experiment is not fully adequate to extensively examine idiosyncratic organization. The problem with this design is that subjects do not experience any common stimulus elements - they do not experience the same situations. Therefore, there are limitations in directly comparing their individual cognitive structures in a search for individual differences, since any differences which were found could be due to the differences in stimulus elements and not to any differences in cognitive organization. An experiment which includes <u>both</u> a set of commonly experienced situations and a set of individually experienced situations would provide more productive information on individual differences. It must be emphatically stressed, however, that one should not go to the opposite extreme and include <u>only</u> those situations which are common to a group of subjects. Such a procedure would ignore the active selective capacities of an individual's cognitive structure. That is, a person's situational cognitive structure is used not only to aid him in organizing those situations which he <u>has experienced</u>, but also to aid him in chosing and selecting what situations he <u>will experience</u> and it can be expected that this

aspect of a cognitive structure is heavily colored by individual idiosyncratic organization. Therefore, to eliminate this type of situation is to eliminate a likely source of idiosyncratic organization. Both types of situations must be included in future research designed to explore idiosyncratic differences in situational cognitive structures.

At this point, it may be worthwhile to discuss in more detail the concept of "idiosyncratic organization" as it applies to multidimensional structures, since it is possible to interpret the term in a number of different ways and each interpretation has different implications for the assessment of individual differences.

First of all, as far as a multidimensional representation is concerned, there are two basic ways to construe differences in individual cognitive structures. One can construe these differences either in terms of the differential usage of particular dimensions or in terms of the location or distance among a set of commonly experienced situations. A couple of examples will make the differences between these two basic viewpoints clearer. Two individuals can employ exactly the same labels for characterizing each of their dimensions and yet differ in where they might place a common set of situations within the space determined by these dimensions. Such an arrangement would seem to indicate that the individuals in question had a different set of rules for determining the position of particular situations along the axis of an abstract dimensional concept. For example, two individuals might both

have a "good-bad" dimension in common but differ in their conceptualization of what represents a "good" situation and what represents a "bad" situation. If this were the case, additional procedures (e.g. a structured interview session)might be necessary to obtain a more adequate understanding of individual differences in situational cognitive structures. On the other hand, two individuals could have completely different sets of abstract dimensions and yet the distance between the elements of a common set of situations within each of their spaces could be quite similar. This would be possible because different cognitions can lead to the same act or constructive process. Again, additional procedures such as the detailed interview session would be necessary to throw light on this second aspect of multidimensional idiosyncratic organization.

Still another way of analyzing idiosyncratic organization has been suggested by Gordon Allport (1937) who has postulated that it may be wise to conceptualize elements of human behavior according to the concept of patterned uniqueness. Roughly speaking, this concept implies that the elements of personality (or in this case the elements of a situational cognitive structure) are assumed to interact with one another and therefore, the individual elements are not additive - the effects of the individual elements cannot be simply added together in order to assess the overall effect of the cognitive structure under question.[9]

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[9]Given this conceptualization of nonadditivity, it would not seem appropriate to represent cognitive structures in terms of any sort of spatial model.

Given the assumption of patterned uniqueness, two subjects would be considered to have qualitatively different cognitive structures as long as one of them had at least one element that the other did not. For instance, two subjects may have a "good-bad" and a "productive-unproductive" dimension in common. However, if they differed on a third underlying dimension they would be construed as having qualitatively different structures. Thus, if the assumption of patterned uniqueness were correct, one would expect to obtain an extensive amount of individual differences. Under this rubric, it would be wise to use the concept of commonality in a strictly demographic manner, to simply describe how many people possess a certain dimension or cognitive element. Within this framework, there would not be any basis for predicting the actions of an individual based on the fact that many (but not all) of the elements of his cognitive structure are similar to another individual or group of individuals.

Finally, the level of abstractness of the concepts under examination becomes a very important consideration in any study involving individual differences in cognitive structure, since at very abstract levels commonality can easily be demonstrated, whereas at very concrete levels it might be extremely difficult to find any commonality between subjects. In future research investigating individual differences and idiosyncratic organization among individual cognitive structures, it will obviously be necessary to explicate exactly what conceptualization of individual differences or idiosyncratic organization is being employed.

It is encouraging to note that the present experiment succeeded in obtaining meaningful and reliable information on situational cognitive structures through the use of real life situations, since information extracted from the rich resources of real life data provides opportunities for exploring questions and problems beyond the limits of the contrived, artificial situations that have been employed to date. This is not to say that the use of contrived situations does not have considerable value in testing certain hypotheses, particularly those which are formed at the group level. The skillful use of both types of data will probably be necessary for any extensive investigation of situational cognitive structures.

There are a number of opportunities for improving the methodology of the present experiment and for extending the scope of this line of research. First, as was mentioned above, efforts should be taken to obtain ratings of the situations on the psychological property scales as soon as possible after the similarity judgments are made. Perhaps, feedback from the subject on the interpretations of the spatial representations and on the appropriate scales would facilitate this process. Secondly, in the present experiment situations were obtained from subjects for two consecutive weeks. In order to gain a full understanding of situational cognitive structures, studies of much greater length must be designed. In these longer studies, it will be possible to derive the psychological property scales from the earlier representations and then to have the subject rate later situations on those scales on the

same day the situations are recorded. In this way, it will be possible to closely examine any fluctuations in the structure and content of the cognitive representations which may take place.

Another fruitful area for future reserach would be a more systematic investigation into the differences between spatial representations obtained from contrived situations and representations obtained from real life situations. An experiment in which the same subjects perform similarity judgments on their own individual real life situations and on a common group of more abstract situations would provide more definitive information on the nature of these differences.

At this point, it seems worthwhile to reemphasize some of the benefits of conceptualizing situations in cognitive representational terms, and in particular in terms of a multidimensional spatial representation. Ekehammar (1974), in a review of the interactionist point of view in psychology, has pointed out the advantages of a theoretical system which conceptualizes both the situation and the person in the same basic units and constructs. In such a system, the problem of deciding which conceptual unit in the situational domain corresponds to which conceptual unit in the person domain is minimized and the likelihood of adequately describing the person-situation interaction is increased. Personality psychologists, such as Lewin (1952) and Murray (1938) have recognized the value of construing persons and situations in commensurate terms and have striven to implement similar ideas into their own conceptual frameworks.

A multidimensional spatial structure, like most cognitive representational models, also allows one to construe persons and situations in the same units - for it is possible to categorize persons by their differing multidimensional cognitive representations and to categorize situations by their differing positions within these cognitive representations. A representational structure such as this provides a powerful tool for reconceptualizing many of the research questions posed by person-oriented psychologists. For example, it should be possible to relate changes in individual behavior from situation to situation to information about how the individual perceives these situations. From a psychotherapeutic point of view, an individual's interpretation of differing situations may be construed as playing an essential part in his adjustment to reality. The effects of a particular treatment can be studied by examining the extent and nature of changes during treatment, both in the structure of situation perceptions and in the perception of specific situations which may be of interest in individual cases.

On the other hand, research which has more of an emphasis on situational events can be reconceptualized in a similar manner. For instance, an environmental or social psychologist might want to obtain information on how a particular setting or event is most commonly construed, or on how people with different positions in the social structure (e.g. employer, employee, teacher, student, etc.) construe the same situation.

Conceptualizing situations in this manner also allows one to address

an important question relevant to all psychological research - that is, to what other situations can the results of a particular psychology experiment be generalized? As many have suggested (e.g. Brunswik, 1956; Orne, 1962), all too often the psychologist construes an experimental situation (e.g. receiving an electric shock) as possessing a certain attribute representative of a certain class of events (e.g. stressful situations) and then later generalizes from his results to other situations which he construes as also possessing the attribute. Minimal attention is given to the possibility that the subject has construed the experimental situation (and the situations to which the psychologist seeks to generalize) in a completely different manner, so that the particular dimension the psychologist has chosen to focus on is, for all intents and purposes, inconsequential and irrelevant. More studies are needed which attempt to map the cognitive representational structures of individual persons onto relevant theoretical constructs, so that a firm basis for the generalization from a specific research situation to other appropriate situations can be established. The methodology proposed here provides a framework by which such research can proceed.

Although the merits of a multidimensional representation have been particularly stressed in this discussion, it should be noted that a multidimensional spatial solution is but one of the models developed for representing internal cognitive structures. There are a number of other models, such as the various clustering techniques which have been proposed (e.g. Johnson, 1967; and Wallace, 1968). Developments in re-

lated fields, such as artificial intelligence and psycholinguistics, promise to add much more. The multidimensional model has been more fully developed and utilized, and its essential elements are easily grasped by psychologists and by anyone else who has had a course in Euclidean geometry. For these reasons, it seems like a good model with which to begin a systematic investigation of internal cognitive structures. However, it is but one model and there is no compelling reason to regard it as being THE representational structure of human cognition.

The multidimensional model, discussed here, has been demonstrated to have some degree of reliability and validity when applied to the domain of "real" life situations. However, one can not expect the multidimensional model, in and of itself, to adequately represent all the myriad facets of human cognitive structure since it is evident that it lacks the capacity to embody some of the more important aspects of cognitive activity. For instance, it is obvious that humans have the ability to think in propositional terms - in sentences with the form: if... then... (e.g. If John comes, the situation will be different.) While it may be possible to represent some aspects of this propositional mode of thought in multidimensional terms, additional types of cognitive structures are needed to fully represent this type of thinking. Therefore, in the future, in order to achieve greater "psychological validity," additional types of cognitive structures will have to be developed to supplement the deficiencies of the multidimensional model. Nevertheless,

despite its limitations, a multidimensional model does seem like a good place to begin the kind of sophisticated thought and reflection necessary for the development of an adequate understanding of the cognitive representation of situations and other complex stimuli.

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APPENDIX A

DIRECTIONS FOR RECORDING SITUATIONS

The purpose of this study is to begin an investigation into the kinds of cognitive structures people use in dealing with a wide variety of situations. In order to obtain some realistic information on the types of situations you encounter on a day to day basis, it will be necessary for you to record situations which you have actually experienced with descriptions in your own words. In order to make sure that the information you provide is scientifically useful, you must record it in a very specific manner. Please read over the following procedure very carefully and if you have any questions ask them immediately.

Before you begin make sure you have two sets of blank reference cards (with 18 cards in a set and both sets of cards labelled with numbers from one to eighteen).

1. Starting Wednesday night and continuing till next Tuesday, please record the following information <u>just before you retire for bed</u>. Note: it is important that the recording be carried out at the very end of each day in order that it include all of the day's happenings.

1a. Try and remember when you got up this morning and then mentally go through your day until you reach the point in time you are at now (the end of the day). Then choose the <u>three</u> situations that stick out the most in your mind--that have made the greatest impact n your mind. To help yourself on this task pretend you are writing a diary and

are limited to recording three situations only. Be sure that you don't choose situations simply because they occurred most recently.

1b. When you have chosen the three situations, take the first 3 cards from both sets of reference cards. Place card No. 1 from both sets down side by side in front of you. On the lined reference card, write a description of one of the situations you have chosen. This description must be at least one sentence long and no more than five sentences long. Write the description in enough detail so that if you were to read the description up to two weeks from now, you could easily recognize the situation and remember yourself being in it.

On the other reference card marked one, write a one word description of the emotion or feeling you felt in the situation. To supplement this information you may write one to seven words describing your emotional state in more detail. This description should be written so that it fully describes your actual feelings at the time. Your description should be written so that by reading it you can imagine yourself feeling an exact emotional state or feeling. If you felt no emotion or no feeling at the time write "none" on this card.

Take the unlined reference card and notice the question marked "one." Look at question 1a--it should look like this:

1 2 3 4 5 6 7 8 9

No Intensity or No Emotion or Feeling — Very Intense

Answer the question by marking how intense the emotion you felt

in the situation was. If you felt no emotion or feeling, mark "1."

Now look at question 1b. It should simply be marked:

PERSONS--

Next to the dash, write the first names of any people who you consider to have been meaningfully involved and present in the situation you have just described. If you don't want to use their real names, that's alright. However, you must use the same name whenever you refer to thatparticular person again throughout the course of the experiment.

Now take card two from both decks and question two from the mimeographed sheet of paper. Pick one of the remaining two situations and follow the same procedure that you used for the first situation. Do the same for the third situation.

2. Follow the procedure you have followed in 1, for the next six days. Make sure that the numbers on the top of both kinds of reference cards correspond.

Remember you will be describing three situations a day.

APPENDIX B

INSTRUCTIONS FOR MAKING PAIRED COMPARISONS

We are now interested in finding out how similar you think the 18 situations you have recorded are to one another. Read the following directions carefully and if there is anything you do not understand immediately, ask the experimenter for further explanations. You will soon be making comparisons on the similarity of each of the 18 situations to one another.

Make your judgments earnestly. Do not spend any time worrying about the correctness of your answers. This is not a test. There are no right or wrong answers. We are interested in your own subjective judgments.

Take the 18 situations you have recorded and place them in order in front of you. Now, look at question number one on the mimeographed sheet in front of you. It should look like this:

		Very Different								Very Similar
1.	SITUATION 1 with SITUATION 2	1	2	3	4	5	6	7	8	9

Examine situation number one and situation number two and record on the coding sheet at question number one how similar you thought the two situations were. Continue in this manner for all of the rest of the comparisons listed on the mimeographed sheet. When you are making these comparisons, do <u>not</u> base your judgment on the following criteria:

1. Do <u>not</u> base your judgment of similarity on the particular lo-

cality in which the two situations took place. For example, do not rate the two situations as being very similar solely because they happened to have occurred in the same room, house, etc. We are not interested in this particular characteristic of situations.

2. Do not base your judgments of similarity solely on the length of the description you wrote or on the particular literary style you chose to describe the situations. For example, do not rate two situations as being very similar solely because you used two sentences to describe the both of them. We are interested in your judgments of the similarity of the situations not in your judgments of the similarity of your descriptions. The descriptions are merely aids to help you remember the situation.

We would like you to base your judgments of similarity on the psychological characteristics of the situations, as you see them. These characteristics should be ones which you actually use to make sense out of your day to day experiences.

APPENDIX C

BIPOLAR SCALES

PLEASE CHECK THE FOLLOWING SCALES FOR EACH SITUATION.

SECTION ONE

IN THE SITUATION, I . . .

FELT DRAWN TOWARD OTHERS	:1:2:3:4:5:6:7:8:9:	FELT DRAWN AWAY FROM OTHERS
WAS THINKING LOGICALLY AND CLEARLY	:1:2:3:4:5:6:7:8:9:	WAS THINKING ILLOGICALLY AND UNCLEARLY
FELT A SENSE OF OBLIGATION OR DUTY	:1:2:3:4:5:6:7:8:9:	FELT NO SENSE OF OBLIGATION OR OF DUTY
WAS COMMUNICATING MY THOUGHTS AND FEELINGS WELL TO OTHERS	:1:2:3:4:5:6:7:8:9:	WAS NOT COMMUNICATING MY THOUGHTS AND FEELINGS WELL TO OTHERS
FELT SELF-CONSCIOUS	:1:2:3:4:5:6:7:8:9:	DID NOT FEEL SELF-CONSCIOUS
FELT I HAD MY THOUGHTS AND FEELINGS UNDER CONTROL	:1:2:3:4:5:6:7:8:9:	FELT I DID NOT HAVE MY THOUGHTS AND FEELINGS UNDER CONTROL
FELT LOVED AND ACCEPTED	:1:2:3:4:5:6:7:8:9:	FELT REJECTED
FELT SURE OF MYSELF	:1:2:3:4:5:6:7:8:9:	FELT UNSURE OF MYSELF
FELT LIKE I WAS PLAYING A ROLE	:1:2:3:4:5:6:7:8:9:	FELT LIKE I WAS LETTING MY REAL SELF COME THROUGH
FELT LIKE I COULD CONTROL WHAT HAPPENED IN THE SITUATION	:1:2:3:4:5:6:7:8:9:	FELT POWERLESS AND UNABLE TO EXERT INFLUENCE OVER THE SITUATION
FELT COMFORTABLE	:1:2:3:4:5:6:7:8:9:	FELT UNCOMFORTABLE AND ILL AT EASE
FELT LIKE MY NORMAL SELF	:1:2:3:4:5:6:7:8:9:	DID NOT FEEL LIKE MY NORMAL SELF
HAD ONE CLEARCLUT FEELING	:1:2:3:4:5:6:7:8:9:	HAD AMBIVALENT FEELINGS

APPENDIX C

SECTION ONE (continued)

FELT FREE TO ACT THE WAY I WANTED	:1:2:3:4:5:6:7:8:9:	FELT MY BEHAVIOR RESTRICTED BY THE SITUATION
FELT MYSELF DETACHED FROM THE SITUATION	:1:2:3:4:5:6:7:8:9:	FELT MYSELF PRESENT AND VERY MUCH INVOLVED IN THE SITUATION
FELT MYSELF BEING EVALUATED IN SOME WAY	:1:2:3:4:5:6:7:8:9:	DID NOT FEEL THAT I WAS BEING EVALUATED
FELT LIKE I WAS ACCOMPLISHING SOMETHING	:1:2:3:4:5:6:7:8:9:	DID NOT HAVE ANY FEELINGS OF ACCOMPLISHMENT
FELT LIKE AN ADULT	:1:2:3:4:5:6:7:8:9:	FELT LIKE A CHILD

SECTION TWO

THE SITUATION . . .

WAS BORING	:1:2:3:4:5:6:7:8:9:	WAS EXCITING
HAD ROMANTIC IMPLICATIONS (FOR MYSELF)	:1:2:3:4:5:6:7:8:9:	HAD NO ROMANTIC IMPLICATIONS (FOR MYSELF)
INVOLVED INTENSE INTERACTION WITH OTHERS	:1:2:3:4:5:6:7:8:9:	INVOVLED SUPERFICIAL INTERACTIONS WITH OTHERS
WAS EXPECTED TO HAPPEN	:1:2:3:4:5:6:7:8:9:	WAS AN UNEXPECTED OCCURENCE
INVOLVED ACADEMIC CONCERNS	:1:2:3:4:5:6:7:8:9:	INVOLVED NON-ACADEMIC CONCERNS
HAS IMPORTANT IMPLICATIONS FOR MY LONG RANGE PLANS AND DESIRES	:1:2:3:4:5:6:7:8:9:	HAS NO IMPORTANT IMPLICATIONS FOR MY LONG RANGE PLANS AND DESIRES
DIRECTLY REFLECTED ON MY ABILITY TO RELATE TO OTHERS	:1:2:3:4:5:6:7:8:9:	DID NOT DIRECTLY REFLECT ON MY ABILITY TO RELATE TO OTHERS

APPENDIX C

SECTION TWO (continued)

INVOLVED PEOPLE WHOM I CONSIDER TO BE MY PEERS AND EQUALS	:1:2:3:4:5:6:7:8:9:	INVOLVED PEOPLE WHO ARE NOT PEERS OR EQUALS
WAS ONE IN WHICH I WAS A MAIN PARTICIPANT AND INITIATOR OF ACTION	:1:2:3:4:5:6:7:8:9:	WAS ONE IN WHICH I WAS MAINLY AN OBSERVER OF THE ACTIONS OF OTHERS
WAS PRODUCTIVE	:1:2:3:4:5:6:7:8:9:	WAS UNPRODUCTIVE
INVOLVED COOPERATION AND HARMONY	:1:2:3:4:5:6:7:8:9:	INVOLVED COMPETITION AND CONFLICT
INVOLVED DEALING WITH AN ESTABLISHED SOCIAL INSTITUTION (SCHOOL, GOVERNMENT, CHURCH)	:1:2:3:4:5:6:7:8:9:	DID NOT INVOLVE AN ESTABLISHED SOCIAL INSTITUTION (SCHOOL, GOVERNMENT, CHURCH, ETC.)
WAS ROUTINE	:1:2:3:4:5:6:7:8:9:	WAS COMPLETELY UNIQUE
ON THE WHOLE WAS GOOD	:1:2:3:4:5:6:7:8:9:	ON THE WHOLE WAS BAD
INVOLVED PEOPLE WITH WHOM I AM VERY CLOSE	:1:2:3:4:5:6:7:8:9:	INVOVLED STRANGERS
INVOLVED INTERACTIONS WITH OTHERS AT A FORMAL LEVEL	:1:2:3:4:5:6:7:8:9:	INVOLVED CASUAL INTERACTIONS WITH OTHERS
WAS IMPORTANT TO ME PERSONALLY	:1:2:3:4:5:6:7:8:9:	WAS NOT IMPORTANT TO ME PERSONALLY
INVOLVED PEOPLE I LIKE VERY MUCH	:1:2:3:4:5:6:7:8:9:	INVOLVED PEOPLE I DON'T LIKE
WAS CONDUCIVE TO MY OWN PERSONAL GROWTH	:1:2:3:4:5:6:7:8:9:	WAS NOT CONDUCIVE TO MY OWN PERSONAL GROWTH

APPENDIX D

PROPERTIES CHOSEN FOR SPECIFIC SUBJECTS

SUBJECT	PROPERTY
1	FELT VERY ANGRY-DID NOT FEEL ANGRY
2	FELT MELANCHOLY - DID NOT FEEL MELANCHOLY FELT GUILTY - DID NOT FEEL GUILTY
3	FELT COMPLETELY ALONE - DID NOT FEEL COMPLETELY ALONE
8	FELT DISGUSTED AT THE IRRATIONALITY OF OTHER PEOPLE - DID NOT FEEL DISGUSTED AT THE IRRATIONALITY OF OTHER PEOPLE
9	FELT ADVENTUROUS - DID NOT FEEL ADVENTUROUS