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Empirical Analyses of the Structure and Content of Spontaneous Causal Thinking after Marital Separation

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EMPIRICAL ANALYSES OF THE STRUCTURE AND CONTENT OF SPONTANEOUS CAUSAL THINKING AFTER MARITAL SEPARATION

by

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LIFE

Karen D. Multon was born on October 11, 1952, in Chicago, Illinois. She is the daughter of Irvin and Helen (Mazurski) Richardson. She has three brothers, Dennis, Jeffrey, and David Richardson. She is married to Carl G. Multon and has one daughter, Jill Susan.

She graduated from Mother McAuley Liberal Arts High School in Chicago in 1970. Her Bachelor of Arts degree was conferred in May, 1974, by the University of Illinois in Chicago. She had majors in both elementary education and in the education of the mentally handicapped. In 1982, she obtained a Master of Arts degree with a major in learning disabilities and a minor in behavior disorders from Saint Xavier College in Chicago.

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CHAPTER I

INTRODUCTION

Attribution theorists and researchers have generated a vast body of literature over the past few decades. Much of the literature is based on the influential works of Fritz Heider (1958). Attribution theory, as explained by Heider, concerns the process by which an individual perceives events "as being caused by particular parts of a stable environment" (p. 297). This assumes that a person is motivated to gain cognitive mastery of the causal structure of the different events in his or her personal domain in order to create a more stable, predictable environment. Causal attribution serves not only the function of providing knowledge and understanding, but also assists the individual in attainment of personal goals by effective management of himself or herself and the surrounding environment (Kelley, 1967; Weiner, 1985).

Forsterling (1986) describes two general lines of research that are concerned with causal attributions. The first line of research examines the antecedents of causal thinking (i.e., what specific stimuli gives rise to different attributions). The second major area of research is concerned with how different attributions may relate to cognitive, affective, and behavioral responses.

The latter line of research has been predominant. Investigations have sought to examine the relationship between different types (e.g., effort, ability, luck, task difficulty) or dimensions (e.g., locus, stability, controllability) of attributions and various indices of behavioral, emotional, and cognitive consequences. Recent work has even been conducted that examines the physiological consequences of attributional style (Du Cette & Keane, 1984; Peterson, Seligman, & Vaillant, 1988). However, the primary avenue of investigation has been focused on the relationship of attributions to consequences following academic achievement or failure (e.g., Weiner, 1986) as well as to how attributional style may be related to depression (cf., Sweeney, Anderson, & Bailey, 1986).

In the 1980's, more attention have been directed at the first line of research. That is, what are the antecedents to attributional thought? Attribution theories (Kelley, 1967; Weiner, 1986) provide guidance regarding which events or types of behaviors seem to generate attributional thinking. According to these theories, a primary function of causal attributions is to create a more stable, predictable world. Thus, it follows that behaviors or events that are unstable, novel, negative, or particularly important to an individual will produce more attributional activity. Most of the research conducted to investigate this hypothesis have been done in laboratory settings. Subjects are generally asked to attribute causality (e.g., to ability, effort, task difficulty, and luck) following some behavioral outcome (e.g., experimenter-manipulated success or failure on a task). If subjects are asked to generate their own causes, then independent judges sort each cause into a number of a priori categories for different causal dimensions.

Underlying both major lines of research (i.e., exploration of antecedents of causal thinking versus the investigation of the consequences of types and dimensions of attributions) is a major assumption common to all the major models of attribution theory. This assumption is that people spontaneously engage in attributional activity in real-life situations (Heider, 1958; Kelley, 1967; Weiner, 1986). The research just discussed did not provide evidence that this assumption is indeed true. The introduction of the concept of causality by the experimenters may have elicited attributional activity from the subjects. Thus, evidence that people would engage in causal search without experimenter influence was not provided.

Fairly recently, studies have been conducted to assess whether people do spontaneously engage in attributional activity in response to actual life events (e.g., Wong & Weiner, 1981). Weiner (1985) recently reviewed this line of research and concluded that attributional thinking does occur in real-life, particularly when events are unexpected and denote failure of some type. Attributional thinking includes both the process of asking "why" questions (e.g, "Why did he leave me?") as well as the outcomes of such a process or causal attributions (e.g., "He left me because I am a boring person.").

In response to these findings and others, Brown and Heath (1984), in a cognitive-behavioral model of coping with critical life events, hypothesized that life events that are unexpected will elicit a significantly greater amount of attributional activity than expected life events. As part of a larger study examining aspects of the proposed model of life-events and coping, Brown (1983) asked subjects who had recently experienced a marital separation to indicate whether the separation was expected or unexpected. Subjects were also asked to list all questions (if any) they asked themselves within the first two weeks after separating from his or her spouse.

This open-ended response format produced 111 non-redundant questions that were coded into one of four categories originally used in the Wong and Weiner (1981) study examining expected and unexpected academic success and failure. These question categories were: (a) attribution (i.e., the "why" questions); (b) action (i.e., questions with a future orientation); (c) re-evaluation (i.e., questions that assess one's ability or goals); and (d) miscellaneous. The Brown and Heath (1984) hypothesis that unexpected separations would elicit a greater number of attribution questions was supported. Furthermore, the results indicated that attribution questions predominate other categories (e.g., action questions which imply future coping responses or re-evaluation of one's abilities) for unexpected separations.

The Wong and Weiner (1981) categories which were developed for academic achievement situations were not entirely satisfactory for coding the questions elicted in the Brown (1983) study. A preliminary examination of the underlying structure of these responses was conducted using multidimensional scaling analysis (Brown & Blake, 1986). Forty of the original 111 questions were randomly selected for this analysis. The results indicated a three-dimensional solution was optimal. The three dimensions were labeled as follows: (a) attribution versus action; (b) self- versus other-focus; and

(c) psychological versus practical coping issues. Thus, these results provide evidence that people do spontaneously engage in attributional thinking following a major negative life event (i.e., marital separation). Further, the results indicate that non-dimensional discrete groupings (e.g, the a priori categories from Wong & Weiner, 1981) may not be as useful as a continuous dimensional format for adequately describing the underlying structure of spontaneous causal thinking after a critical life event.

Although the results of the multidimensional scaling (MDS) analysis done in the Brown and Blake (1983) study do indicate that attributional activity is a major component of post-separation thinking, these results must be considered only preliminary for two primary reasons. The first is that not all of the data were used in the study (i.e., only 40 of the original 111 questions were used in the analysis to elicit the underlying structure of spontaneous cognitive activity). Secondly, the results may or may not be stable. In the present study both of these issues will be addressed by secondary analyses conducted on the data generated from the Brown and Blake (1986) study.

In the last few years, there has been an increasing number of studies that examine attributional activity in both satisfying and unsatisfying intimate relationships, including a few on divorced couples (e.g., Doherty, 1980; Fincham & Bradbury, 1987; Fletcher, 1983; Holzworth-Monroe & Jacobson, 1985; Howe, 1987; Jacobson, McDonald, Follette, & Berley, 1985). In addition, there have been studies that examine the effectiveness of therapy (both individual and couples therapy) that incorporate attributional retraining (see Brehm & Smith, 1986, for a review). Baucom, Epstein, Sayer, and Sher (1989), however, argue that "at present there is little cohesion and direction in the study of how couples think about their relationships" (p. 31). They view the problems as resulting from: (a) lack of delineation of important cognitive variables (e.g., attributions and expect-ancies); (b) conceptual and methodological difficulties in operationalization of these variables; and (c) a lack of models of marital functioning that incorporates cognitions in a detailed manner.

Before any measure of attribution-making in divorced couples could be considered valid, basic research demonstrating that couples spontaneously engage in attributional thinking after a marital separation must be conducted (e.g., Brown, 1983). In addition, it is important to examine the cognitive activities that occur after a divorce and determine if there is a stable underlying structure to these activities. In the discussion of looking at broader dimensions (e.g., locus) versus a focus on content of causal thinking, Baucom et al. (1989) note that "in assessing attributions within marriage, almost no investigators have focused on the actual content of the attributions" (p. 35). The causal dimensions (a priori categories), rated by examiners examining content, were the focus of the studies on couples.

The primary purpose of this study will be to examine the cognitive activities that occur after a marital separation and determine if there is a evidence for a stable underlying structure to this type of thinking.

Consequently, the hypotheses to be tested are:

1. Spontaneous causal thinking after a negative life event (marital separation) will elicit a structure from empirical analysis that will include a causal attribution dimension and this dimension will be a primary one.

2. A second dimension expected to result from the analyses of spontaneous causal thinking is action-oriented questions. This dimension will not be as prominent as the causal attribution dimension.

3. The resulting dimensions will be relatively stable.

Results of this study are to be compared to the basic assumptions underlying attribution theory and implications related to theory confirmation, assessment, and clinical interventions will be systematically discussed.

CHAPTER II

REVIEW OF LITERATURE

Causes are imposed by the perceiver to account for the relationship between what has occurred and the outcome. The perceiver may be an actor (one involved in the event) or an observer. Attribution theory is based on the premise that individuals are motivated to gain a realistic causal understanding of their environment as well as their own actions to predict and control the events in their lives. They may be viewed as "lay scientists" intent on providing meaning to past events, particularly those that are novel, negative, and/or important.

There is no one theory of attribution, although most seem to be based on the work of Heider (1958). In his book The Psychology of Interpersonal Relations, Heider described the processes that operate under the assumption the individual were motivated to make attributions about his or her world. These attributions may be of causes, inherent properties, or dispositions. Heider assumes that a person engages in attributional thinking to "try to make sense out of the manifold of proximal stimuli..." (p. 296) in an attempt to gain some level of mastery over his or her environment. In this attempt to seek to comprehend the causal relationships that govern his or her interaction with the environment, he or she isolates conditions in the physical surroundings, in the activities of others, and in his or her own actions and holds them reponsible for resulting in a particular outcome. This "knowledge" is then used to determine future actions. Thus, Heider explicitly provides the motivation for spontaneous causal thinking and the assumption that people make attributions to attain a cognitive mastery of the environment.

In addition, Heider points out the similiarities between naive epistomology and scientific episotomology. The lay person's epistemic encounters with the world are assumed to be basically rational, although psychological biases may exist and introduce distortions into the process. It is posited that the logic whereby the layman validates his conceptions and hypotheses essentially resemble the scientific method.

The present study will focus on the attributional theory of motivation and emotion developed by Weiner (1986) as the conceptual framework for exploring the underlying cognitive processes of recently divorced or separated persons. While much of the work based on Weiner's theory has been in the achievement domain, it is also applicable to other areas in which there are negative outcomes (e.g., the ending of a marital relationship) for which attributions can be made.

Weiner posits that when events or behaviors take place that are unexpected, negative, and/or important to the individual, he or she will engage in a cognitive search for causality and the attributions that result will have cognitive, affective, and/or behavioral consequences. The underlying assumption that people spontaneously engage in attributional thinking as consequence of "real-life" events, has only been recently investigated. Weiner (1985) concludes in his review of this research that "why" (i.e., attribution) questions do occur in response to naturally-occurring events, particularly those that involve unexpected failure.

Most of the research, however, has been focused on the relationship of particular attributional styles or dimensions to certain antecedents and/or kinds of feeling, thinking, or behavioral responses (e.g., Anderson, 1983; Brunson & Matthews, 1981; Cutrona, Russell, & Jones, 1984; Diener & Dweck, 1978; Sacks & Bugental, 1987). Weiner (1986) proposes that the underlying cognitive architecture of attributional activity includes three major dimensions (locus, stability, and controllability) with the possibility of two other dimensions (intentionality and globality) being represented. Studies which examined the underlying dimensions of attributions will be discussed in the following section.

Empirical Studies of Attributional Dimensions

In the examination of the underlying dimensions of attributional processes, three major empirical techniques have been used. The first two methods are factor analysis and multidimensional scaling (MDS). In addition, one study (Stern, 1983) included four independent investigations of a concept formation task that used a multitrait, multimethod procedure to separate the method variance from true variance.

Factor Analytic Studies. Factor analysis is "an analytic technique that permits the reduction of a large number of correlated variables to a smaller number of latent dimensions" (Tinsley & Tinsley, 1987, p. 414). In the attributional literature, subjects rate a number of causes of outcomes and the intercorrelations provide a pattern by which causal structure is inferred through factor analysis. Of the three studies using factor analysis, two (Meyer, 1980; Meyer & Koebel, 1982) focused on achievement situations while the third (Wimer & Kelley, 1982) examined attributions from a wide variety of situations (both major events and rather minor events).

In the study conducted by Meyer (1980), the subjects were required to rate nine causes with bipolar anchors as determiners of outcome in 16 exam situations.

The nine causes were: (a) general intelligence, (b) study habits, (c) test-taking ability, (d) teacher ability, (e) teacher effort, (f) mood, (g) luck, (h) preparation for exam, and (i) difficulty of exam. The situations varied as to outcome (success or failure) as well as to type of information provided that has been demonstrated by previous research to influence attributions (e.g., task importance, previous achievement history). Different factor solutions of the ratings were examined and resulted in the isolation of three factors, labeled stability (stable or unstable), locus (internal or external), and control (controllable or uncontrollable). These three factors directly correspond to the major factors posited by Weiner (1986).

The Meyer and Koebel (1982) investigation was quite similar, but with a few important changes. In this study, the situations were real rather than hypothetical because the subjects were required to rate their own exam performance and no information other than the actual exam outcome was given. Again, nine causes with bipolar anchors were rated by the students as determining the results of the exam grade. However, teacher ability and teacher effort were combined into a cause labeled "teacher" and general intelligence and test-taking ability were combined into "ability". Anxiety and background were then included among the possible causes of actual exam outcome. Four factors emerged as a result of the factor analysis. The first three were named locus, stability, and control, but the fourth could not be named. Anxiety and mood obtained the highest loadings on the fourth factor, while luck and task difficulty obtained the lowest loadings. Thus, the two studies resulted in consistent data.

The third study employing a factor analytic technique to determine causal structure did not confine itself to the achievement domain. Instead, Wimer and Kelley (1982) gave descriptive sentences of outcomes, actions, or emotional states of a diverse nature. Examples include "Jack is afraid of women" and "Bill criticized his supervisor". Subjects were asked to write "the most likely cause for the event described" (p. 1144) and then rate that attribution on 44 rating scales, with each scale describing some property of the attribution on a scale of 1 to 5 ranging from "not at all" to "completely". These attributional rating scales included such statements as "The cause was far in the past", "The cause is something in the person's situation", and "The cause puts blame on the person". The factor analysis resulted in five major factors: good-bad, simple-complex, the person, enduring-transient, and motivation. As Weiner (1986) indicates in his summary of this study, the person factor is congruent with the internal anchor of the bipolar dimension of locus. Enduring-transient appears to be similiar to the stability factor, but in fact it refers to the length of time that the cause impinges on a person. Thus, this dimension and the stability factor does not correspond as well as might be thought at first glance. Nonetheless, Weiner states that "among the dimensions identified, one or two appear to overlap with the properties posited by Meyer (1980) and Meyer and Koebel (1982)" (p. 56).

Multidimensional Scaling Studies. The second empirical techique used to examine the structure of attributional processes is multidimensional scaling. Multidimensional scaling (MDS) is "a family of geometric models for multidimensional representation of data or corresponding set of methods for fitting such models to actual data" (Carroll & Arabie, 1980, p. 608). MDS statistical procedures are designed to fit a continuous dimensional structure. Although much of the literature has assumed a non-dimensional discrete structure to causal thinking and attributional dimensions in particular, Weiner (1986) suggests that the dimensions may in fact be on a continuum (e.g, internal-external) and not separate categories. MDS has been used to examine underlying attributional dimensions in achievement situations (Passer, 1977), negative interpersonal events between marriage partners (Passer, Kelley, & Michela, 1978), and causes of loneliness (Michela, Peplau, & Weeks, 1982).

Passer (1977) was the first to use MDS techniques to examine attributional dimensions. Subjects were asked to rate for degree of similiarity all possible pairings of 18 salient causes for success and failure in academic achievement. Causes for the failure condition included "hard course", "no time to study", "bad mood", and "no ability", while causes for the success condition included "easy course", "time to study", "good mood", and "ability". A second group of subjects rated each cause on 14 bipolar scales to assist in the labeling of dimensions found. These scales included "stable-unstable", "intentional-unintentional", "strong-weak", and others. Two major dimensions resulted in the academic failure condition: internal-external (locus) and intentional-unintentional (control). The only dimension that emerged from the success condition was locus.

The next MDS study examined dimensions underlying attributions for interpersonal behavior that negatively affected a marriage partner. Passer and his colleagues (Passer et al., 1978) asked college students to rate the similiarity of 13 causes given either by the enactor of the negative behavior or by the spouse and then rate each cause on several bipolar scales to aid in identifying the underlying causal structure. Both conditions (actor versus partner) resulted in two dimensions. The first dimension was labeled "positive versus negative attitude toward spouse" and appeared for both conditions. The second dimension of the actor condition was labeled "intentional versus unintentional" (i.e., control) while the second dimension of the spouse condition was interpreted as "actor's traits versus circumstances or states" (i.e., stable versus unstable). Thus, the interpersonal domain seems to yield an attitudinal dimension that was not apparent in previous studies exploring the achievement domain. In addition, it appears that an attributional bias may occur as a result of being the actor or the perceiver of a negative interpersonal behavior.

The third study examined the causes of loneliness (Michela et al., 1982). The procedures were similar to the previous two MDS studies: 13 causes of loneliness were rated on similiarity and bipolar scales were also rated for each cause to assist in labeling any resulting dimensions. The MDS analysis revealed a two-dimensional solution. The first dimension was interpreted to be locus and the second dimension was labeled stability.

Multitrait-Multimethod Study. Weiner (1986) reports a complex study conducted by Stern (1983) in which subjects were required to make concept formation decisions using a variety of tasks. For most of the tasks, the subjects were given 16 cards with each card describing one cause for the success or failure at either an academic exam or a sports performance. In the free-sort, subjects grouped the cards into as many categories as they wished. In the second task (sort-resort), the cards had to be sorted into two logically distinct groups. The 16 causes were resorted in two new piles, again using a logical rule to separate the groups. This procedure was repeated until the subject could no longer develop a new rule by which to sort the cards into only two groups. The third concept formation task required subjects to use sequential sorting procedures. That is, the cards were first grouped into two categories then resorted into smaller groups. This continued until the subject could no longer logically divide the groups. Graph building was a procedure in which subjects connected causes based on similiarity judgements (e.g., the most similar causes were connected by a line labeled "1"). Other groups of subjects made similiarity judgements or rated the 16 causes on bipolar scales.

A priori similiarity scores for the 16 causes were determined through logical analysis and a correlation matrix was created. That is, if one cause was similiar to another cause on the three dimensions of locus, stability, and controllability, than a score of 3 was assigned. A score of 0 indicated dissimilarity on all dimensions. The data from the concept formation decisions were also transformed into numerical values depending on the grouping of causes. The average correlation between the a priori score and the score from the data was approximately .60, a fairly high correlation given all the methods used in this study. Stern then employed a multitrait, multimethod procedure that demonstrated that the different methods yielded identical dimensional scores.

Summary of Empirical Studies. In his review of the empirical studies examining the underlying attributional dimensions, Weiner (1986) argues that the "data unambiguously support the contention that there are three dimensions of perceived causality" (p. 64). These are locus, stability, and control (or intent). Other dimensions (e.g., complex-simple motivation in the study by Wimer & Kelley, 1982) were also found in some of the studies, but there was not enough between-study validation.

All of these studies used empirical analyses to elicit the underlying structure of attributional thinking. However, these investigations did not examine spontaneous attributional activity. Experimenters provided the conditions (e.g., success versus failure) within a context (e.g., achievement domain) with the assumption that causal thinking would naturally occur after such events.

There is the only one known study (Brown & Blake, 1986) that has attempted to examine through empirical analysis subjects' spontaneously-generated cognitive processes after a negative event (i.e., marital separation). As discussed in detail in Chapter I, these researchers conducted an MDS analysis to examine the dimensions along which subjects categorize divorce-related questions in a sorting task that was minimally structured. Thus, the subjects were allowed to categorize the 111 non-redundant questions generated from a previous study of divorced or separated persons (Brown, 1983) on any basis they wished. In addition, they were not required to report the basis for sorting these questions into any number of categories they chose. The MDS analysis of 40 of the questions randomly selected from the original 111 resulted in a three-dimensional solution that provided preliminary evidence that people do engage in attributional thinking following an important negative life event and that this type of cognitive processing is predominant. This confirmed previous research (e.g., Brown, 1983; Wong & Weiner, 1981).

Affliation Literature in Attribution Theory

Weiner (1986), in his general attribution theory of motivation and emotion, identifies two major areas of causal ascriptions. The first, achievement, has been the major focus of research efforts. However, the causal ascriptions related to affliation (e.g., social acceptance or rejection) has been more prominant recently in the attribution literature.

There have been some conclusions regarding the content of couples' attributions and their relations to marital satisfaction or discord. Thompson and Synder (1986), in a review of attribution research in intimate relationships, state that:

> In general, research has supported a strong association between attributional processes and relationship satisfaction and functional interaction patterns. However, this association is complex and mediated by such variables as behavior being attributed and type of attribution being made. Interpretation of the extant literature is further complicated by the lack of a well-defined methodology to assess attributional process (p. 135).

Thompson and Synder further suggest that there is a need for basic research documenting the process of spontaneous attributional search in couples, as well as basic theory building and methodological refinements. Analyzing how an individual thinks about a past marriage may have important implications relating to the person's capacity to cope with divorce in an adaptive way as well as implications for his or her future intimate relationships. As stated previously, Brown and Blake (1986) have provided the only evidence that individuals engage in spontaneous casual thinking related to interpersonal conflict (i.e., marital separation or divorce). This type of research may lead to better assessment techiques as well as implications for clinical interventions (e.g., post-divorce attributional retraining).

CHAPTER III

METHOD

The primary purpose of this study is to examine empirically the cognitive activities that spontaneously occur after a marital separation in order to determine if a stable underlying structure is evident. Attribution theorists posit that events that are unexpected, novel, negative, and/or important to the individual will generate attributional thinking. An event such as a divorce fulfills at least one of these conditions for causal activity. Thus, the following hypotheses were tested:

1. Spontaneous causal thinking after a negative life event (marital separation) will elicit a structure from empirical analyses that will include a causal attribution dimension and this dimension will be a primary one.

2. A second dimension expected to result from the analyses of spontaneous causal thinking is action-oriented questions. This dimension will not be as prominent as the causal attribution dimension.

3. The resulting dimensions will be relatively stable.

Subjects and Procedure

The following section describes the methodology in the Brown and Blake (1986) study. The current study reanalyzed the data set that resulted from the Brown and Blake procedures.

Subjects. The subjects were 46 undergraduates enrolled in psychology classes at a large midwestern university. There were 18 males and 28 females with a mean age of 22.59 (*SD* = 3.36; range = 19 to 35). Most of the subjects were single (*n* = 39), with 4 married and 3 divorced or separated (from 2 to 6 years). Approximately 80 percent of the sample was caucasion. Of the total sample, 41 percent reported at least one family member who was divorced. A definition for "family member" was not given by the researchers, presumably to allow the subjects to come up with their own definition. Divorced family members reported by this sample included parents (*n* = 10), sisters (*n* = 8), brothers (*n* = 6), cousins (*n* = 2), an uncle (*n* = 1) and "in-laws" (*n* = 1). The amount of time since the divorce for each of these family members (*n* = 28) ranged from 3 months to 35 years with a mean of approximately 8 years.

Procedures. Questions generated from the Brown (1983) study were reduced for redundancy into a set of 111 questions. Each question was printed on a 4 by 6 unlined index card and the whole set of 111 questions was given to each of the subjects. The subject was requested to read through the entire set of cards, then sort the cards into piles of "cards that seem to belong together according to their content". No limits were placed on either the number of categories or the number of cards in each category. After completing the task, the subject labeled each group of questions according to the scheme they used to place the cards in category. Subjects were tested in small groups (5 to 10 per group). Instructions were given both orally and in written form. A Demographic Information form was given after the oral instructions and before completing the sorting task.

The Brown and Blake (1986) study used a frequency matrix of 40 of the original 111 variables to run the multidimensional scaling analysis which resulted in the three-dimensional solution previously described. These 40 variables were randomly selected. Each cell in the sub-diagonal matrix contained a frequency count of the number of subjects who grouped each pair of stimulus variables in the same category. The range was 0 to 46 (total number of subjects equals 46) for each cell.

Statistical Analyses

In the following section, the statistical secondary analyses of the existing data set from the Brown and Blake (1986) study are described.

<u>Data Matrix Conversion.</u> For this study, the entire frequency matrix (111 x 111) was used. It was an off-diagonal lower half matrix which has 6,105 cells. Each cell contained a frequency count of the number of subjects who grouped one variable (question) with another variable in the same category. The frequency count in each cell had a possible (as well as actual) range of 0 to 46.

This previously existing data set was transformed into a new matrix. Each entry in this matrix, ij, was a measure of the degree to which stimulus question i and stimulus question j were perceived by the subjects to belong to the same category. The similarity measure, designated the "index of association" (I) was calculated by determining the square root of the proportion of each cell entry. For example, if the frequency count in a cell was 20 (of a possible 46), the resulting square root of the proportion would be .659. This result is analagous to a correlation coefficient and may be interpreted as such. This new matrix of similarity data was used for all subsequent analyses.

<u>Cluster Analysis.</u> This very large data set was too unwieldly to examine properly the underlying structure and thus had to be reduced considerably. Brown

and Blake (1986) chose to reduce the data set by random selection. However, it seemed likely that a more stable solution would be reached if this data set were first divided into homogeneous groupings before using MDS procedures. Since the number of groupings was unknown, the statistical technique that was indicated was cluster analysis. The clustering process is considered preclassificatory (Lorr, 1983).

A cluster analysis constructs a sequence of partitions from an object set in which the objects that are similar become associated with each other. Objects may be variables or subjects. In the present study, the measure of similarity was the index of association and the objects were the stimulus questions. Cluster techniques fit a non-dimensional discrete structure to similarity data. That is, stimulus questions that were more similar to each other formed a cluster, which then were considered a general grouping or category based on common characteristics of the questions (e.g., content, intent, locus, etc.) as perceived by the subjects.

There are many different types of cluster analysis techniques. A structural model was chosen based on the kind of cluster expected to be found in the data (Lorr, 1983). The clusters generated from this data set were expected to be compact (roughly spherical) rather than chained (elongated). Compact clusters are characterized by high similarity among members. Each member is more like every other member than it is like any other point in another cluster and the relationship is symmetric.

A second consideration made for the determination of the cluster analytic techniques used was the criteria to be used for combining clusters in an agglomerative hierarchical clustering analysis. Edelbrock in a Monte Carlo study and Mezzich using constructed data sets (cited in Lorr, 1983) each found that average linkage was significantly more accurate than other procedures for correlations (which are similar to the index of association to be used in this study). A variant of this method, the average linkage within groups, was the first cluster analysis done. It "combines clusters so that the average distance between all cases in the resulting cluster is as small as possible" (Norusis, 1985, p. 181). It was considered useful to cross-validate the results using a different method in order to confirm that the underlying cluster structure was being recovered. Thus, the average distance between clusters was the method used to cross-validate the results from the first clustering technique.

The results of the hierarchical cluster analyses were examined to determine an optimal number of homogeneous groups to select between 25 and 30 variables for the multidimensional scaling procedure. As differences in the two cluster analytic procedures were found various options (e.g., eliminating some variables) were considered to obtain clusters that are stable. The variables for the first data set (Group A) were selected randomly from within each grouping. A second data set of 25 to 30 variables (Group B) were also selected randomly from within each grouping in order to test the stability of the MDS solution reached with the first data set.

Multidimensional Scaling. Once the sets (Groups A and B) of variables were selected as a result of the hierarchical clustering algorithms, a non-metric MDS technique (ALSCAL; Takane, Young, & de Leeuw, 1977) was used with Group A to generate from two- to six-dimension solutions. Torgerson (1958) cites MDS as a solution to the following problem: "given a set of stimuli which vary with respect to an unknown number of dimensions, determine (a) the minimum dimensionality of the set, and (b) the projections of the stimuli (scale values) in each of the dimensions involved " (pp. 247-248).

Thus, the MDS model is a way to disclose the underlying cognitive dimensions of spontaneous causal thinking after marital separation and to measure the stimuli in respect to those cognitive dimensions. Deciding on the number of dimensions to obtain a solution depended on percentage of variability accounted for, interpretability, ease of use, and stability of the solution (Kruskal & Wish, 1978). A higher dimensional solution was preferred over a lower dimensional solution only if there were important stimulus features that appeared in the higher dimensional solution, but failed to appear in the lower dimensional solution (Davison, 1983).

The ALSCAL program also has a "goodness-of-fit" index called stress (Kruskal, 1964). Generally, the lower the stress, the better the relationship between the observed and true distances of objects in the data set. Therefore, the goal of the first MDS analysis was to produce a solution with a low stress value that was interpretable and useful, and had a high percentage of variability accounted for in the data matrix. The stability of this solution was tested by using the second data set (Group B) and running a confirmatory MDS analysis.

Kruskal and Wish (1978) describe the most common way to interpret a multidimensional solution is to "look for lines in space, possibly at right angles to each other, such that the stimuli projecting at opposite extremes of a line differ from one another in some easily describable way" (p. 31.). Since the configuration is based on the distance between points (i.e., the lower the index of association, the greater the distance between points), it was permissible to rotate axes. In addition, axes do not have to be orthogonal (although there are statistical arguments in their favor). Oblique axes may in fact provide a better characterization of the "real" world (Kruskal & Wish, 1978). Axes, rotation, and the choice of a coordinate system are arbitrary (Lingoes, 1981b).

Interpretation of the MDS Solution. Kruskal and Wish (1978) describe different "neighborhood" interpretations (also called the pattern approach) of MDS configurations which proved to be useful. While the interpretation of dimensions as described in the previous section is the most common approach, this approach provided a structure in addition to that provided by the dimensional interpretation. "It is often desirable to supplement closeness in the configuration with closeness based directly on the proximities data, because neighborhoods in a low-dimensional (2 or 3 dimensions) space may misrepresent the data from which they were derived" (Kruskal & Wish, 1978).

Summary of Methodological Procedures

To reiterate, this investigation reanalyzed the data set that resulted from the Brown and Blake (1986) study of cognitive activities that occur after a marital separation. The data set was an off-diagonal lower half matrix (111 x 111) consisting of 6,105 cells. Each cell contained a frequency count of the number of subjects who grouped each pair of variables (i.e., questions) in the same category.

The first step in reanalyzing this data was to convert each cell in the matrix into a new similiarity measure called the "index of association" (I) by calculating the square root of the proportion in each cell entry. This resulted in cell entries that were analagous to correlation coefficients and could be interpreted as such.

In the next step, cluster analysis was used to reduce this very large data set into homogeneous groupings so that between 25 and 30 variables could be selected for further analysis. The first cluster analysis done was average linkage within groups. The results were cross-validated using an average linkage between groups cluster analysis. Variables were then randomly selected from each cluster. A second data set of the same number of variables were also selected from within each grouping in order to test the stability of the solution reached in the MDS solution wih the first data set.

Finally, a non-metric MDS technique was used with the first data set to generate from two- to six-dimension solutions since the number of underlying dimensions was unknown. The number of dimensions was then decided upon based on several guidelines (e.g., percentage of variance accounted for and interpretability). The second data set was used to test the stability of the MDS solution examining the underlying structure of spontaneous causal thinking after a negative life event.

CHAPTER 1V

RESULTS

This chapter contains the results relative to each of the three hypotheses. The results are discussed according to the sequence of the data analysis described in Chapter III.

A data set resulting from the Brown and Blake (1986) study has been reanalyzed to investigate these hypotheses. The data set was based on the 46 sample subjects who independently categorized 111 spontaneously generated questions after marital separation from an earlier study (Brown, 1983). The questions are listed in Table 1.

Data Matrix Conversion

The Brown and Blake (1986) procedures resulted in an 111 x 111 off-diagonal lower half matrix with a frequency count in each cell. The frequency counts ranged from 0 to 46, the maximum possible range. The frequency counts were transformed into a new similarity measure, designated the index of association. This index, analagous to a correlation coefficient, ranged from .00 to 1.00. Visual inspection of the converted matrix for patterns of similarity as a first step to

Table 1

Questions Elicited From the Brown (1983) Study

Item	Question
1.	What kind of parent must I be?
2.	How can anyone love me?
3.	How could I be such a failure?
4.	Am I crazy?
5.	How could I change to be a better wife/husband?
6.	How can I be so selfish?
7.	How can I achieve my goals for future, happiness, etc....and are they realistic?
8.	Where can I get a good lawyer?
9.	How would I get my things moved?
10.	What do I want for my future and that of my children?
11.	Should I invest in a home business?
12.	How am I going to manage my job?
13.	Can I really make it on my own?
14.	Where shall I live and with whom?
15.	How am I going to manage the responsibility of keeping up our home alone?
16.	Where would I live?
17.	How am I going to make it financially?
18.	How do I get a full-time job?
19.	Should I stay in this town or move back to the cities?
20.	How am I going to manage money, handle the bills?
21.	Am I going to be able to support myself and my children?
22.	What do I do with the kids?...battered women's shelter again, foster home?
23.	How do say the right things to my teenagers?
24.	How do I cope with my children?
25.	How am I going to manage the children?
26.	How can I help the kids through this?
27.	How could I protect my children from hurt, rejection?
28.	How will my children take it?...Will they understand?
29.	How will I ever be able to live without him/her?
30.	How can I live alone?
31.	Will I always live alone?
32.	How can I know what I want?
33.	Will I ever love or trust anyone again?
34.	What do men/women mean to me?...Do I need them?
35.	Are my expectations of marriage too high or unrealistic?

Table 1 (continued)

Item	Question
36.	What can I do to improve?
37.	Would he get the kids even though he'd been reported for child abuse?
38.	Why?!
39.	Why me?
40.	Is this really happening?
41.	What went wrong?...Why did the marriage fail?
42.	What should we have done differently with our lives together?
43.	Could it have been helped?
44.	What is the truth?
45.	How did this really happen?
46.	Is this the last time?
47.	Did we do the right thing?
48.	Is this the right thing?
49.	Is this what I want?
50.	Should I tell my family now, or when I'm settled?
51.	How should I tell my parents?
52.	What would my family think when I told them everything?
53.	What will my family say?
54.	Where will I stand with Christians?
55.	How am I going to tell everyone?
56.	How am I going to manage facing our friends?
57.	How am I going to manage telling my colleagues at work?
58.	How are my landlords going to react?
59.	Why don't people understand?
60.	Why can't people stop pressuring me?
61.	Why my friends didn't tell me my husband/wife had somebody else when they knew for so long?
62.	Who made him/her leave me?
63.	How could he/she do this to me?
64.	How could he/she have hurt me like he/she did?
65.	What has happened to him/her?
66.	How could he/she not care? How could he/she hurt me when our lovemaking always seemed to go so well?
67.	How could he/she leave his/her children?
68.	Why did he/she have to start drinking again?
69.	How could I have been blind for so long?
70.	Why did I let him treat me like he did?
71.	Why did this happen to me?...I felt I had tried so hard?
72.	Why do things like this happen to people like me?
73.	Why doesn't he/she love me anymore?
74.	When will it all be settled?

Table 1 (continued)

Item	Question
75.	Where do I go?
76.	What is the outcome going to be?
77.	What am I doing?
78.	How am I going to keep control of myself and my mind at work?
79.	Why was he/she unfaithful to me?
80.	Doesn't he/she love me, or was it all a game?
81.	Why did he/she lie?
82.	How long has he/she been deceiving me?
83.	Have I just made similar/bad choices in a mate?
84.	Should I have spent more time at home?
85.	What did I do wrong?
86.	What's the matter with me?
87.	How could I have changed things so this wouldn't have happened?
88.	How will the children adjust to this situation?
89.	How much will my child suffer?
90.	How will this affect the children?
91.	Will my child be O.K.?
92.	How will this affect the children's feelings toward me?
93.	How am I going to manage my life alone?
94.	What is he going to do to help me with finding a place to live and money?
95.	How will I be able to cope with 13 yrs. of contact with my sons' father?
96.	Why didn't I go through with this when he went back to drinking 3 yrs. ago?
97.	Am I going to be physically abused by my husband?
98.	Will he leave the state and not contact me at all?
99.	Will my wife please give us another chance?
100.	What scriptures could I stand on for the restoration of my marriage?
101.	What would God have me do?
102.	Is God still working on this?
103.	How long will it take for him to leave me alone?
104.	How could I have prevented this?
105.	Who is she seeing?...Another man?
106.	Why can't she communicate with me?...let me know how she is feeling, what she is thinking?
107.	How long will he/she stay away?
108.	Will the kids be hurt?
109.	Is it for the best in the long run?
110.	Do I want to get back together with him/her?
111.	Should I remain single?...Should I remarry soon?

examining underlying structure was not productive due to the size of this unwieldy data set. The matrix consisting of 6,105 cells needed to be reduced statistically as a preliminary step before attempting to elicit the underlying cognitive dimensions.

Cluster Analysis

To reduce this data set into homogeneous groupings, hierarchical cluster analyses were conducted. The first analysis was the average linkage within groups. The resulting horizontal icicle plot was examined to determine an optimal number of conceptually distinct groups. The results were then cross-validated by an average linkage between groups cluster analysis.

Table 2 lists all the items grouped according to the results of the cluster analyses. Seven homogeneous groupings, each with a readily identifiable common characteristic, were determined through the first procedure and cross-validated by the second cluster analytic technique. In addition, five of the seven clusters contained at least two subsets that could be labeled. The groups of questions were labeled as follows:

Cluster 1: Concerns Regarding the Decision to Separate
- Subset 1A: Future Concerns Regarding the Decision
- Subset 1B: Concern if the Right Decision Was Made
- Subset 1C: Attributional Search Questions

Cluster 2: Self Concerns
- Subset 2A: Self Doubt Questions

Subset 2B: Self Improvement Attributional Questions
Subset 2C: Self Blame Attributional Questions

Cluster 3: Spouse Concerns
Subset 3A: Self Blame Attributional Questions Regarding Spouse's Behavior
Subset 3B: Future Concerns Regarding Spouse
Subset 3C: Spouse Blame Attributional Questions

Cluster 4: Future Concerns
Subset 4A: Reevaluation Questions
Subset 4B: Financial/Practical Concerns
Subset 4C: Concerns Regarding Living Arrangements

Cluster 5: Child Concerns

Cluster 6: Concerns Regarding Others
Subset 6A: Concerns Regarding Interaction with Others
Subset 6B: Concerns Regarding Informing Others of the Separation Decision

Cluster 7: Religious Concerns

Only three of the 111 items failed to remain in the original groups after the second analysis using another type of hierarchical clustering procedure was completed. These items (also noted in Table 2) were eliminated from further analyses to provide clearly distinct, stable clusters.

The purpose of the cluster analyses was to provide homogeneous clusters from which to randomly select variables for a multidimensional scaling analysis in an effort to increase the probability of a more stable solution. A minimum of four items had to be randomly selected from each cluster for each of the two data sets in order to obtain the 25 to 30 variables needed for the MDS analyses. Thus, each group or cluster had to contain

Table 2

Major Clusters with Sub-Groups of All 111 Questions. Randomly Selected Items for Subsequent Analyses Indicated by A or B. Starred (*) Items Did Not Cross-Validate Between Different Cluster Analytic Techniques.

CLUSTER 1

Subset 1A

B	46.	Is this the last time?
A	74.	When will it all be settled?
	76.	What is the outcome going to be?

Subset 1B

A	47.	Did we do the right thing?
B	48.	Is this the right thing?
B	49.	Is this what I want?
A	109.	Is it for the best in the long run?

Subset 1C

	38.	Why?!
A	40.	Is this really happening?
	41.	What went wrong?...Why did the marriage fail?
B	42.	What should we have done differently with our lives together?
A	43.	Could it have been helped?
B	44.	What is the truth?
	45.	How did this really happen?

Subset 1D

*	110.	Do I want to get back together with him/her?

CLUSTER 2

Subset 2A

A	32.	How can I know what I want?
B	77.	What am I doing?

Subset 2B

	5.	How could I change to be a better wife/husband?
A	35.	Are my expectations of marriage too high or unrealistic?
B	36.	What can I do to improve?
B	83.	Have I just made similar/bad choices at home?

Table 2 (continued)

	84.	Should I have spent more time at home?
A	87.	How could I have changed things so this wouldn't have happened?
	104.	How could I have prevented this?

Subset 2C

	2.	How can anyone love me?
	3.	How could I be such a failure?
	4.	Am I crazy?
A	6.	How can I be so selfish?
B	39.	Why me?
B	71.	Why did this happen to me?...I felt I had tried so hard!
	72.	Why do things happen to people like me?
	85.	What did I do wrong?
A	86.	What's the matter with me?

CLUSTER 3

Subset 3A

B	69.	How could I have been blind for so long?
A	70.	Why did I let him treat me like he did?
	96.	Why didn't I go through with this when he went back to drinking three years ago?

Subset 3B

	98.	Will he leave the state and not contact me at all?
	99.	Will my wife please give us another chance?
B	103.	How long will it take for him to leave me alone?
A	107.	How long will he/she stay away?

Subset 3C

	62.	Who made him/her leave?
	63.	How could he/she do this to me?
A	64.	How could he/she have hurt me like he/she did?
A	65.	What has happened to him/her?
	66.	How could he/she not care? How could he/she hurt me when our lovemaking always seemed to go so well?
B	68.	Why did he/she have to start drinking again?
A	73.	Why doesn't he/she love me anymore?
	79.	Why was he/she unfaithful to me?
B	80.	Doesn't he/she love me, or was it all a game?
	81.	Why did he/she lie?

Table 2 (continued)

	82.	How long has he/she been deceiving me?
B	105.	Who is she seeing?...Another man?
	106.	Why can't she communicate with me?...Let me know how she is feeling, what she is doing?

CLUSTER 4

Subset 4A

B	7.	How can I achieve my goals for future happiness, etc...and are they realistic?
	33.	Will I ever love or trust anyone again?
	34.	What do men/women mean to me?...Do I need them?
A	111.	Should I remain single?...Should I remarry soon?

Subset 4B

	8.	Where can I get a good lawyer?
A	11.	Should I invest in a home business?
B	12.	How am I going to manage my job?
	15.	How am I going to manage the responsibility of keeping up our home alone?
	17.	How am I going to make it financially?
	18.	How did I get a full-time job?
	20.	How am I going to manage money, handle the bills?
B	21.	Am I going to be able to support myself and my children?
A	78.	How am I going to keep control of myself and my mind at work?
	94.	What is he going to do to ehlp me with finding a place to live and money?

Subset 4C

B	9.	How would I get my things moved?
	13.	Can I really make it on my own?
A	14.	Where shall I live and with whom?
B	16.	Where would I live?
	19.	Should I stay in this town or move back into the cities?
A	29.	How will I ever be able to live without him/her?
	30.	How can I live alone?
	31.	Will I always live alone?
	75.	Where do I go?
	93.	How am I going to manage my life alone?

Table 2 (continued)

CLUSTER 5

Subset 5A

	1.	What kind of parent must I be?
A	10.	What do I want for my future and that of my children?
	22.	What do I do with the kids?...battered women's shelter again, foster home?
	23.	How do say the right things to my teenagers?
B	24.	How do I cope with my children?
	25.	How am I going to manage the children?
A	26.	How can I help the kids through this?
A	27.	How could I protect my children from hurt, rejection?
B	28.	How will my children take it?...Will they understand?
	37.	Would he get the kids even though he'd been reported for child abuse?
	67.	How could he/she leave his/her children?
B	88.	How will the children adjust to this situation?
A	89.	How much will my child suffer?
B	90.	How will this affect the children?
	91.	Will my child be O.K.?
	92.	How will this affect the children's feelings toward me?
A	95.	How will I be able to cope with 13 yrs. of contact with my sons' father?
B	108.	Will the kids be hurt?

Subset 5B

*	97.	Am I going to be physically abused by my husband?

CLUSTER 6

Subset 6A

A	59.	Why don't people understand?
B	60.	Why can't people stop pressuring me?

Subset 6B

A	50.	Should I tell my family now, or when I'm settled?
B	51.	How should I tell my parents?
B	52.	What would my family think when I told them everything?
A	53.	What will my family say?
B	55.	How am I going to tell everyone?

Table 2 (continued)

A 56. How am I going to manage facing our friends?
B 57. How am I going to manage telling my colleagues at work?
A 58. How are my landlords going to react?

Subset 6C
* 61. Why my friends didn't tell me my husband/wife had somebody else when they knew for so long?

CLUSTER 7

54. Where will I stand with Christians?
100. What scriptures could I stand on for the restoration of my marriage?
101. What would God have me do?
102. Is God still working on this?

at least eight items. All but one of the clusters met this minimum criterion. One group, labeled "Religious Concerns", contained only four items. Therefore, this cluster of questions was eliminated from further analyses.

The six remaining clusters contained between 10 and 24 questions in each. Therefore, 5 items were randomly selected from within each cluster for each of the two data sets needed for further analyses. Examination of any subsets that made up each cluster determined how the items would be selected. All but one of the clusters (i.e., Group 5: Child Concerns) could be further sub-divided into two to three groups. Relative proportion determined how many questions would be randomly selected from each sub-group. For example, the smallest cluster, Group 6, contained two sub-clusters. One cluster had only two items and thus, one item was randomly selected for each MDS group (i.e., Group A and Group B). The other cluster contained eight items, four randomly selected for each MDS group.

Consequently, five items were randomly selected from each of the six clusters for a total of 30 items for Group A. The same procedures was used to get 30 items for Group B.

Multidimensional Scaling

Overview of Procedures and Results. Using the first set of variables (Group A, Table 3) selected as a result of the hierarchical clustering algorithms, a non-metric MDS technique was used to generate from two- to six-dimensional solutions. On the basis of stress values (Kruskal, 1964) and percentage of variance explained (R^2) as well as the interpretability of the dimensions, it was concluded that a three-dimensional solution best portrayed the structure of the data. The dimension plots, the corresponding plot coordinates, plot of linear fit, plot of nonlinear fit, and plot of trans- formation for each set of solutions may be found in Appendix A, with the exception of the three-dimensional solution which may be found in Table 4 and Figures 1 through 6 . The results were cross-validated by conducting a non-metric MDS analysis generating form two- to six-dimensional solutions on the second set of selected variables (Group B, Table 5). The results from the three-dimensional solution are found in Table 6 and Figures 7 through 12, while the remainder are found in Appendix B. The results were adequately cross-validated, thus the three-dimensional solution that best portrays the underlying structure of data appears to be relatively stable.

TABLE 3

Indices of Association (Correlations) for Group A Questions. Decimal Points Have Been Omitted.

Questions:	6	10	11	14	26	27	29	32	35	40	43	47	50	53	56	58	59	64	65	70	73	74	78	86	87	89	95	107	109
10	21																												
11	15	49																											
14	15	47	72																										
26	15	78	00	15																									
27	00	77	15	44	98																								
29	42	36	39	55	21	15																							
32	49	39	42	15	15	00	57																						
35	66	21	26	00	00	00	39	47																					
40	39	00	00	00	00	00	33	57	44																				
43	42	00	15	00	00	00	33	47	55	66																			
47	29	00	21	00	00	00	42	53	49	64	79																		
50	00	21	26	21	21	26	21	21	00	00	00	00																	
53	00	21	15	15	21	21	15	21	00	00	00	00	98																
56	21	15	21	21	15	15	15	26	15	15	00	00	91	91															
58	21	21	29	33	15	15	15	26	00	00	00	00	83	86	86														
59	26	00	00	00	21	15	26	26	29	33	26	26	71	74	75	71													
64	36	00	00	00	00	00	47	26	26	15	33	29	15	15	15	00	36												
65	15	00	00	15	00	00	33	15	26	26	21	21	15	15	21	00	29	82											
70	57	15	00	00	15	00	42	42	44	29	42	26	00	00	15	00	26	68	64										
73	47	15	15	15	00	00	51	36	33	36	39	21	21	21	21	15	29	74	72	63									
74	26	33	36	42	00	00	51	44	29	61	53	42	00	00	00	00	26	26	21	33	26								
78	29	36	64	53	15	21	53	47	33	26	21	21	26	15	26	26	21	00	15	26	21	36							
86	83	15	00	00	21	15	42	53	64	53	36	26	15	15	21	00	36	29	21	51	51	26	36						
87	69	15	00	00	00	00	36	47	71	39	44	39	15	15	21	00	26	42	29	59	55	39	15	68					
89	15	75	00	15	94	93	15	21	00	15	15	15	21	21	15	15	15	00	00	00	00	00	00	15	15				
95	29	68	36	36	68	68	39	39	26	15	00	15	36	36	33	33	21	15	15	29	26	29	42	29	26	66			
107	21	21	00	29	00	00	51	29	21	29	33	36	21	21	26	15	26	55	64	44	59	51	26	26	39	00	26		
109	29	21	21	26	00	00	44	42	49	66	64	74	15	15	15	15	26	26	29	26	29	74	33	29	42	00	21	42	
111	29	44	49	69	00	00	57	59	49	29	33	39	15	15	15	21	00	00	15	26	15	53	51	29	33	00	42	39	51

Table 4: Three-Dimensional MDS Solution Coordinates for Group A

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3
1	Q6	1	0.8893	0.5047	-0.9307
2	Q10	2	-1.4073	1.2127	-0.0200
3	Q11	3	-0.8124	1.1988	1.5006
4	Q14	4	-1.2439	0.8413	1.3812
5	Q26	5	-1.7809	0.2716	-1.5325
6	Q27	6	-2.0858	0.4437	-1.0371
7	Q29	7	0.4003	0.5920	0.3943
8	Q32	8	0.4567	0.7518	0.0948
9	Q35	9	1.3052	0.6812	-0.2736
10	Q40	A	1.4595	0.3270	-0.6692
11	Q43	B	1.5710	0.3719	-0.4951
12	Q47	C	1.4791	0.7464	-0.1755
13	Q50	D	-1.5834	-1.1752	0.5302
14	Q53	E	-1.5483	-1.3971	0.3275
15	Q56	F	-1.1580	-1.4380	0.5046
16	Q58	G	-1.6705	-0.7793	1.0471
17	Q59	H	-0.1672	-1.6146	-0.3451
18	Q64	I	1.0816	-1.4765	-0.4526
19	Q65	J	0.9003	-1.6486	0.2983
20	Q70	K	1.2479	-0.3753	-0.8314
21	Q73	L	0.9289	-1.0915	0.0518
22	Q74	M	0.8854	0.9909	0.7335
23	Q78	N	-0.3705	1.0121	0.9842
24	Q86	O	0.6778	-0.1060	-1.2421
25	Q87	P	1.2394	-0.3959	-0.6026
26	Q89	Q	-1.5991	0.3686	-1.6463
27	Q95	R	-1.1951	0.4162	-0.2461
28	Q107	S	0.8120	-0.7328	0.8637
29	Q109	T	1.0209	0.3148	0.7903
30	Q111	U	0.2667	1.1849	0.9982

Figure 1: Three-Dimensional MDS Solution for Group A; DIM 1 x DIM 2

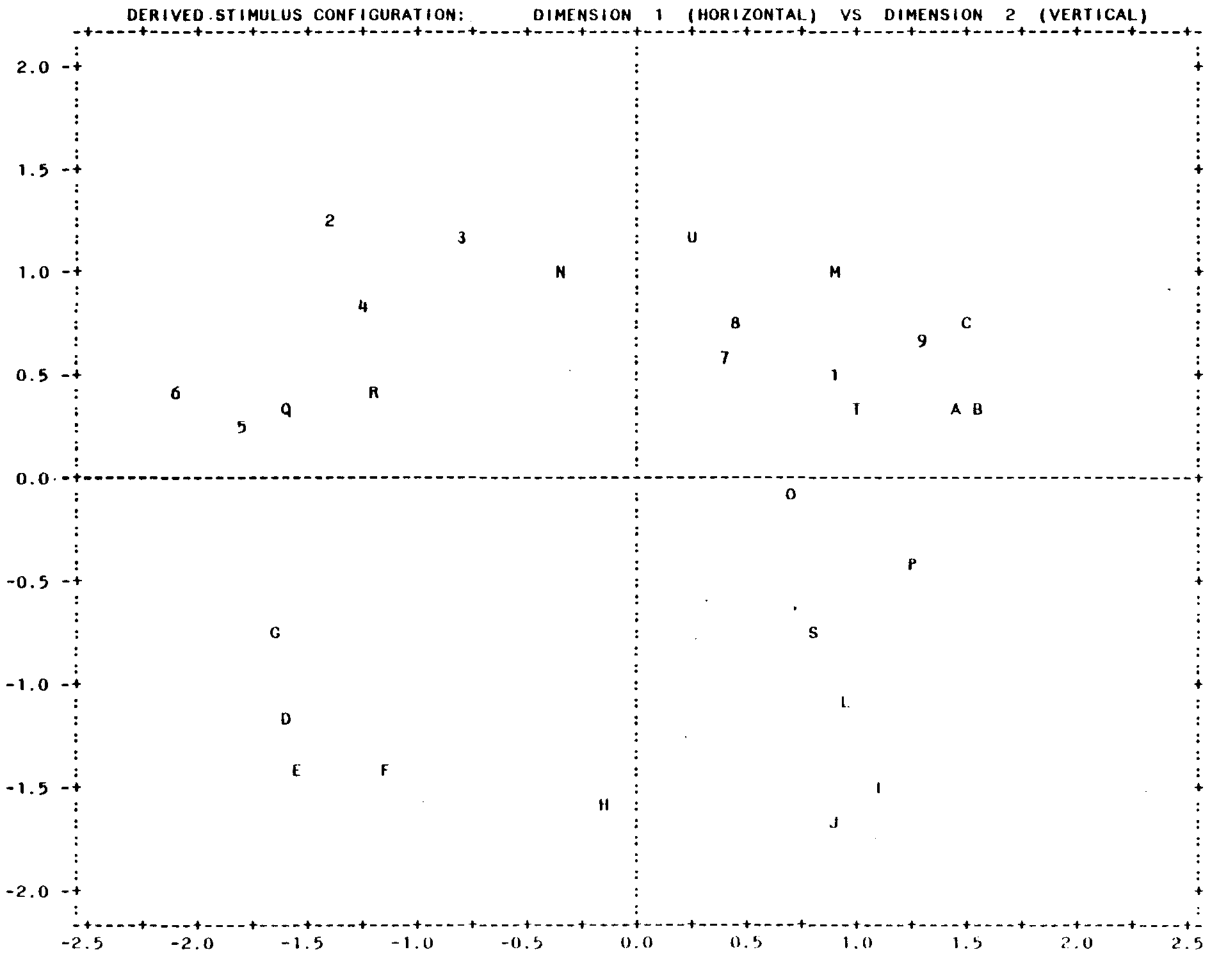

Figure 2: Three-Dimensional MDS Solution for Group A; DIM 1 x DIM 3

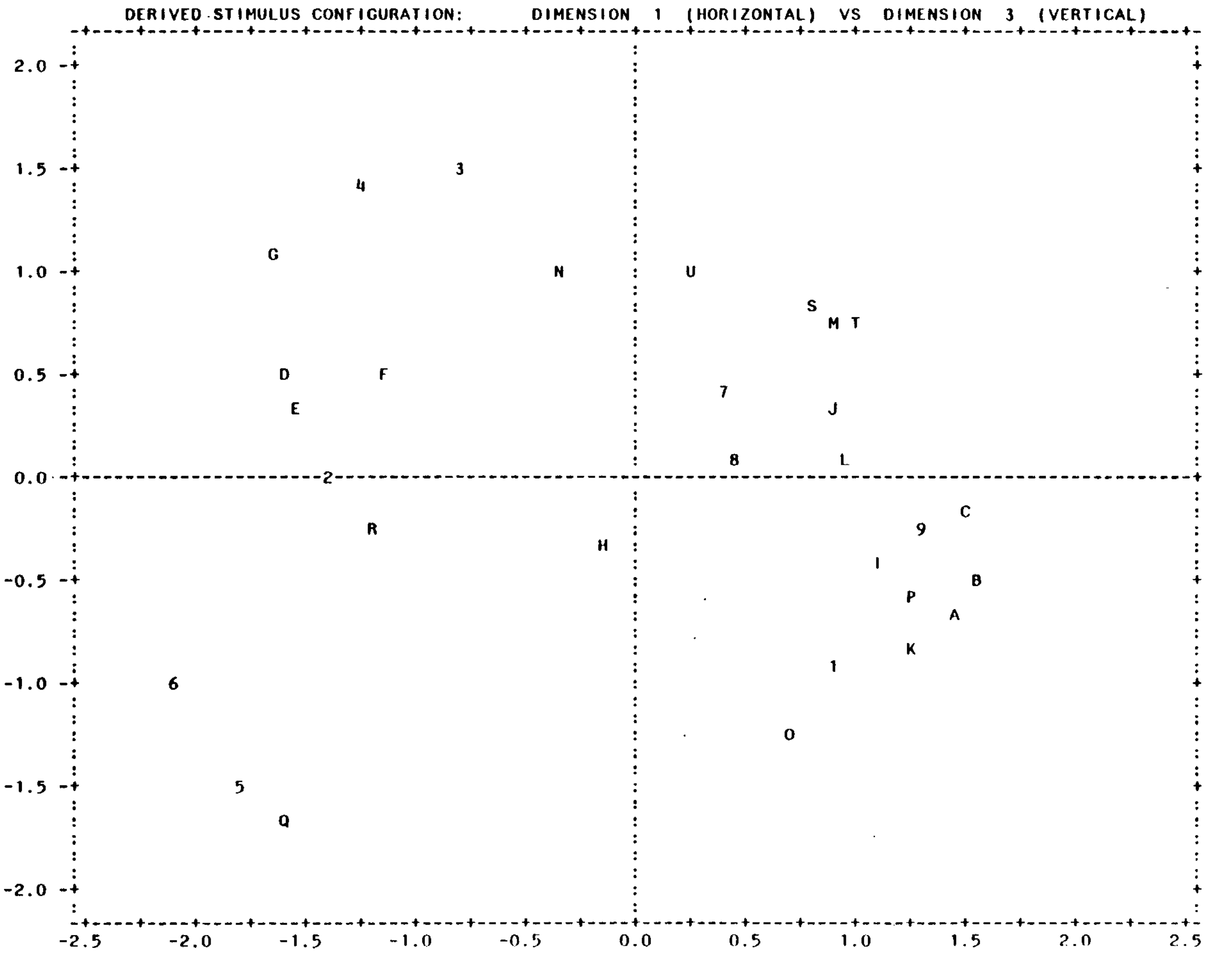

Figure 3: Three-Dimensional MDS Solution for Group A; DIM 2 x DIM 3

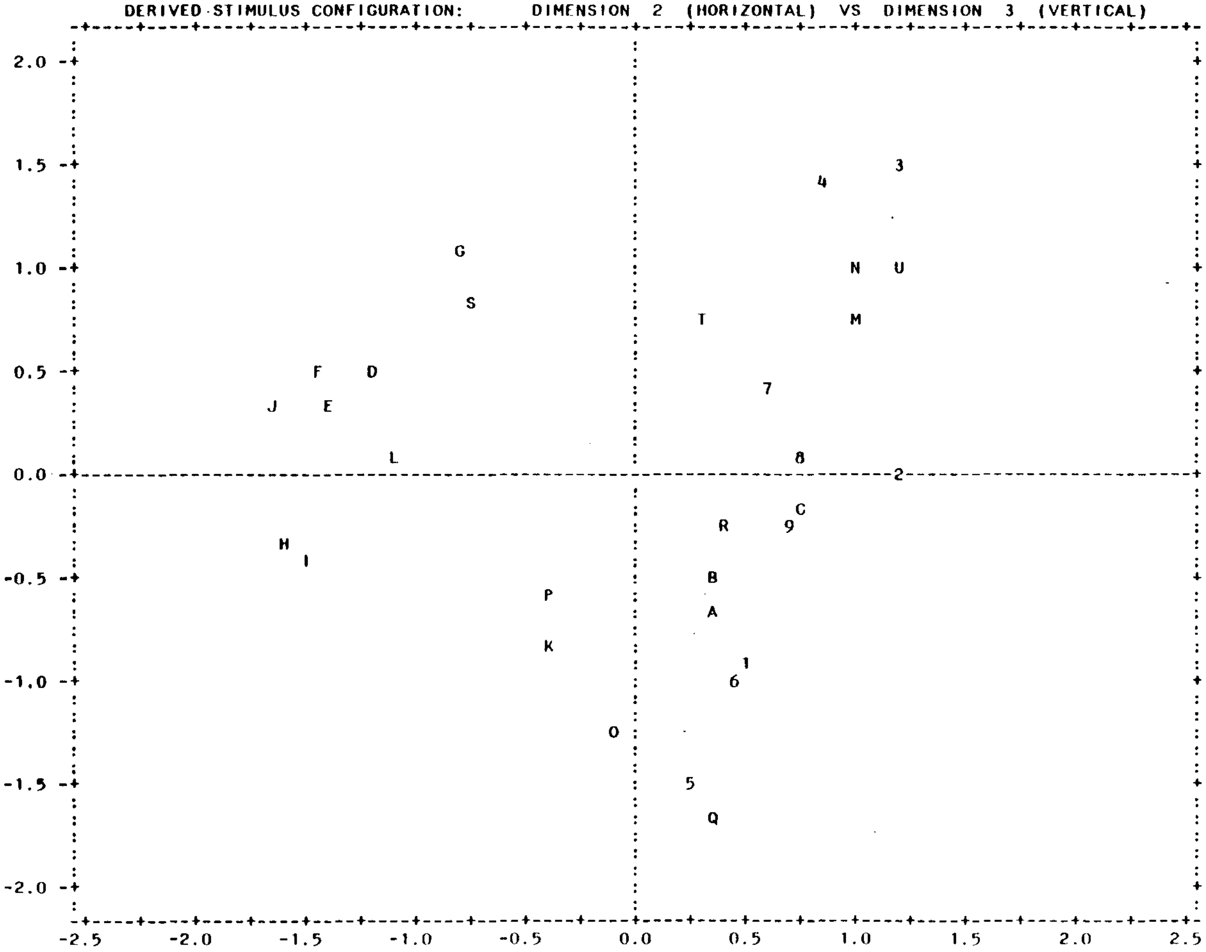

Figure 4: Three-Dimensional MDS Solution for Group A; Linear Fit Plot

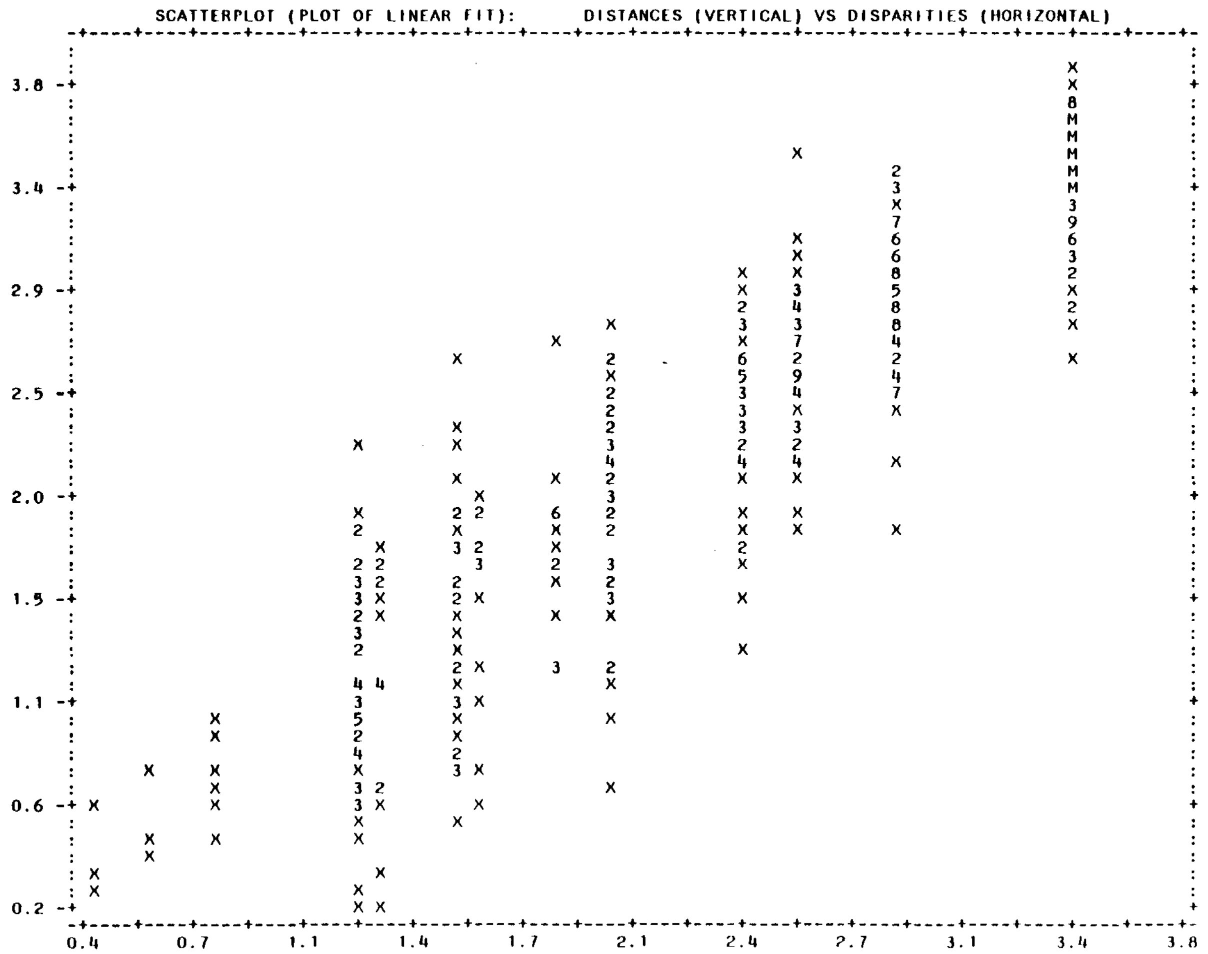

Figure 5: Three-Dimensional MDS Solution for Group A; Nonlinear Fit Plot

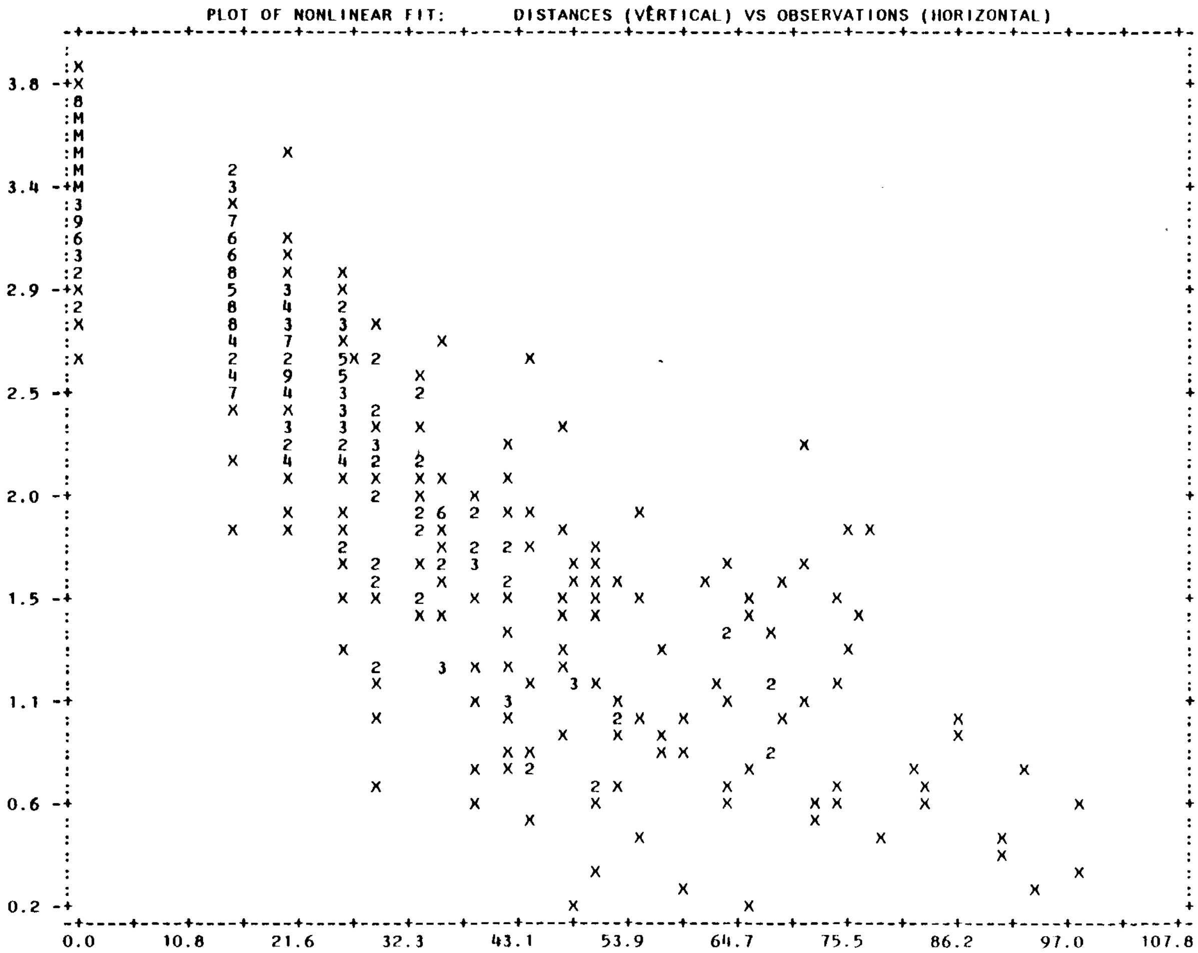

Figure 6: Three-Dimensional MDS Solution for Group A; Transformation Plot

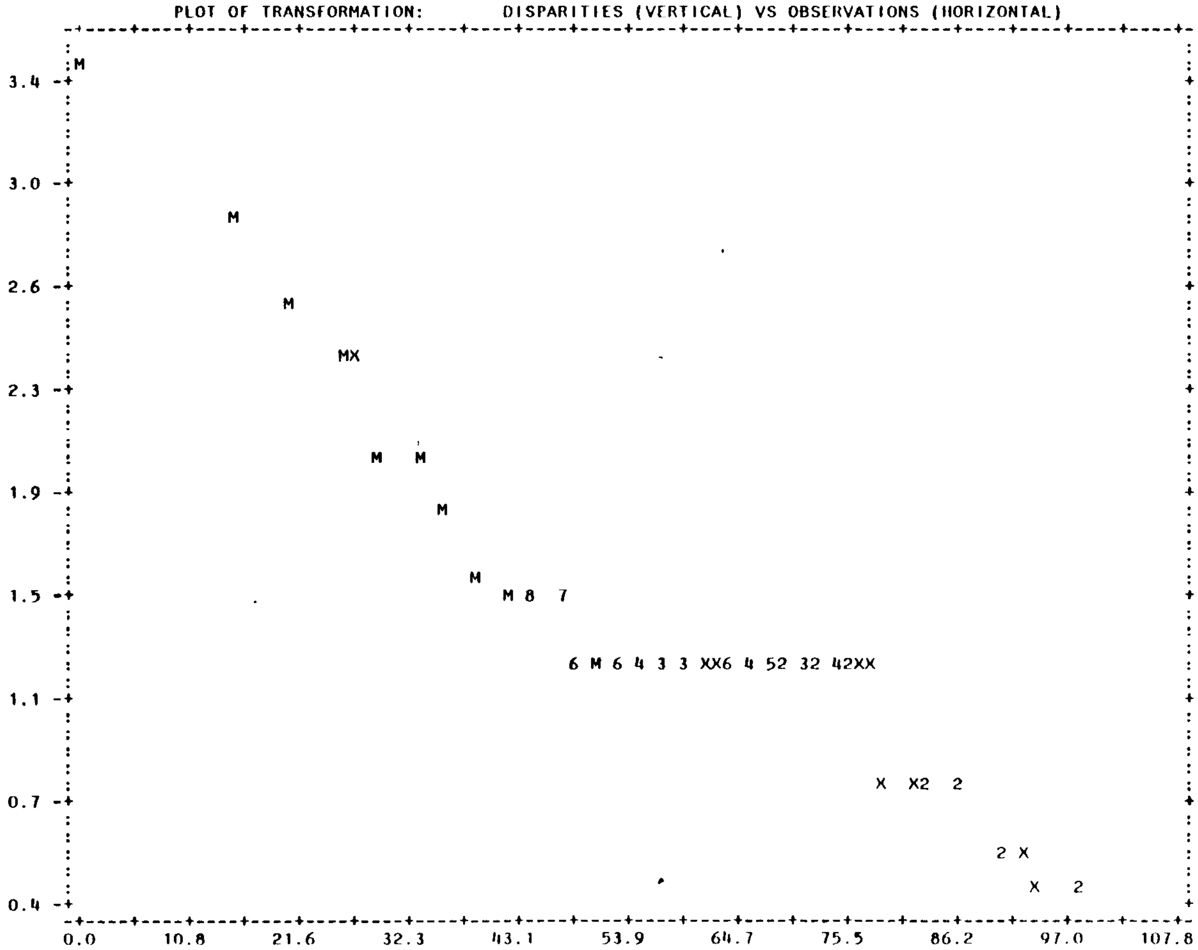

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TABLE 5

Indices of Association (Correlations) for Group B Questions. Decimal Points Have Been Omitted.

Questions:	7	9	12	16	21	24	28	36	39	42	44	46	48	49	51	52	55	57	60	68	69	71	77	80	83	88	90	103	105
9	64																												
12	66	68																											
16	59	83	66																										
21	55	63	78	59																									
24	15	21	36	21	53																								
28	15	00	15	15	49	87																							
36	64	39	33	36	29	29	21																						
39	33	15	00	00	00	15	00	53																					
42	36	15	00	00	00	15	00	53	33																				
44	36	00	00	15	00	15	00	42	61	61																			
46	42	26	21	39	26	15	00	39	39	39	64																		
48	49	00	00	29	15	21	00	53	55	51	68	71																	
49	57	33	21	33	29	26	15	59	51	47	53	51	79																
51	15	26	15	15	00	21	21	15	00	00	00	00	15	15															
52	15	21	15	15	00	26	26	15	00	00	00	00	15	15	92														
55	15	21	21	21	00	21	21	15	00	00	00	00	15	15	87	88													
57	26	21	39	26	26	26	26	15	00	00	00	00	15	15	85	86	96												
60	00	00	15	00	00	21	15	21	39	15	29	21	29	15	64	66	71	69											
68	00	00	00	00	00	00	00	21	26	15	21	26	15	15	15	00	15	15	29										
69	29	21	00	15	15	15	00	55	61	39	36	33	26	36	15	15	15	15	42	53									
71	29	15	00	00	00	15	00	59	79	44	36	26	36	42	00	00	00	00	36	36	74								
77	49	36	26	36	21	21	15	57	73	36	66	44	64	66	15	15	15	15	33	21	47	55							
80	26	15	15	21	00	15	00	47	39	42	39	33	33	33	15	15	15	15	15	69	55	55	21						
83	49	26	15	21	00	21	00	59	53	49	39	44	53	59	00	00	00	00	26	21	53	59	44	42					
88	15	00	15	15	49	86	97	21	15	00	21	15	00	15	15	21	15	21	15	00	00	00	26	15	00				
90	15	15	15	21	47	86	96	21	00	00	00	00	00	15	15	21	21	15	00	00	00	15	00	00	96	00			
103	26	29	21	21	21	00	00	26	15	29	29	39	15	29	15	00	15	15	26	61	49	26	26	51	29	21	68		
105	00	00	21	15	15	21	00	00	21	26	39	26	00	15	15	00	15	15	36	81	51	29	00	64	21	00	21	15	
108	15	00	15	15	49	88	96	26	00	15	00	00	00	15	15	21	15	21	15	00	00	00	15	00	00	96	21	15	00

Table 6: Three-Dimensional MDS Solution Coordinates for Group B

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3
1	Q7	1	-0.3473	-1.0321	-0.9413
2	Q9	2	0.6035	-0.8789	-1.4485
3	Q12	3	1.2208	-0.7307	-1.2063
4	Q16	4	0.5878	-1.0903	-1.2598
5	Q21	5	1.3497	-1.2559	0.2243
6	Q24	6	1.5009	-0.6045	0.8185
7	Q28	7	1.7093	-0.4404	1.1766
8	Q36	8	-0.6107	-0.8738	-0.4121
9	Q39	9	-1.5344	0.0369	-0.1266
10	Q42	A	-1.5375	-0.4024	0.1829
11	Q44	B	-1.4938	-0.0514	0.2482
12	Q46	C	-1.1602	-0.7405	-0.3005
13	Q48	D	-1.2374	-0.4406	-0.7541
14	Q49	E	-0.8661	-0.8295	-0.4858
15	Q51	F	1.1492	1.5426	-0.8658
16	Q52	G	1.3207	1.4301	-0.7638
17	Q55	H	1.1850	1.5049	-0.8384
18	Q57	I	1.3822	1.0945	-0.8865
19	Q60	J	0.1173	1.7158	-0.3294
20	Q68	K	-0.6388	1.5535	1.0401
21	Q69	L	-1.2180	0.6786	0.3121
22	Q71	M	-1.4445	0.4395	0.2805
23	Q77	N	-0.7881	-0.5905	-0.8096
24	Q80	O	-1.2586	0.5538	0.5781
25	Q83	P	-1.2462	-0.5252	0.1596
26	Q88	Q	1.4453	-0.6284	1.2478
27	Q90	R	1.1698	-0.5422	1.5017
28	Q103	S	-0.4910	0.1426	1.4270
29	Q105	T	-0.4226	1.5722	0.9979
30	Q108	U	1.5536	-0.6075	1.2335

Figure 7: Three-Dimensional MDS Solution for Group B; DIM 1 x DIM 2

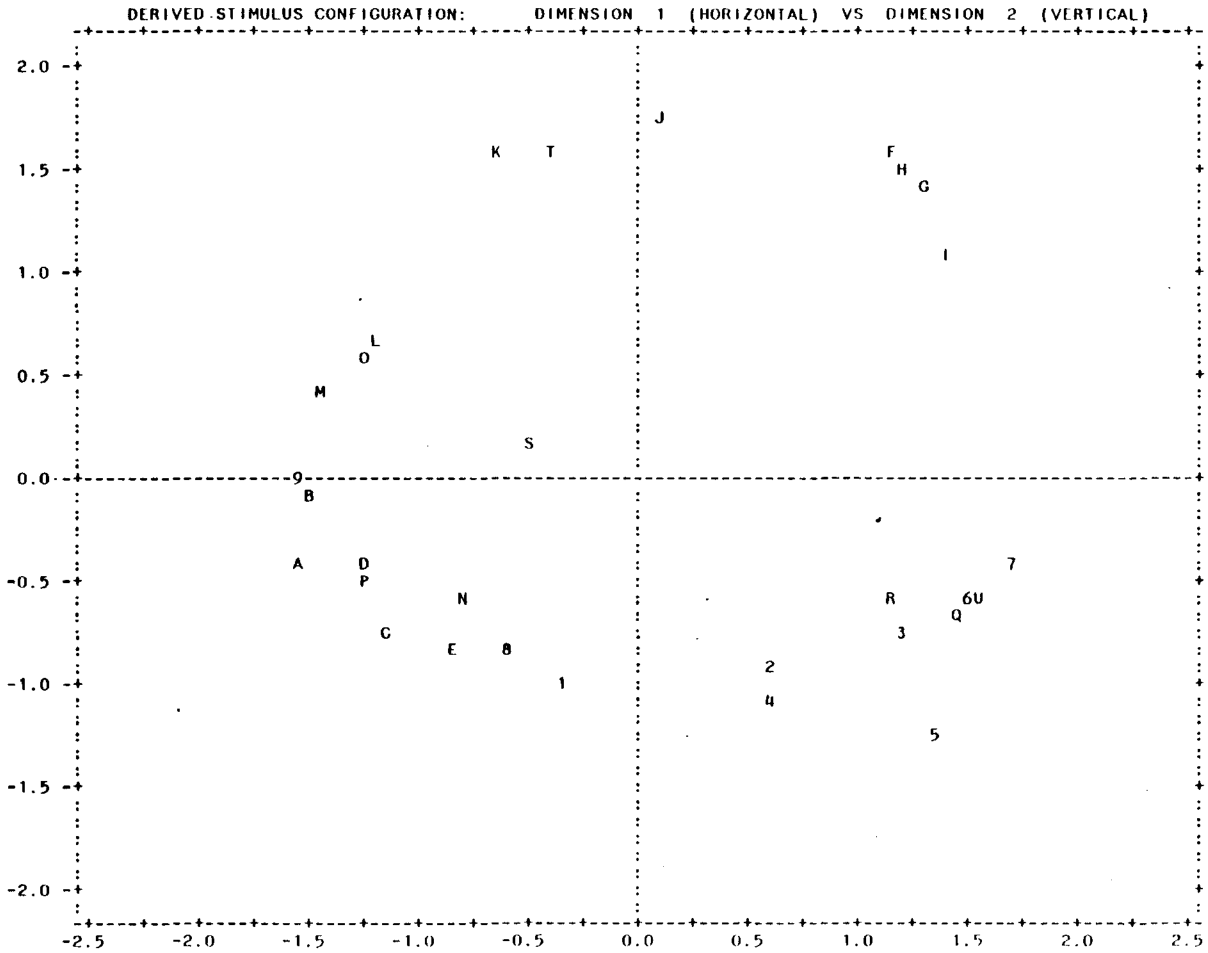


Figure 8: Three-Dimensional MDS Solution for Group B; DIM 1 x DIM 3

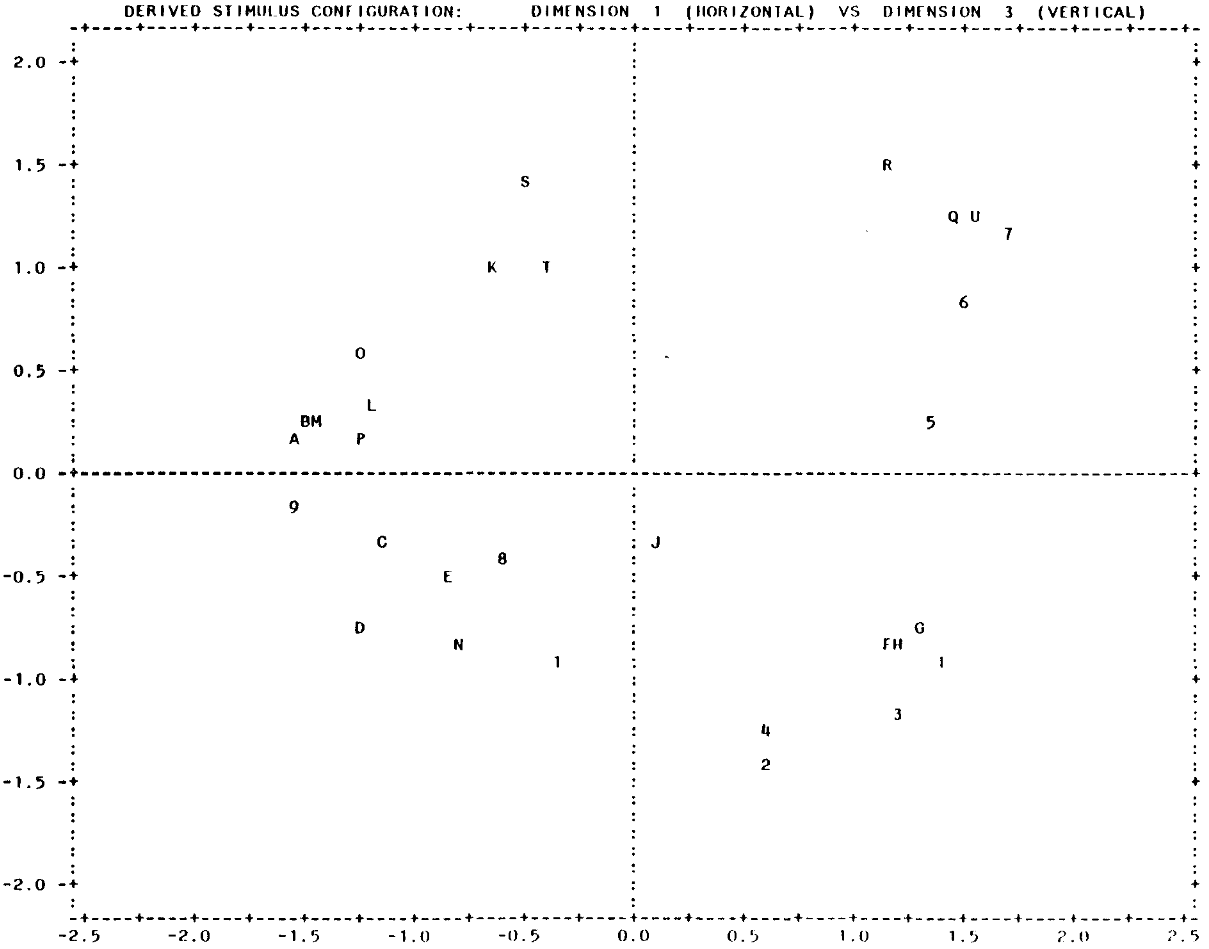


Figure 9: Three-Dimensional MDS Solution for Group B; DIM 2 x DIM 3

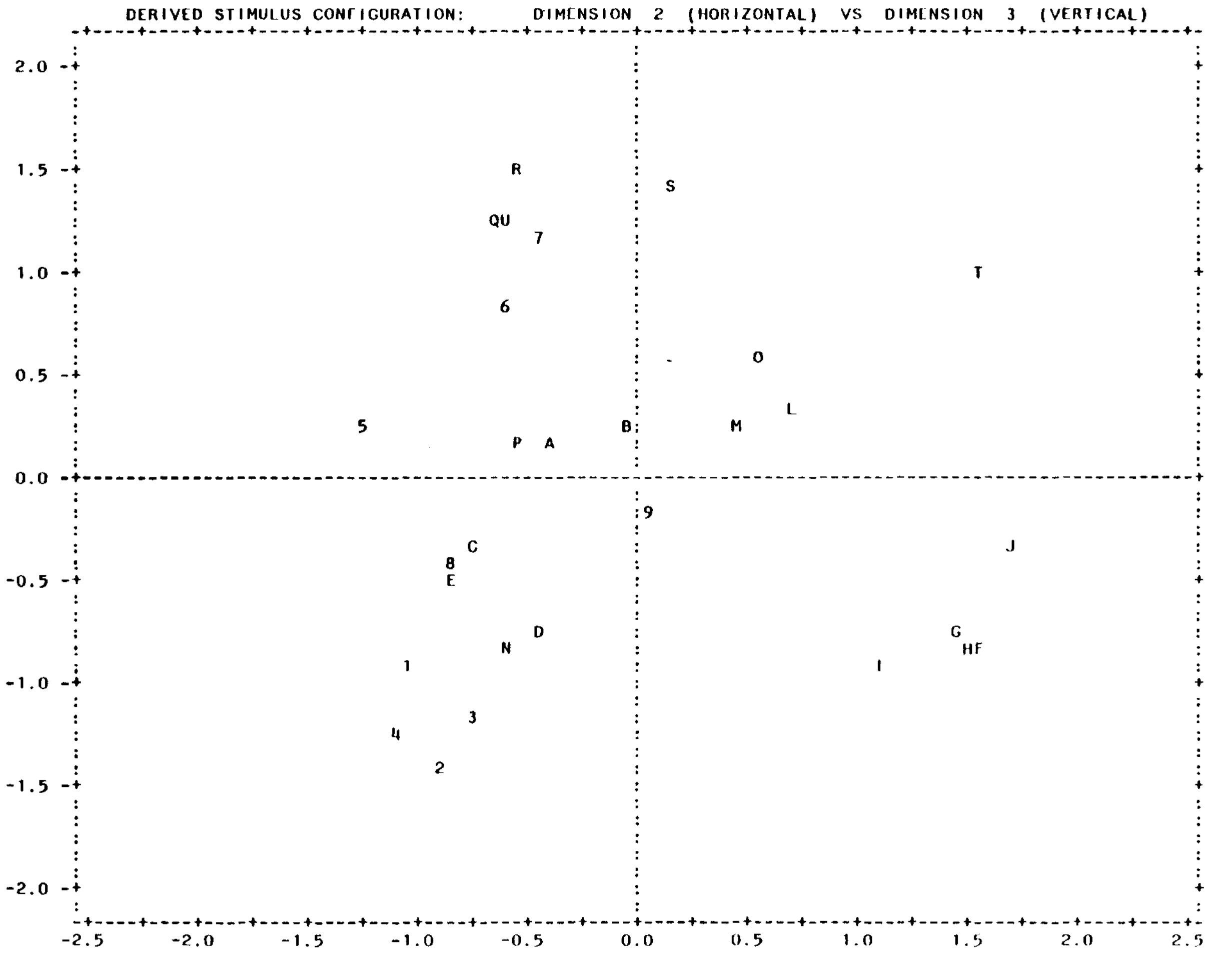


Figure 10: Three-Dimensional MDS Solution for Group B; Linear Fit Plot

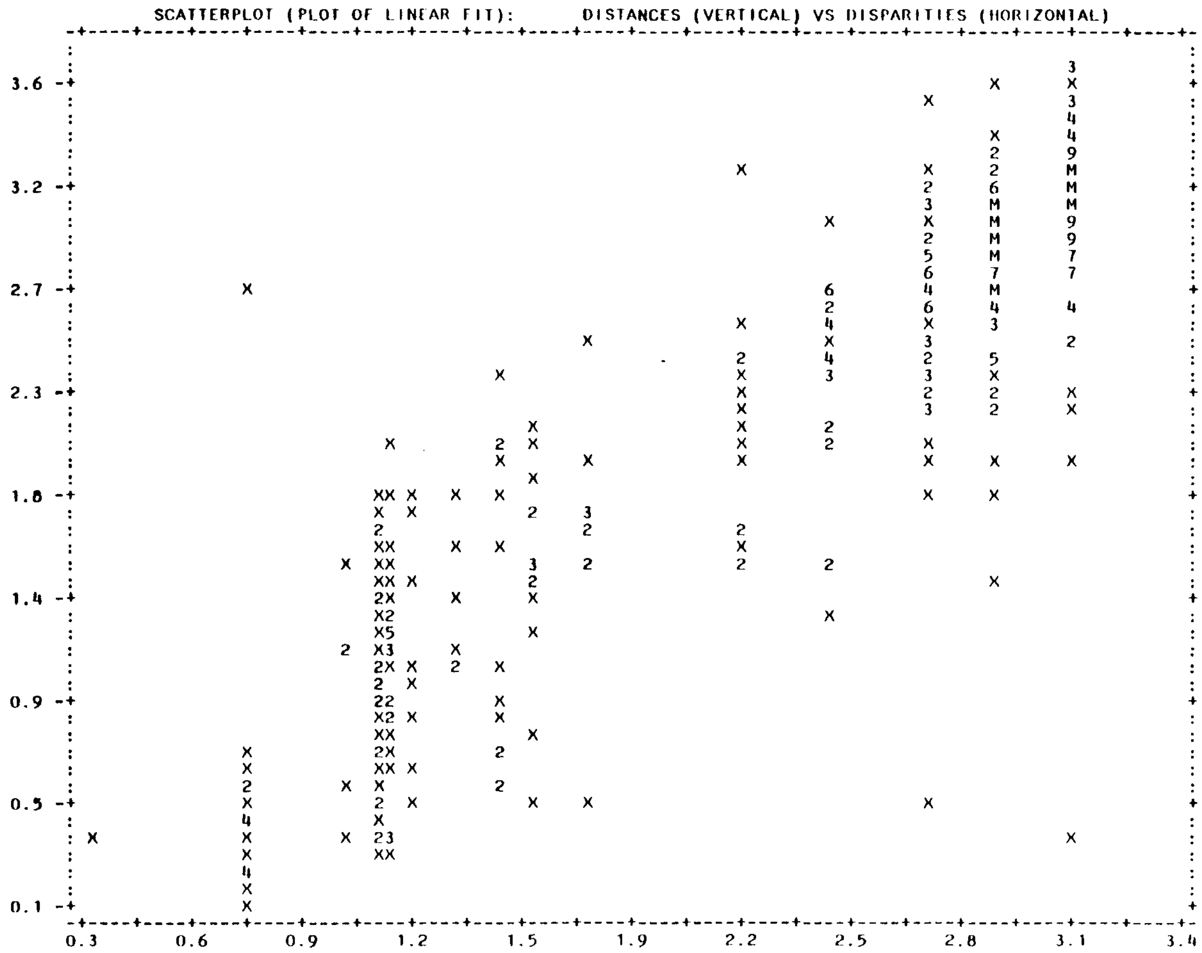


Figure 11: Three-Dimensional MDS Solution for Group B; Nonlinear Fit Plot

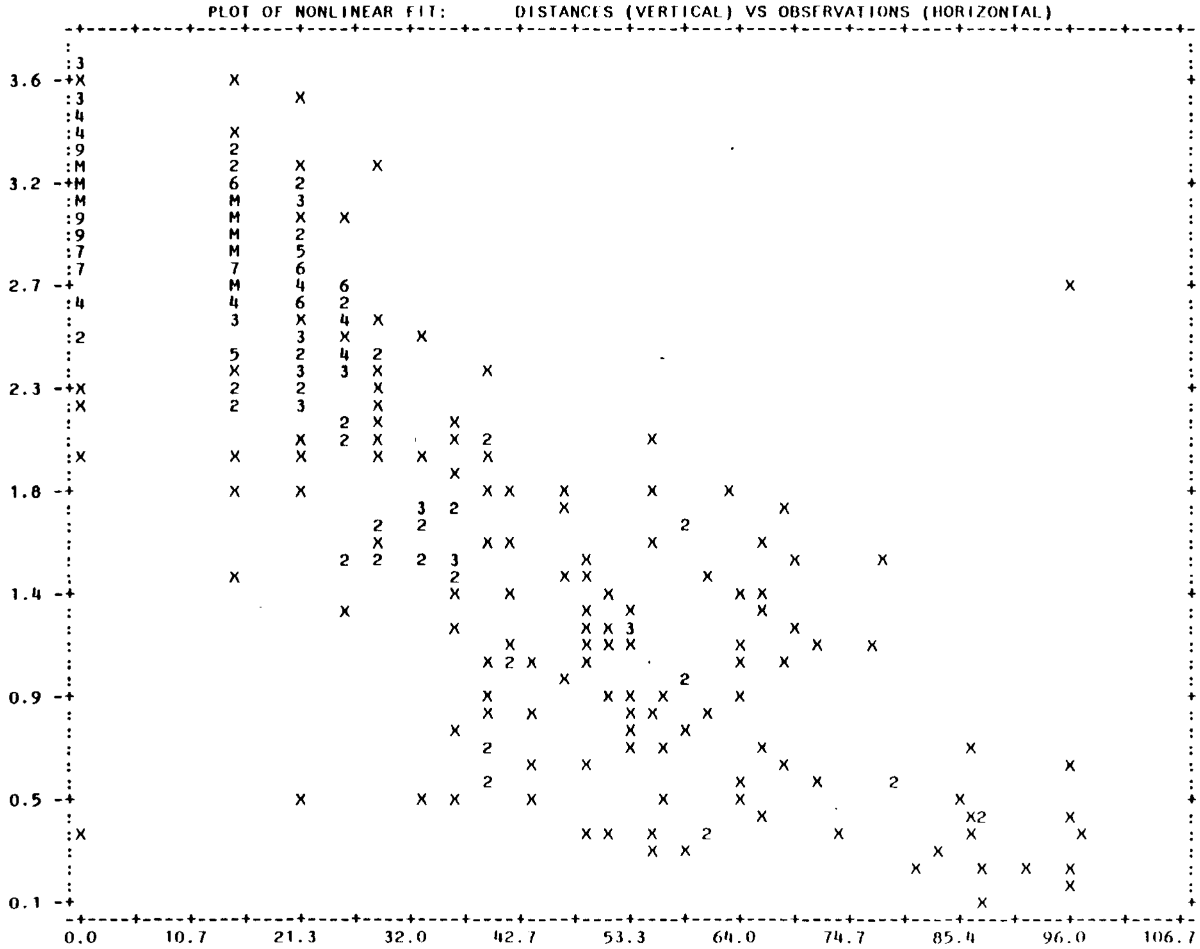
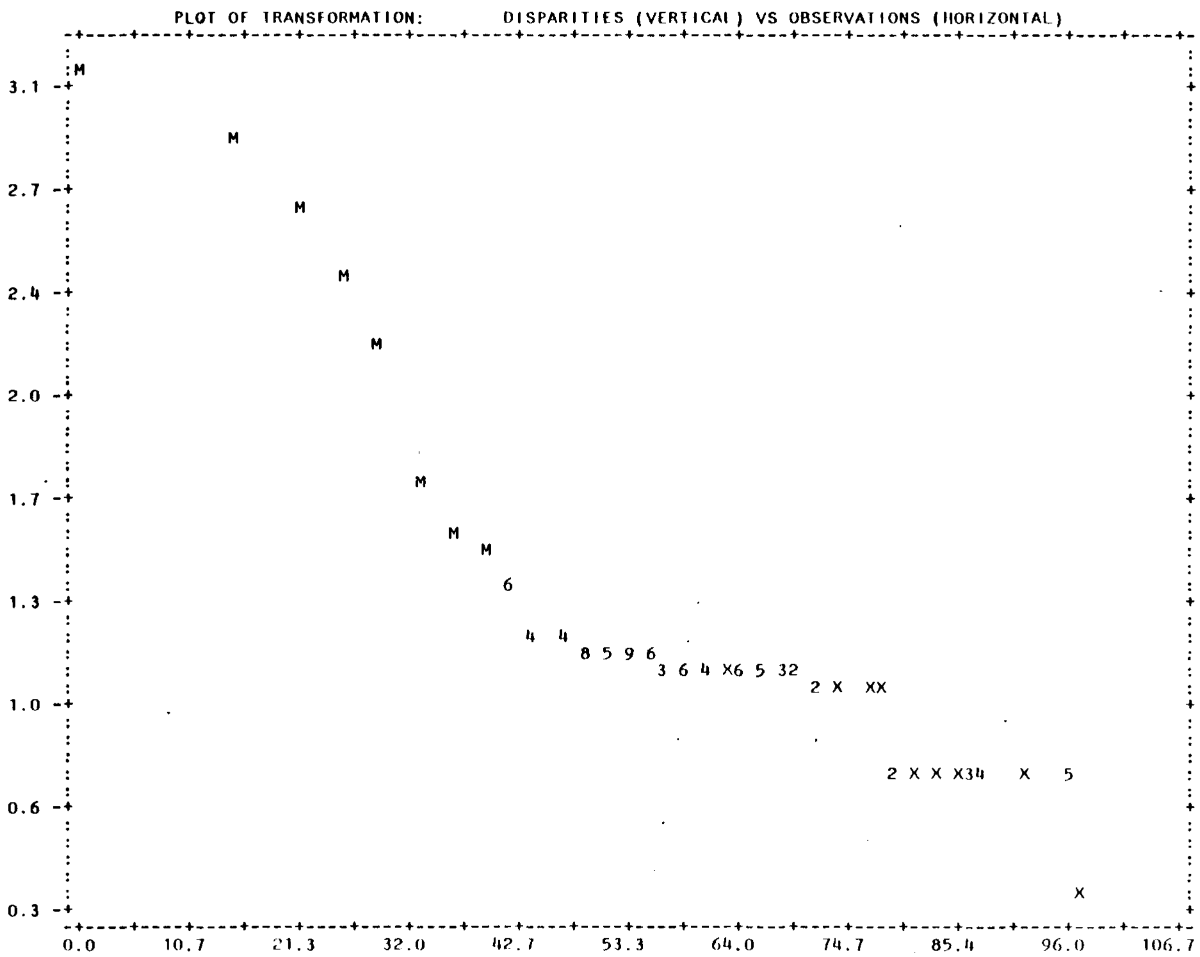


Figure 12: Three-Dimensional MDS Solution for Group B; Transformation Plot



Determination of Optimal Solution. In order to determine the optimal number of dimensions underlying these data sets of spontaneous causal thinking after marital separation, several factors were considered. First, the plots of linear fit, nonlinear fit, and transformation were visually examined to determine if the slope was in the required direction for each type of scatterplot. All of the plots of linear fit had the expected upward slope and less scatter indicated a closer fit between the model and actual data. All of the plots of non-linear fit demonstrated the expected downward slope (i.e., the distances diminish as the degree of similarity increases). In addition, the plot of transformation for each of the solutions show the relationship between the disparities (using Kruskal's least-squares monotonic transformation) and the actual proximities. All plots of transformation slope downward, as required. Therefore, none of the solutions were eliminated from consideration based on the plots of linear fit, nonlinear fit, or transformations.

Next, the stress value (Kruskal, 1964) and percentage of variance explained (R^2) was examined for each of the solutions for both data sets. These are listed in Tables 7 and 8 on page 65.

Table 7

Stress Value and Percentage of Variance Explained for Two- to Six-Dimensional Solutions for Group A

Number of Dimensions	Stress Value	R^2
2	.234	.715
3	.148	.838
4	.111	.889
5	.065	.952
6	.053	.964

Table 8

Stress Value and Percentage of Variance Explained for Two- to Six-Dimensional Solutions for Group B

Number of Dimensions	Stress Value	R^2
2	.247	.688
3	.170	.801
4	.129	.855
5	.100	.888
6	.079	.917

As expected, the percentage of variance explained increases as the stress value decreases. Stress is a "goodness of fit" measure and Kruskal (1964) suggests that values .20 or greater may be considered a "bad fit". As Tables 7 and 8 indicate, the two-dimensional solution for both data sets had stress values greater than .20. Therefore, the two-dimensional solution was eliminated from further consideration. All other solutions had a low enough stress value and an acceptable percentage of variability accounted for in the data matrix.

Finally, the remaining solutions were carefully examined for ease of interpretability. Items at opposite extremes were identified and a determination was made if those items differed from each other in some easily describable way. Only the three-dimensional solution satisfied the requirement of ease of interpretability. Higher-dimension solutions provided some decrease in stress and increase in R^2, but it was not possible to adequately interpret all the dimensions. The interpretation was cross-validated with the results of the MDS procedures producing a three-dimensional solution using the second data set.

Interpretation of the Three-Dimensional Solution. The meaning of the three-dimensional solution was interpreted visually on the basis of the stimuli located at different points on the dimension. To provide an interpretable solution, the axes of each plot had to be rotated 45 degrees. This was an acceptable procedure because the rotation is arbitrary. Thus, for the first dimension of Group A (Figures 1 and 2; pages 50 and 51), attribution versus present and future concerns, at one end were such questions as "How could he/she have hurt me like he/she did", "What has happened to him/her" and other questions reflecting a search for reasons why the marital separation occurred. Examples of questions from the second data set (Group B: Figures 7 and 8; pages 58 and 59) include "Why did he/she have to start drinking again" and "Why did it happen to me? I felt I had tried so hard".

Questions reflect a present/future orientation were positioned at the other end of the first dimension. Examples of questions from the first data set include "What can I do for my future and that of my children", and "Where shall I live and with whom". Group B questions include "Am I going to be able to support myself and my children", and "Will the kids be hurt".

The second dimension, <u>we versus they</u>, revealed an emphasis on locus. Examples of questions concerning the marital relationship ("we") from the first data matrix (Group A: Figures 1 and 3; pages 50 and 52) include "Did we do the right thing" and "Are my expectations of marriage too high or unrealistic". A focus on the marital relationship was reflected in the following anchor questions from Group B (Figures 7 and 9; pages 58 and 60): ""What should we have done differently with our lives together" and "Is this the right thing".

The opposite pole of the second dimension has a focus on others outside the nuclear family (e.g., friends, extended family). The anchor questions from Group A included "What will my family say" and "How am I going to manage facing my friends". Similar items were found in Group B (e.g., "What would my family think if I told them everything" and "How am I going to tell everyone").

The third dimension is titled Uncertainty of the Marital Relationship versus Recovery. Questions from Group A (Figures 2 and 3; pages 51 and 52) that are located at the far end of the dimension and describe confusion regarding whether or not the marital relationship will continue in some way are "How long will he/she stay away", and "When will this all be settled". Questions from the second set (Group B: Figures 8 and 9; pages 59 and 60) that reflect similar concerns include "How long will it take for him to leave me alone" and "Is this the last time".

The opposite end of the third dimension contains questions that relate to recovery after the marital separation, with a particular emphasis on how to help the children cope with the separation. Group A questions included "How can I help the kids through this" and ""How can I protect the kids from hurt, rejection", while Group B anchor questions were "Will the kids be hurt" and "How will the children adjust to the situation".

Hypotheses. Empirical analyses has elicited a primary dimension of the underlying structure of spontaneous causal thinking after marital separation that is bipolar. This continuum contains attributional questions at one end and questions relating to present and future concerns on the other. Thus, evidence has been provided that the first hypothesis is valid (i.e., that causal attribution is a primary dimension).

The second hypothesis states that the second dimension would consist of action-oriented questions. The results have indicated that action-oriented questions are a large component of the present and future concerns end of the bipolar first dimension. Thus, the second hypothesis has been only partially supported.

The third hypothesis relates to the stability of the solution. It has been demonstrated through the use of cross-validation of the cluster analytic and MDS procedures that the resultant three-dimensional solutions does appear to be stable.

MDS Analysis Using the Attribution Clusters

The cluster analysis revealed three groupings that contained subsets that consisted of variables that were clearly identified as questions relating to attribution. These groups were subsets 2B, 2C, 3A, and 3C listed in Table 2 (pages 41-45). General attribution search questions found in subset 1C were not included because no specific cause was implied (e.g., "Why?!"). An MDS analysis was conducted using all the data points from the four subsets from the two major clusters. The data matrix of indexes of association for this set of attribution variables may be found in Table 10 (page 71). Two- to six-dimensional solutions were generated and all plots of linear fit, nonlinear fit, and transformation were in the expected direction. Stress values and percentage of variance explained (R^2) may be found in Table 9.

Table 9

Stress Value and Percentage of Variance Explained for Two- to Six-Dimensional Solutions for the Attribution Cluster

Number of Dimensions	Stress Value	R^2
2	.165	.900
3	.132	.915
4	.104	.933
5	.089	.944
6	.077	.950

As expected, as R^2 increased, the stress level decreased. Stress values and R^2 were acceptable for all solutions, so all were examined for interpretability. Based on ease of interpretation, it was determined that a three-dimensional solution best fits the underlying structure of the data. Plots and coordinates for the three-dimensional solution are found in Table 11 (page 72) and Figures 13 through 18 (pages 73-78). Plots and

TABLE 10

Indices of Association (Correlations) for Attribution Questions. Decimal Points Have Been Omitted.

Questions:	2	3	4	5	6	35	36	39	62	63	64	65	66	68	69	70	71	72	73	79	80	81	82	83	84	85	86	87	96	104	105
3	93																														
4	85	88																													
5	57	66	57																												
6	86	92	83	64																											
35	66	69	64	74	66																										
36	59	68	61	83	68	66																									
39	68	71	81	53	66	68	82																								
62	29	29	21	29	29	26	21	29																							
63	42	44	39	29	44	26	29	36	79																						
64	36	36	29	33	36	26	26	33	81	94																					
65	29	21	15	26	15	26	00	26	78	78	82																				
66	33	36	36	26	42	26	29	39	77	91	87	75																			
68	29	26	21	26	26	21	21	26	75	82	85	85	82																		
69	57	64	61	57	66	53	55	61	51	51	53	55	53	53																	
70	49	55	53	51	57	44	49	51	59	66	68	64	64	66	82																
71	72	77	74	66	75	71	59	79	36	49	47	33	44	36	74	63															
72	77	83	78	57	77	61	57	81	39	53	47	29	44	36	71	61	86														
73	57	51	49	39	47	33	39	44	68	72	74	72	69	69	51	63	55	55													
79	26	26	15	15	21	15	00	21	83	81	86	82	77	81	47	66	29	29	72												
80	49	47	44	49	44	33	47	39	64	75	75	68	72	69	55	64	55	55	79	68											
81	21	15	00	15	15	15	00	21	86	83	87	86	77	83	53	68	29	33	71	91	69										
82	21	15	15	15	21	00	00	29	81	75	81	82	72	79	61	66	33	36	64	88	66	92									
83	59	63	57	68	63	78	59	53	15	15	26	29	26	21	53	49	59	49	33	15	42	15	21								
84	63	71	63	75	69	68	71	55	36	39	36	21	39	26	64	61	71	59	51	33	47	36	26	57							
85	77	83	75	68	81	69	66	21	33	33	33	29	33	33	63	61	74	69	53	33	42	36	29	64	74						
86	86	93	87	63	83	64	64	72	36	42	29	21	33	29	61	51	69	79	51	15	42	15	21	57	66	79					
87	64	71	63	83	69	71	74	55	39	44	42	29	36	29	61	59	68	61	55	36	49	29	29	64	86	77	68				
96	44	49	47	36	53	36	39	47	53	59	59	61	57	72	72	79	53	51	51	59	49	59	63	47	39	49	49	44			
104	68	75	66	81	72	71	72	59	33	36	36	15	36	21	61	57	72	59	47	21	44	15	21	66	86	78	71	86	39		
105	21	15	00	15	15	15	00	21	83	77	80	81	79	81	51	59	29	33	69	00	64	91	86	21	36	36	15	29	51	15	
106	15	15	00	29	21	36	21	21	77	78	82	82	78	79	49	64	26	29	71	81	66	82	78	33	36	36	15	39	57	21	85

Table 11: Three-Dimensional MDS Solution Coordinates for Attribution Group

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	DIMENSION 2	DIMENSION 3
1	Q2	1	1.4864	0.2423	-0.6905
2	Q3	2	1.5642	0.0631	-0.4651
3	Q4	3	1.6200	-0.1806	-0.6174
4	Q5	4	1.4111	0.8250	0.9193
5	Q6	5	1.5594	-0.1859	-0.4563
6	Q35	6	1.6516	0.0512	1.0596
7	Q36	7	1.5554	0.2406	1.0352
8	Q39	8	1.2632	-1.3601	0.4477
9	Q62	9	-1.8669	-0.0096	0.3142
10	Q63	A	-1.5228	-0.3794	-0.4644
11	Q64	B	-1.7389	-0.1275	-0.1999
12	Q65	C	-1.9524	-0.1066	0.2273
13	Q66	D	-1.7144	-0.3895	-0.1261
14	Q68	E	-1.9247	0.3445	-0.3068
15	Q69	F	0.2384	-0.7074	-0.0601
16	Q70	G	-0.4411	0.5262	-0.5751
17	Q71	H	1.2758	-0.1160	-0.5693
18	Q72	I	1.0821	-0.7745	-0.5016
19	Q73	J	-0.8387	0.7649	-0.9828
20	Q79	K	-1.3097	-1.4905	0.6703
21	Q80	L	-1.2138	0.6717	0.0146
22	Q81	M	-1.9800	-0.2385	0.1850
23	Q82	N	-1.9101	-0.4055	0.1890
24	Q83	O	1.4072	0.3780	1.3206
25	Q84	P	1.3461	1.0001	0.1075
26	Q85	Q	1.3067	0.9591	-0.5020
27	Q86	R	1.5505	0.0221	-0.6637
28	Q87	S	1.1834	0.9511	0.3172
29	Q96	T	-0.6900	-1.1516	-0.8384
30	Q104	U	1.5086	0.7290	0.3680
31	Q105	V	-1.9743	-0.1598	0.3499
32	Q106	W	-1.9323	0.0142	0.4940

Figure 13: Three-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 2

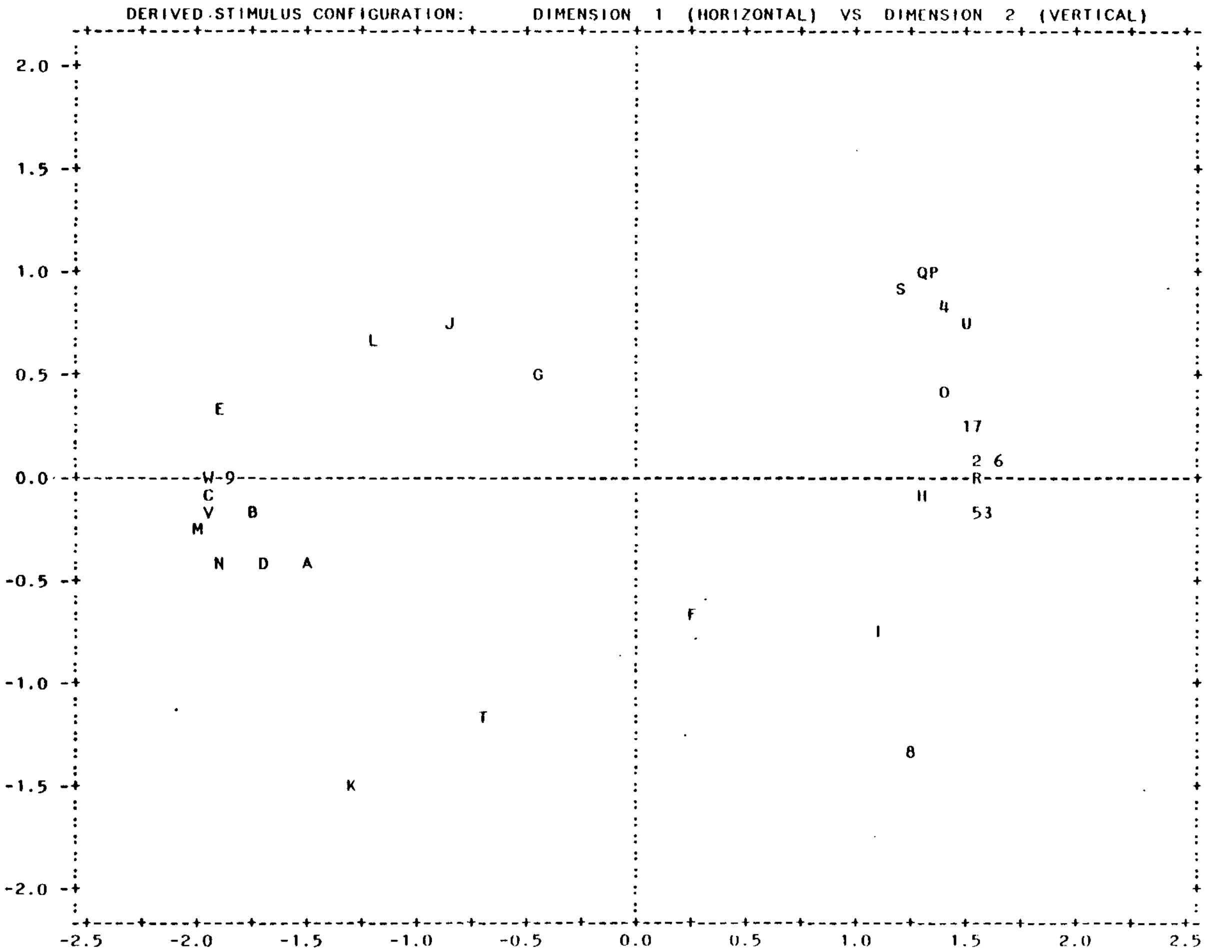


Figure 14: Three-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 3

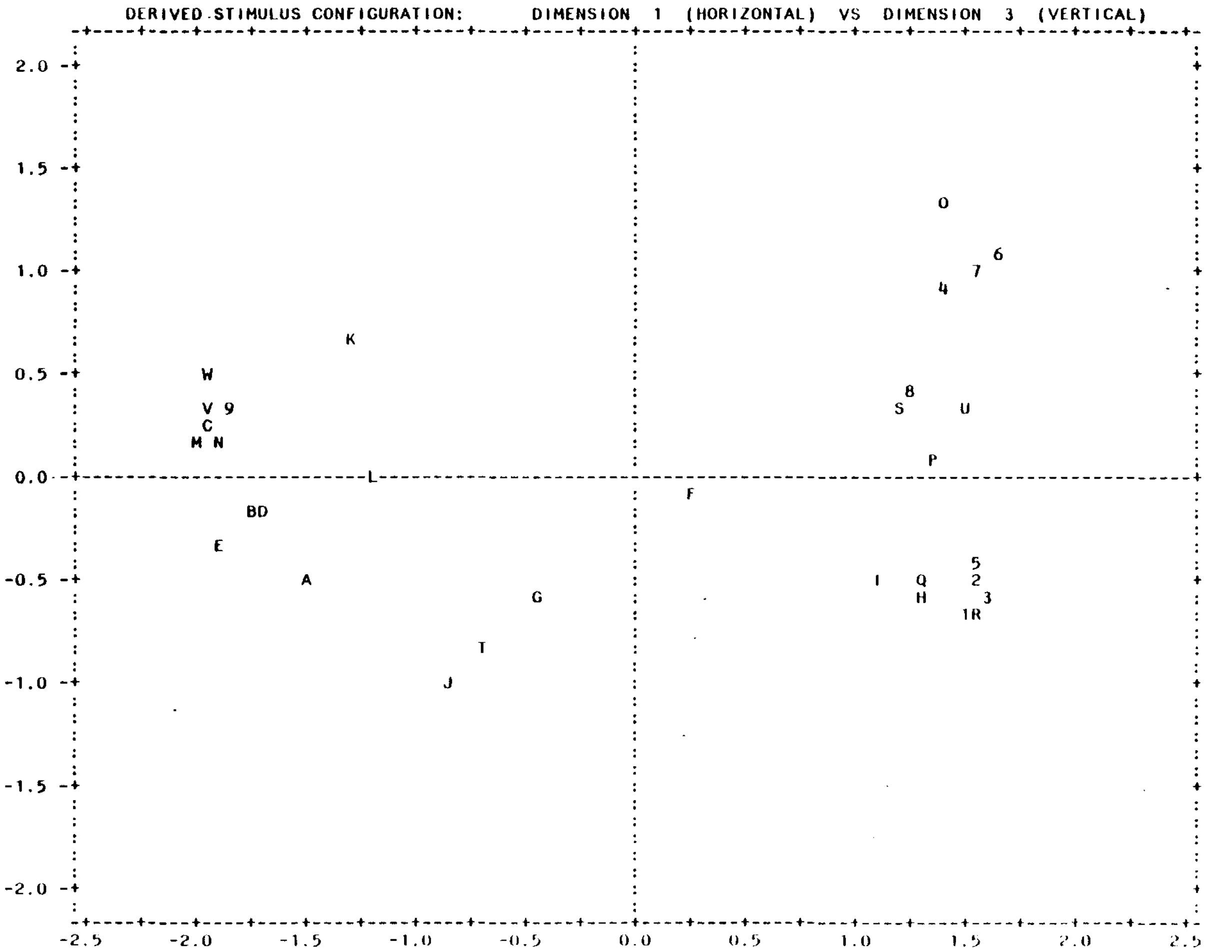


Figure 15: Three-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 3

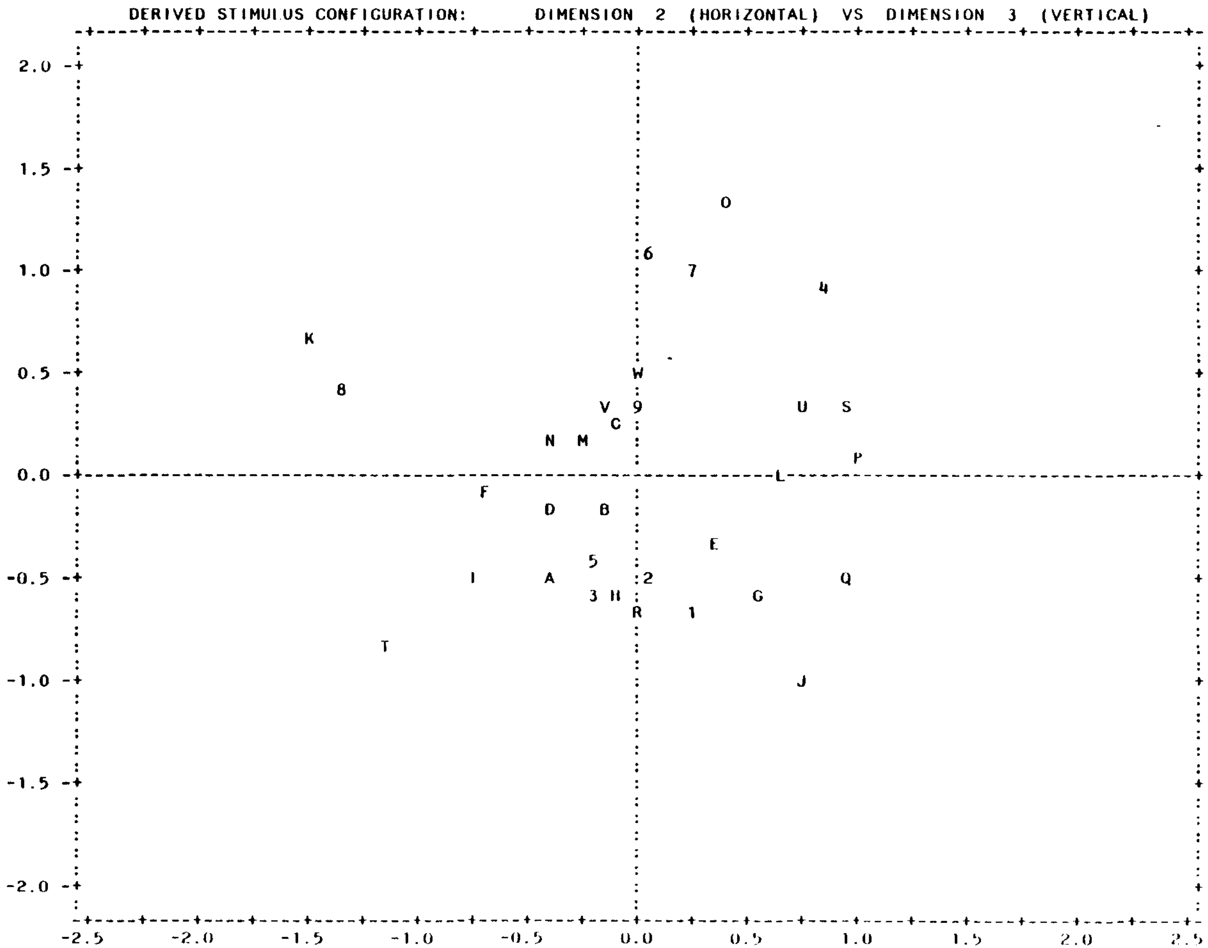


Figure 16: Three-Dimensional MDS Solution for Attribution Group; Linear Fit Plot

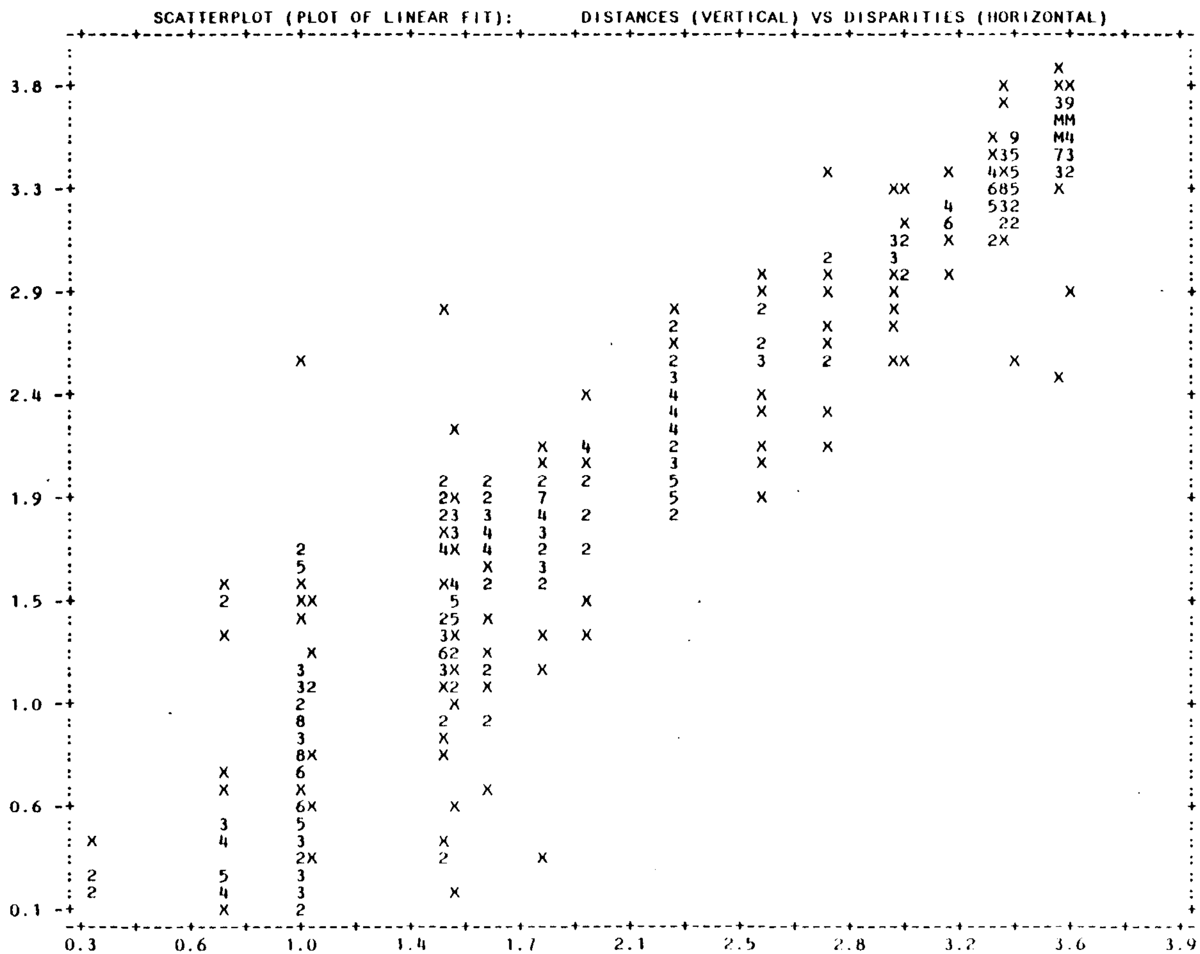


Figure 17: Three-Dimensional MDS Solution for Attribution Group; Nonlinear Fit Plot

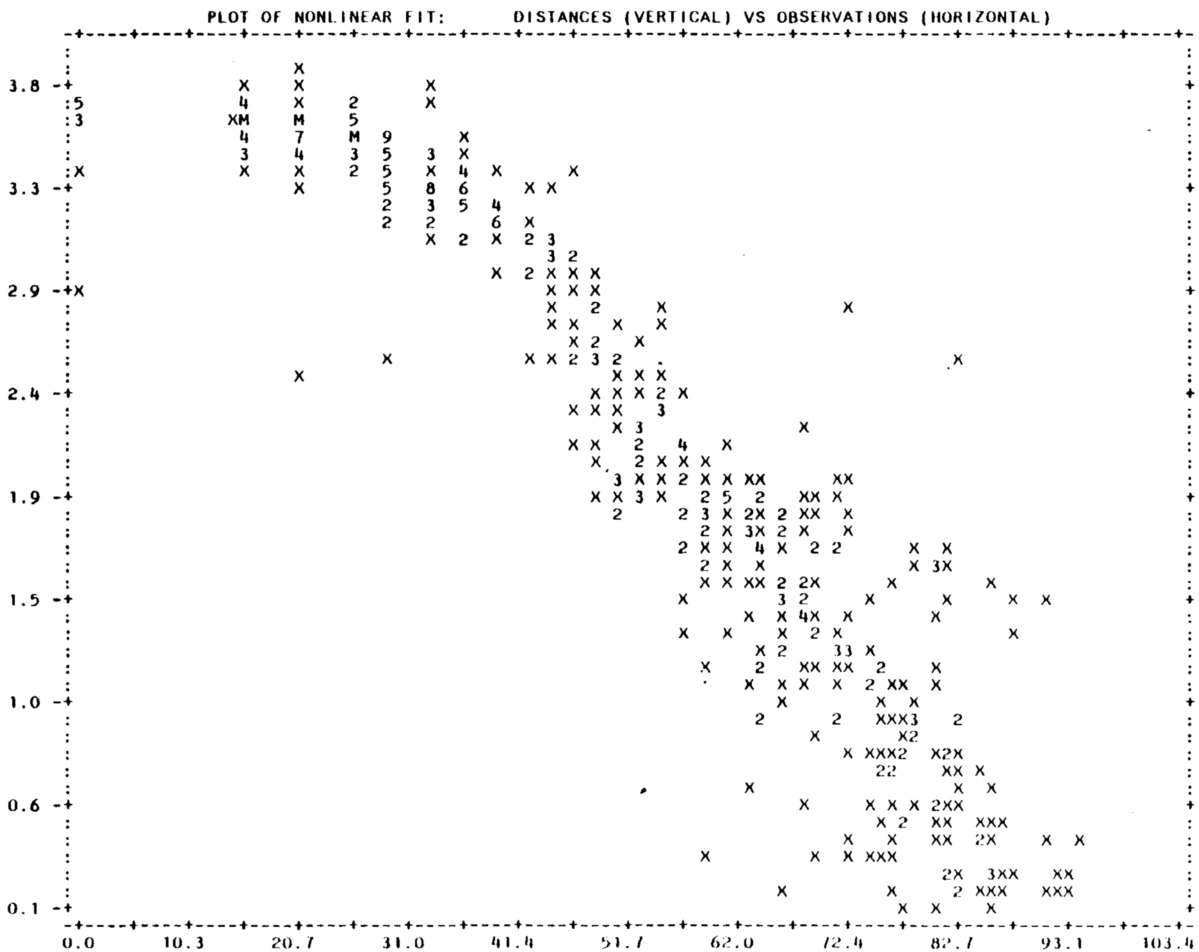
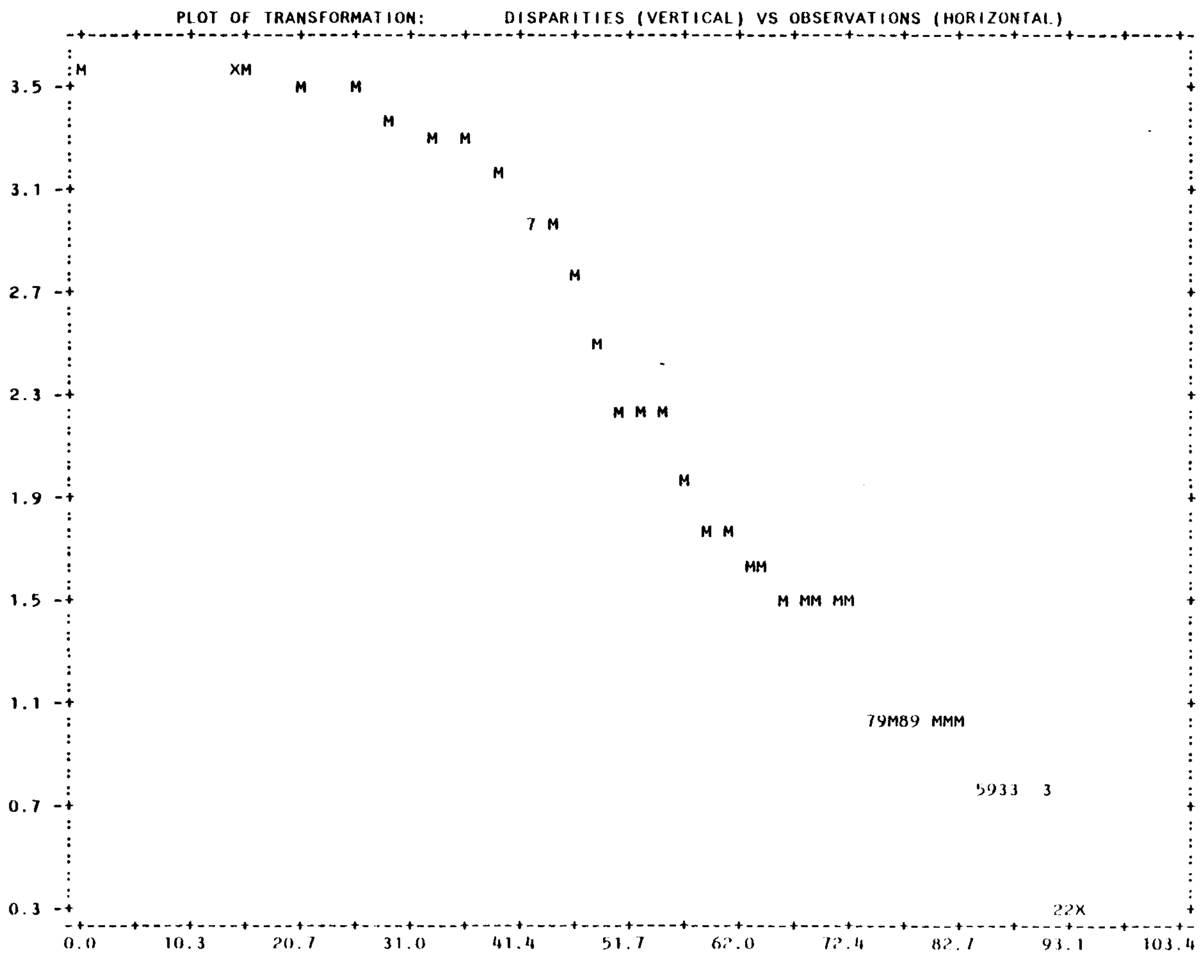


Figure 18: Three-Dimensional MDS Solution for Attribution Group; Transformation Plot



coordinates for all other solutions may be found in Appendix C.

Interpretation of the Attribution Solution. It was not necessary to rotate the axes for the attribution MDS plots for ease of interpretation. The first dimension (Figures 13 and 14; pages 73 and 74), locus, consists of attributional questions focused on the self (i.e., internal locus) at one end and attributional questions focused on the spouse (i.e., external locus) at the other end. Self attribution items include "Am I crazy" and "Are my expectations of marriage too high or unrealistic". At the other end of the bipolar dimension, spouse attributional questions include "Why did he/she leave" and "Who is she seeing...another man".

The second dimension (Figures 13 and 15; pages 73 and 75), stability, contains questions that imply cause related to traits at one end and questions that imply causes that are situational at the opposite pole. Thus stable attributional questions include "Why was he/she unfaithful to me" (implication of an inherent trait of one or both partners) and "Why me" (implication of something "wrong" with the person). Unstable attributional questions include "How could I have changd so that this wouldn't have happened" and "Should I have spent more time at home".

<u>Controllability</u> describes the third dimension (Figures 14 and 15; pages 74 and 75). At one end of the continuum are attributional questions that imply the actor has some degree of control over behavior (e.g., present or future thoughts and behaviors). Examples include "Are my expectations of marriage too high or unrealistic" and "What can I do to improve". At the opposite end are attributional questions that seem uncontrollable (e.g., past events or other's behavior). Anchor items include "Why doesn't he/she love me anymore" and "Why didn't I go through with this when he went back to drinking 3 years ago".

It was not originally anticipated that an examination of the underlying cognitive architecture of questions relating to attributions would be possible. However, the MDS analyses of the selected subsets of clusters have provided a three-dimensional solution that has theoretical relevance.

CHAPTER V

DISCUSSION

The primary purpose of this study was to analyze the structure and content of spontaneous casual thinking after marital separation as well as to assess the stability of the elicited underlying cognitive structure. Attributional theory (e.g., Heider, 1958; Kelley, 1967; Weiner, 1986) suggests that after a novel, important, and/or negative life event (i.e., marital separation) the lay person engages in attributional thinking in an effort to provide some understanding of his or her world as well as to assist the individual in the development of personal goals.

Cluster analytic techniques were used primarily to attain discrete groupings of the rather large data set from which to randomly select smaller subsets for further analysis. However, the stable clusters that resulted also provided evidence for the content of spontaneous causal thinking. Of the 111 spontaneously generated questions, 39 of the items grouped into subsets (subsets 1C, 2B, 2C, 3A, and 3C shown in Table 2, pages 41-45) that clearly were identifiable as causal thinking. Thus, evidence has been provided that individuals do indeed spontaneously engage in attributional activity after a real-life event, a primary assumption common to all the major models of attribution theory. One of the subsets (1C) consisted of attributional search questions (e.g., "What went wrong?...Why did the marriage fail?"), while the other subsets (2B, 2C, 3A, and 3C) contained questions that implied causal attributions (e.g., "Why did he/she lie?"). Both types of attributional activity are consistent with Weiner's (1985) review of previous research (e.g., Wong & Weiner, 1981) that assess whether people engage in this type of thinking in naturally occurring events. In addition, Weiner concluded that attributional thinking is prompted by unexpected or novel events as well as nonattainment of a goal (i.e., failure). An individual's perception of his or her marital separation would fulfill at least one of the conditions. In conclusion, people ask attributional questions even when not specifically told to do so.

While the results of the cluster analytic techniques did succeed in identifying attributional activity, it assumed a non-dimensional discrete structure underlying the cognitions. Although much of the literature (e.g., Diener & Dweck, 1978; Holtzworth-Munroe & Jacobson, 1985; Wong & Weiner, 1981) does indeed make this assumption, Weiner (1986) posited that the underlying structure of causal thinking consists of dimensions that are continuums (e.g., stable-unstable) and not discrete groupings. MDS is an empirical technique designed to fit a continuous dimensional structure. Thus, MDS was employed to examine the cognitive architecture of the data and to address the major hypotheses of this study.

The results of the MDS analyses disclosed cognitive dimensions that fit a three-dimensional structure. As hypothesized, attribution was a primary component. However, it was not a dimension by itself, but rather one end of the bipolar primary dimension underlying the data. The other end of this dimension, attribution versus present and future concerns, consisted of items that primarily included action-oriented questions. Thus, the second hypothesis stating that a second dimension would be revealed that contained action-oriented questions was partially supported. Rather than defining two distinct dimensions, attribution and action questions (with action questions subsumed under present and future concerns) were found to be at opposite poles of the primary dimension underlying the spontaneous cognitive activity related to marital separation. This finding is consistent with Brown and Blake's (1986) results.

The bipolar aspect of the primary dimension implies that the frequency with which a person engages in one type of thinking (i.e., attributions or present and future concerns) would necessarily be negatively related to the frequency with which the individual could engage in the other type of thinking (Brown & Blake, 1986). Thus, a person who is preoccupied with determining the cause or causes of his or her divorce is less likely to engage in thinking focused on present and future concerns that may lead to action.

While an understanding of the cause of a major negative life event is important in attaining cognitive mastery of the environment, too much of a focus on attribution may impede one's ability to cope in the present as well as to plan for the future. If further research were to support this contention, for divorce and other negative life events, it may be posited that post-event adjustment would be correlated with a person's frequency of engagement of one type of thinking over the other.

In a related literature examining intimate conflict, Doherty (1981) argues that increased attributional activity reduces the family member's ability to engage in efficacy expections (i.e., the expection that the conflict can be adequately resolved). Diener and Dweck's (1978) study in the achievement domain noted that after academic failure, students classified as "mastery-oriented" focused on remedies for failure (i.e., a major component of present and future concerns) while "helpless" childen focused on the causes of failure (i.e., attributions). This finding corresponds with the bipolar aspect of the first dimension found in this study and further suggests that adjustment may be related to what type of thinking predominates during the post-event phase. Furthermore, it may be found in future research that the healthy adjustment to a major negative life event (e.g, divorce) requires that the frequency of one type of thinking versus the other gradually shifts over time. For example, in the initial stages of adjustment, a person may need to predominately engage in attributional thinking to achieve a level of mastery over the environment before focusing primarily on present and future concerns (e.g., action). This type of proposed research would provide the basis wih which to develop effective interventions to assist individuals in the post-event phase to promote healthy adjustment.

The second dimension, we versus they, revealed an emphasis on locus. At one end were questions relating to the marital relationship (e.g., "Did we do the right thing?"), while the other end focused on others outside the nuclear family (e.g., friends, extended family members). This result did not quite correspond with the second dimension elicited from the Brown and Blake (1986) procedures which they titled "self- versus other-focus". While one end of the dimension remains the same, the opposite pole contains questions relating to the marital partners rather then a self-focus only. However, questions relating to the self are located near that end of the continuum. It should be noted that several of the items located on the "we" end of the dimension may also be classified as re-evaluation questions, thus the Wong and Weiner (1981) categories of attribution, action, and re-evaluation have all been represented in the first two dimensions of the MDS model.

As in the Brown and Blake (1986) study, a third dimension emerged from the empirical analyses. This dimension, uncertainty of the marital relationship versus recovery, is anchored by questions such as "How long will he/she stay away" at one end and "How will the children adjust to this situation" at the other. This dimension does not readily correspond to Brown and Blake's (1986) third dimension (psychological vs. practical coping issues), although there is some similarity between practical coping issues and recovery. Future research might explore the relationship between psychological distress and the frequency of causal thinking focused on the status of the spousal relationship. It would seem, based on this bipolar dimension, that if the status is uncertain, it would be very difficult to engage in thinking or behavior to lessen the impact of the marital separation on oneself and others (e.g., children).

The three-dimensional MDS model was based on data from a relatively unstructured sorting task involving similarity judgements. The model provided a means of disclosing which perceptual, cognitive, or evaluative dimensions operate in a subject's mind during the post-separation phase. These dimensions were found to be relatively stable through the use of cross-validation. Thus, the third hypotheses was supported. The results of these secondary analyses of the Brown and Blake (1986) data appear to be relatively stable and therefore are more likely to reflect the true underlying cognitive structure of the data set.

In addition to the major analyses that addressed the hypotheses of this study, it was possible to empirically examine the underlying dimensions of the items that reflected attributional activity. These items were identified through the cluster analytic procedures (see Chapter IV). MDS procedures resulted in a three-dimensional solution that reflect the locus, stability, and control dimensions of causality. In general, the three dimensions proposed by Weiner (1986) seem to encompass most of the attributional questions recently separated persons generate. However, it does not imply that the structure of attributional activity is simple. Fletcher (1983) found attributions to be complex in his study of the structure and content of real-life attributions regarding marital separation that were elicited by the experimenter (i.e., subjects were asked to list causes). Fletcher also found that the attributions were predominately person-centered, but the role of external causes were not ignored. This corresponds to the locus dimension. In addition, attributions were found to be generally dispositional (stable) rather than episodic (unstable).

In a related area of literature, Thompson and Synder (1986) found in their review of attribution theory in intimate relationships (both distressed and nondistressed married couples) that, in general, "results are felt to offer strong evidence of the importance of attribution processes in determining spousal interactions and relationship satisfaction" (p. 123). Newman and Langer (1981) found in their study of recently divorced women that there is a relationship between post-divorce adjustment and the attributions given for the failure of the marriage. That is, those woman who attributed the divorce to interactive rather than personal factors are more active, more socially skilled, and less likely to blame themselves for failure.

At first glance, it may appear that the results of the two studies just discussed may somewhat contradict the results discussed earlier (i.e., the first dimension resulting from the MDS analyses of items sampled from the entire data set) as well as the studies conducted by Doherty (1981) and Diener and Dweck (1978). It must be noted, however, that this data set only includes spontaneously generated questions, not statements. An attribution statement implies the person has come to an understanding of why an event took place and therefore can focus on present and future concerns. For example, DuCette and Keane (1984) noted in their study of patients undergoing surgery that those that did not have answers to attributional questions made poorer recoveries. Acknowledgement of a cause may lead to a sense of security. What seems to be important is how a person who has come to some conclusion regarding the cause or causes of the marital separation fares in post-transition adjustment. This adjustment appears to be related to the type of attributions made. In this study the attributional questions imply certain causes, yet it is not certain if a conclusion has been reached. Further research may employ similar methods to elicit spontaneous causal thinking as in the Brown (1983) study, but impose even less structure by asking for "thoughts" rather than elicit post-separation questions.

Finally, a comparison of the perceived causal structure of different types of situations would be theoretically relevant. Anderson (1983) argues that attributions differ as a function of the type of situation. Therefore, it would be useful to examine the underlying dimensions involved in other major life events (e.g., job loss, major illness) in which cognitive processes may be important in post-event adjustment.

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Appendix A

Table 12: Two-Dimensional MDS Solution Coordinates for Group A

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	DIMENSION 2
1	Q6	1	1.0178	0.2658
2	Q10	2	-1.0916	1.1036
3	Q11	3	-0.6053	1.6601
4	Q14	4	-1.0811	1.3343
5	Q26	5	-1.8737	-0.4631
6	Q27	6	-1.9860	0.1869
7	Q29	7	0.3915	0.5332
8	Q32	8	0.4370	0.5352
9	Q35	9	1.1925	0.4408
10	Q40	A	1.3750	-0.0686
11	Q43	B	1.4231	0.0646
12	Q47	C	1.3278	0.4630
13	Q50	D	-1.5193	-0.6814
14	Q53	E	-1.4466	-1.0056
15	Q56	F	-1.0720	-1.0886
16	Q58	G	-1.7003	0.1670
17	Q59	H	-0.1299	-1.3503
18	Q64	I	0.9180	-1.3167
19	Q65	J	0.7596	-1.3732
20	Q70	K	1.1466	-0.5814
21	Q73	L	0.7764	-0.8289
22	Q74	M	0.8233	0.9650
23	Q78	N	-0.1695	1.1445
24	Q86	O	0.7297	-0.7336
25	Q87	P	1.0562	-0.5730
26	Q89	Q	-1.7570	-0.4796
27	Q95	R	-0.9206	0.3176
28	Q107	S	0.7745	-0.4478
29	Q109	T	0.8786	0.5322
30	Q111	U	0.3254	1.2782

Figure 19: Two-Dimensional MDS Solution for Group A; DIM 1 x DIM 2

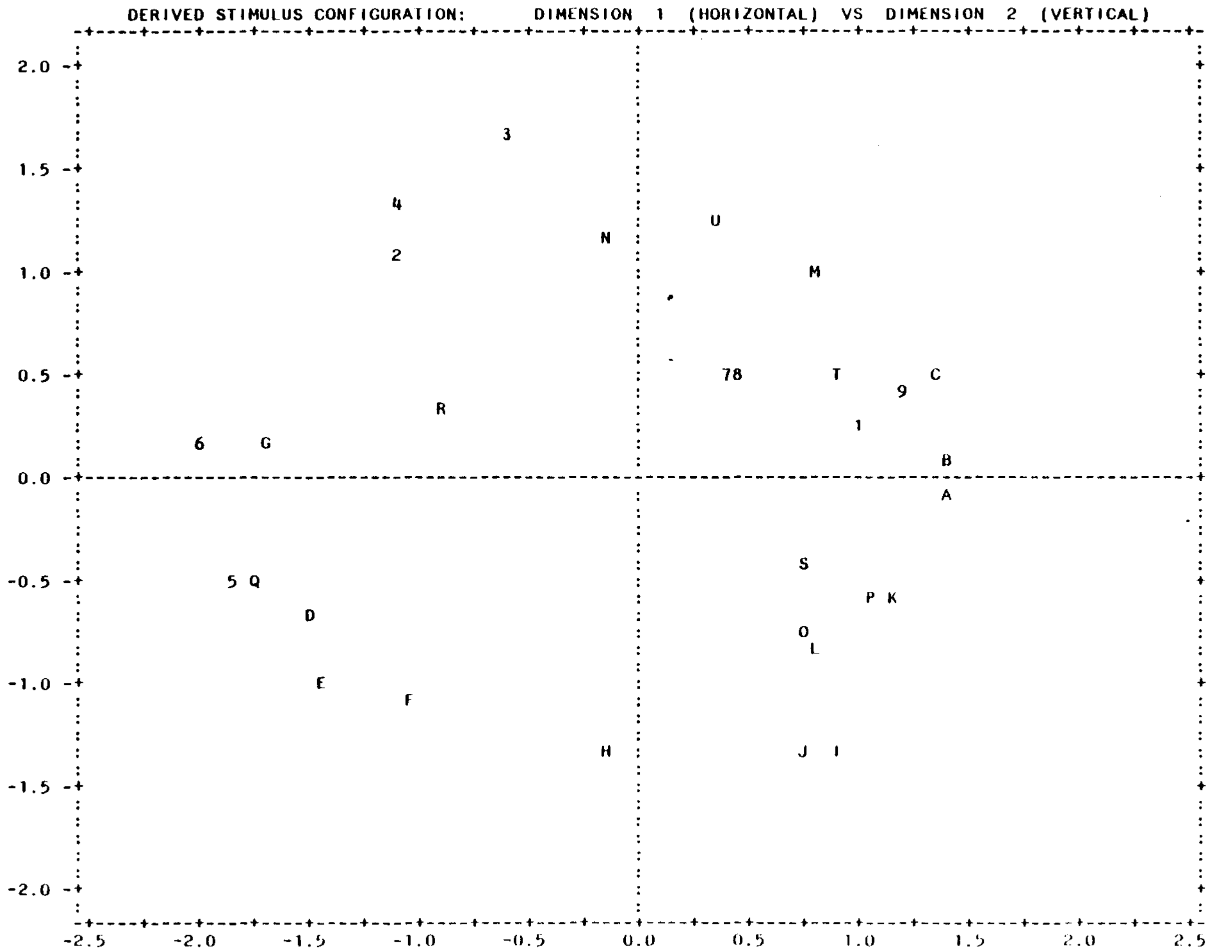


Figure 20: Two-Dimensional MDS Solution for Group A; Linear Fit Plot

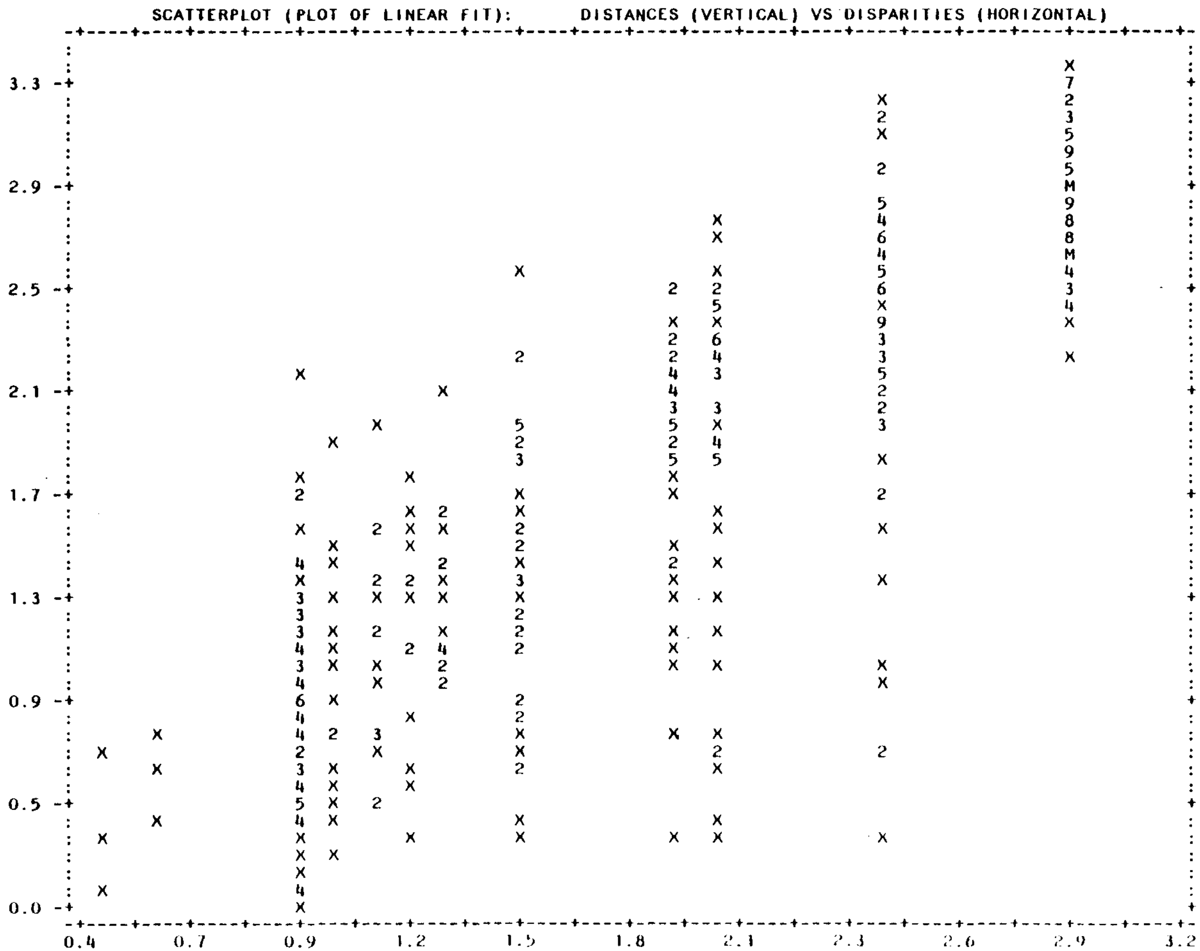


Figure 21: Two-Dimensional MDS Solution for Group A; Nonlinear Fit Plot

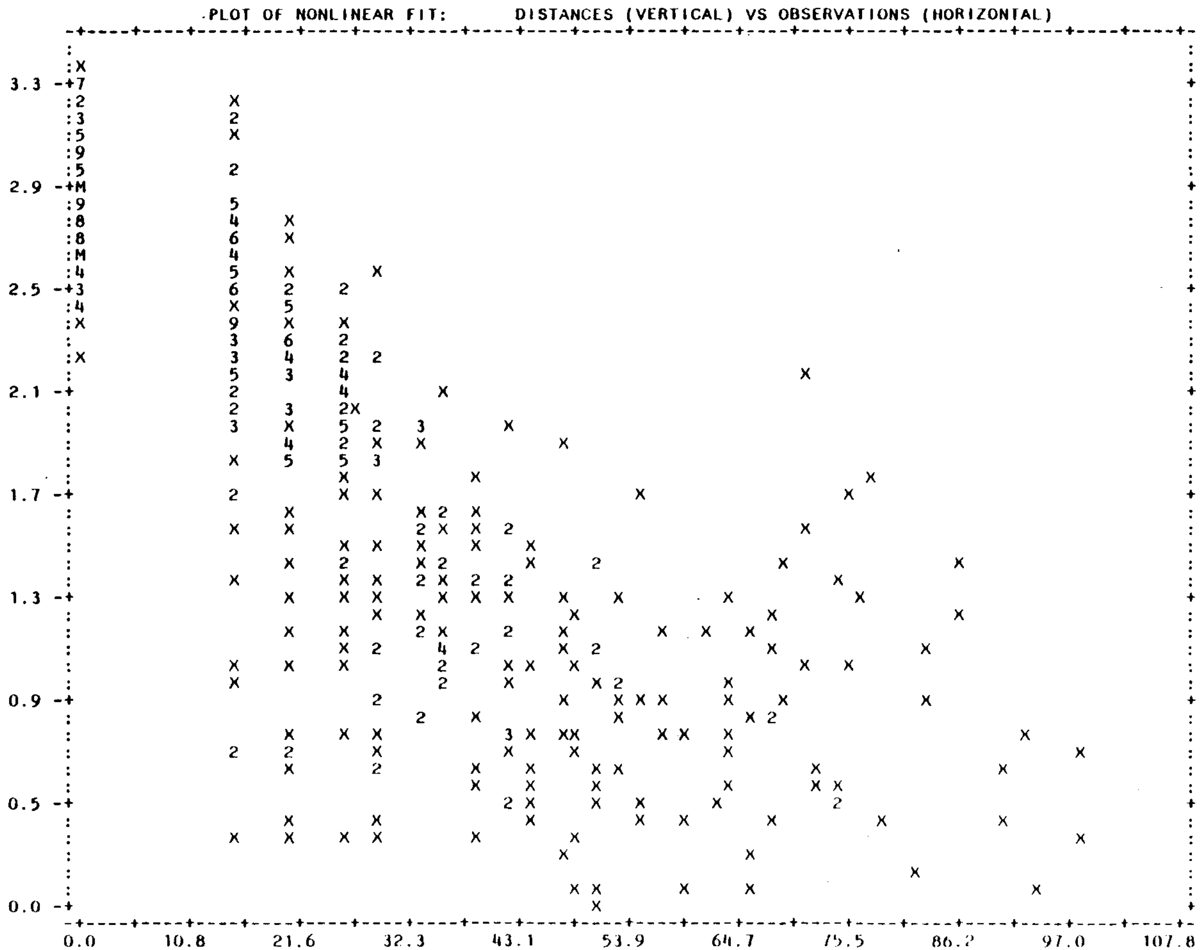


Figure 22: Two-Dimensional MDS Solution for Group A; Transformation Plot

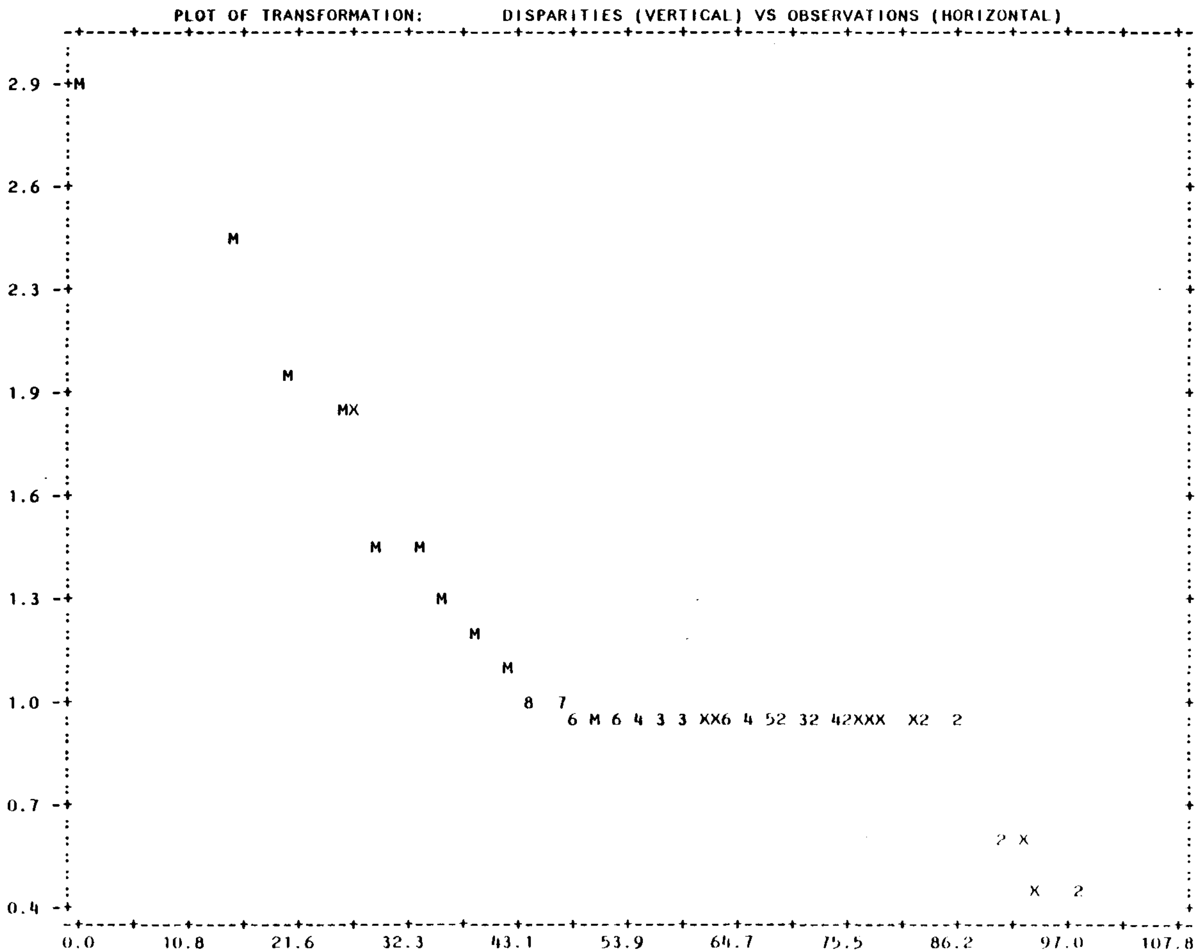


Table 13: Four-Dimensional MDS Solution Coordinates for Group A

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4
1	Q6	1	1.0301	-0.1617	1.0305	-0.8443
2	Q10	2	-1.4885	-1.3531	0.3717	0.5450
3	Q11	3	-0.9212	-1.2809	-1.6242	0.2233
4	Q14	4	-1.1524	-1.1021	-1.1046	1.1733
5	Q26	5	-1.8038	-0.4604	1.7300	0.1486
6	Q27	6	-2.0255	-0.6567	1.3041	0.4495
7	Q29	7	0.5072	-0.6411	-0.4227	0.9461
8	Q32	8	0.5803	-0.6988	-0.2430	-0.8932
9	Q35	9	1.3135	-0.4834	0.2515	-0.9895
10	Q40	A	1.3973	-0.2467	0.2158	-1.2292
11	Q43	B	1.6279	-0.2737	0.2527	-0.8658
12	Q47	C	1.4219	-0.6097	-0.1855	-1.1136
13	Q50	D	-1.6347	1.4188	-0.7038	-0.4338
14	Q53	E	-1.5711	1.6116	-0.5504	-0.5544
15	Q56	F	-1.2688	1.6130	-0.7019	-0.6309
16	Q58	G	-1.6351	1.1624	-1.0771	-0.7168
17	Q59	H	-0.4015	1.8033	-0.1898	-0.7583
18	Q64	I	1.0315	1.3064	0.5294	1.2730
19	Q65	J	0.7935	1.3240	0.1332	1.6281
20	Q70	K	1.2589	0.5552	0.8583	0.8790
21	Q73	L	1.0193	1.0774	0.3921	0.9261
22	Q74	M	0.9260	-1.0895	-0.8819	0.4401
23	Q78	N	-0.4642	-1.1351	-1.2976	0.1353
24	Q86	O	0.9040	0.2007	1.1902	-0.7610
25	Q87	P	1.4095	0.4240	0.7856	-0.1818
26	Q89	Q	-1.6900	-0.5210	1.7860	-0.1478
27	Q95	R	-1.4094	-0.5775	0.5851	0.2814
28	Q107	S	0.8181	0.6312	-0.4351	1.4105
29	Q109	T	1.2080	-0.4681	-0.8695	-0.3996
30	Q111	U	0.2193	-1.3685	-1.1293	0.0608

Figure 23: Four-Dimensional MDS Solution for Group A; DIM 1 x DIM 2

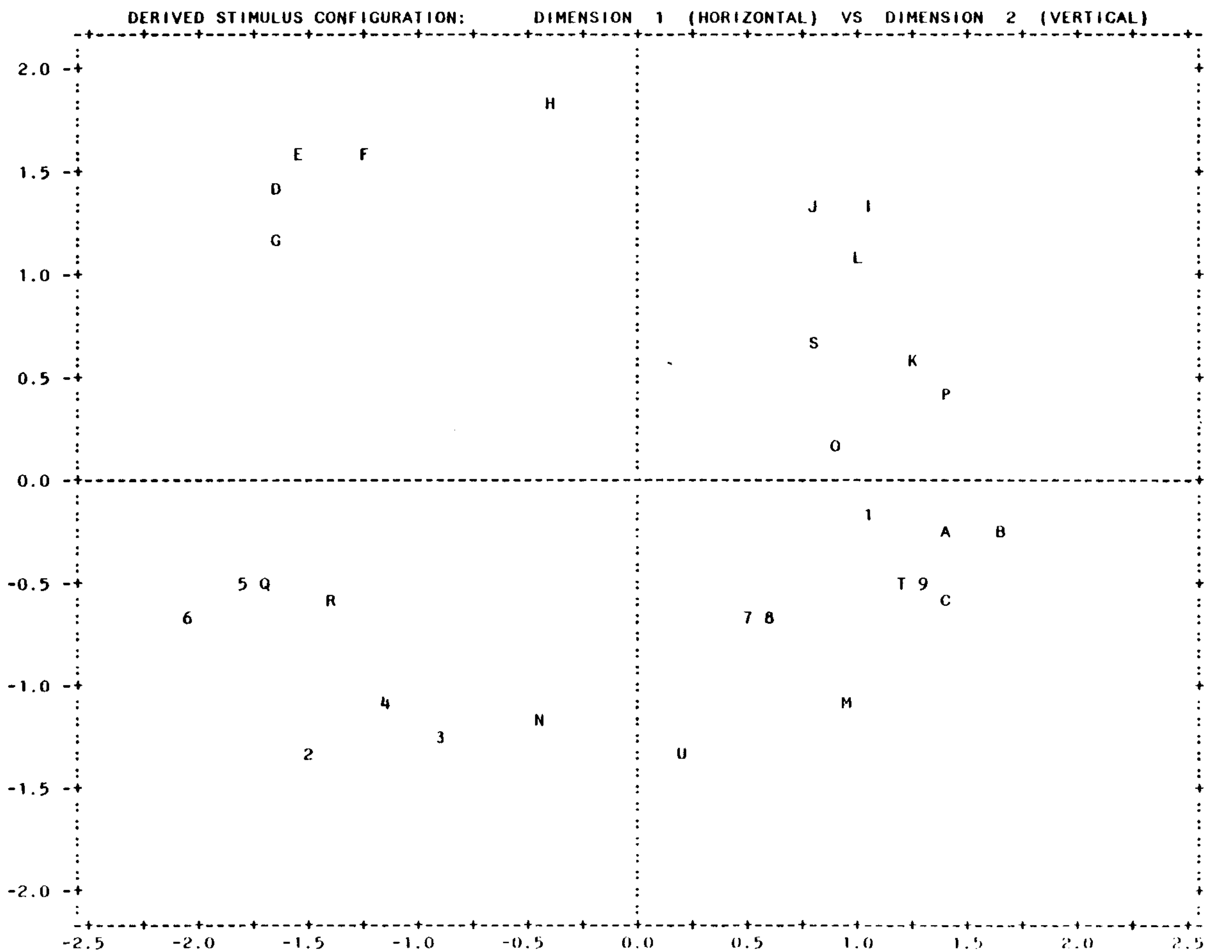


Figure 24: Four-Dimensional MDS Solution for Group A; DIM 1 x DIM 3

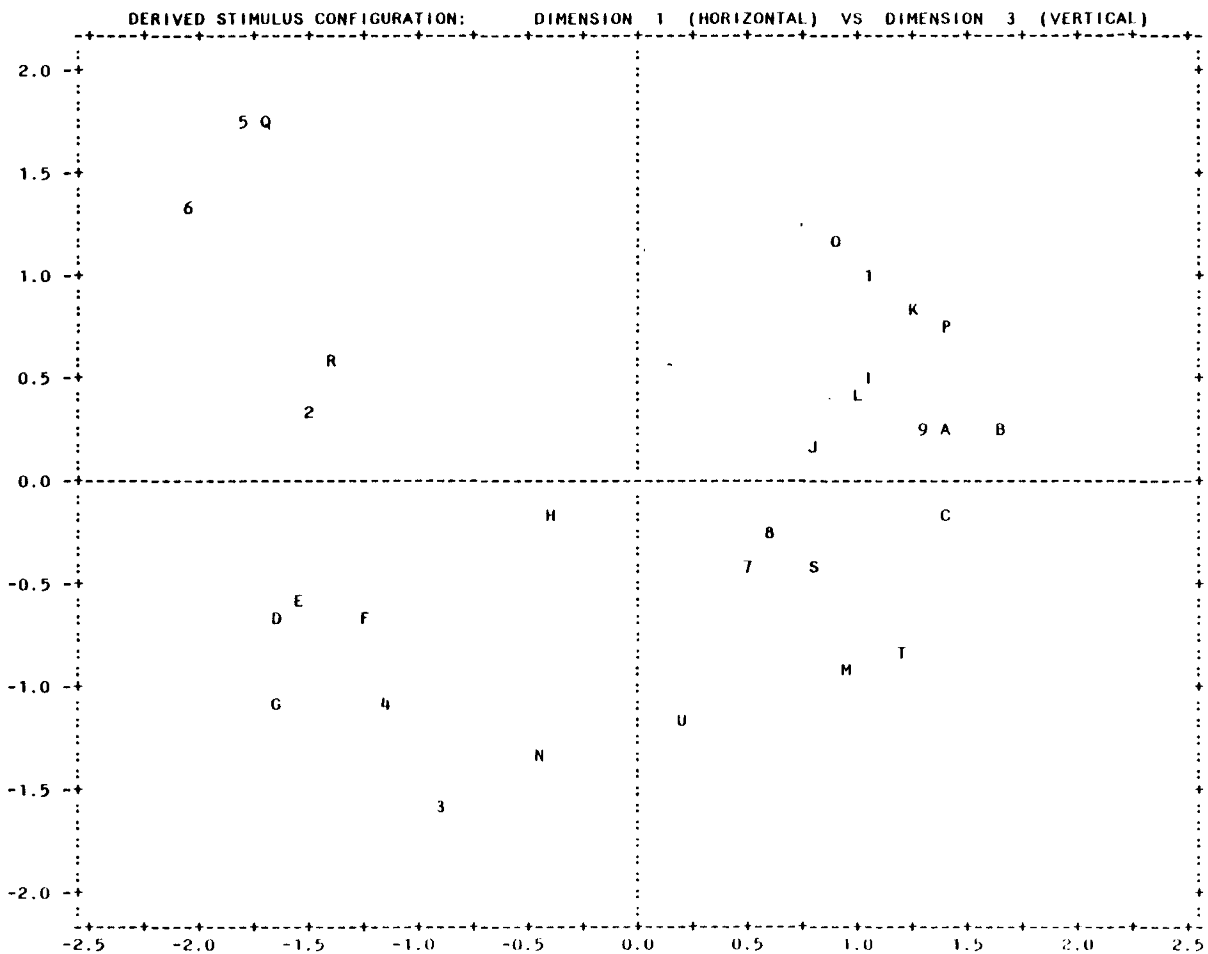


Figure 25: Four-Dimensional MDS Solution for Group A; DIM 2 x DIM 3

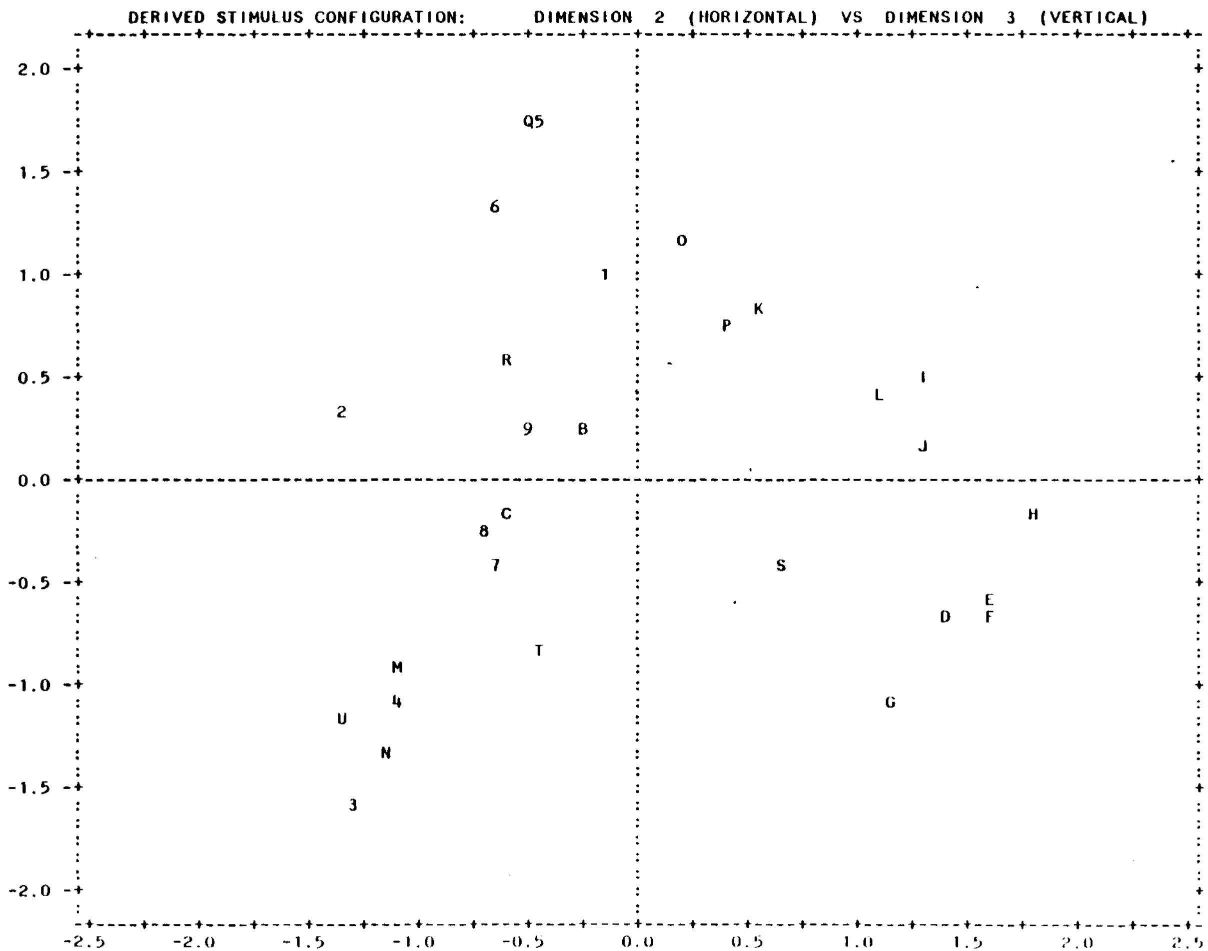


Figure 26: Four-Dimensional MDS Solution for Group A; DIM 1 x DIM 4

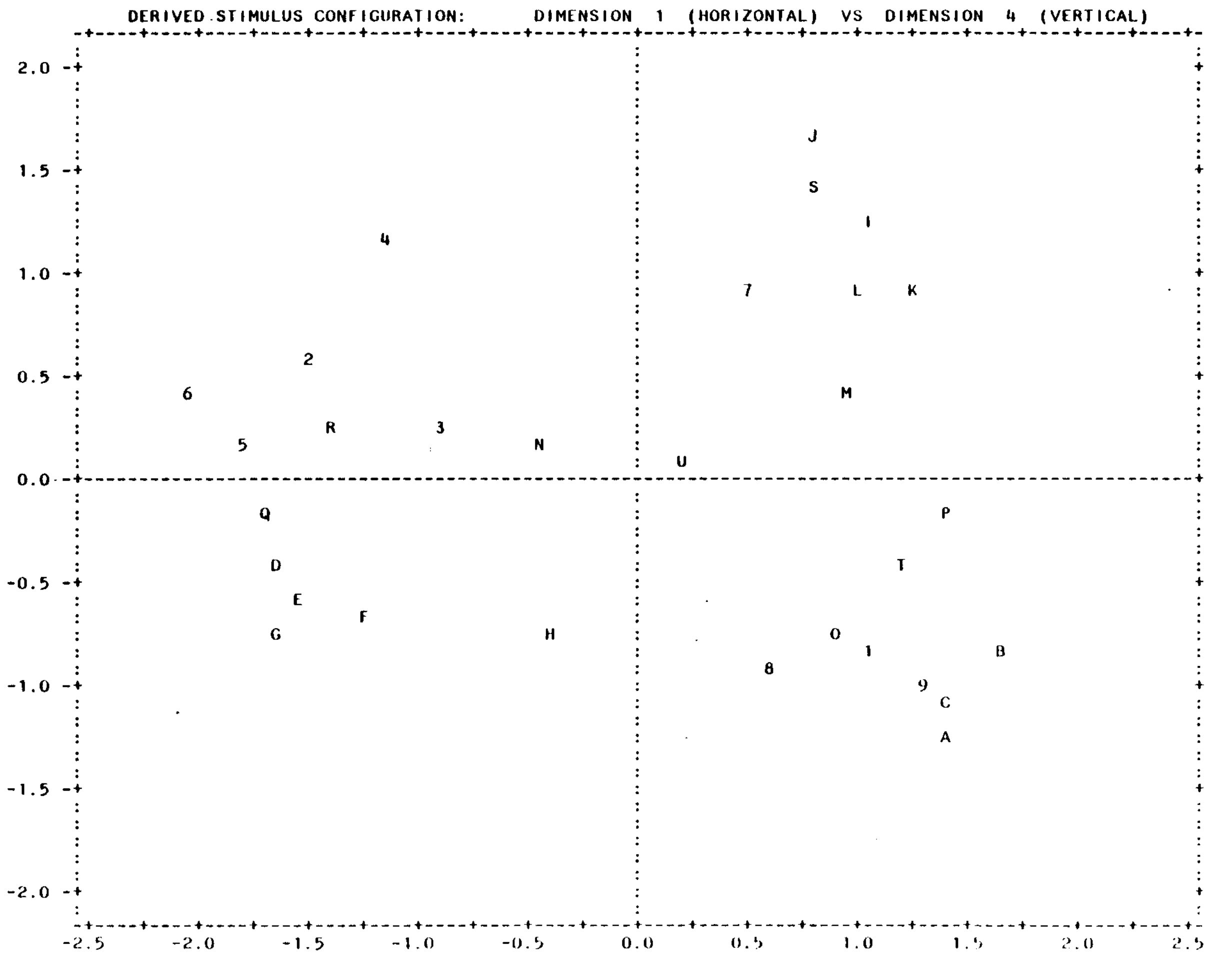


Figure 27: Four-Dimensional MDS Solution for Group A; DIM 2 x DIM 4

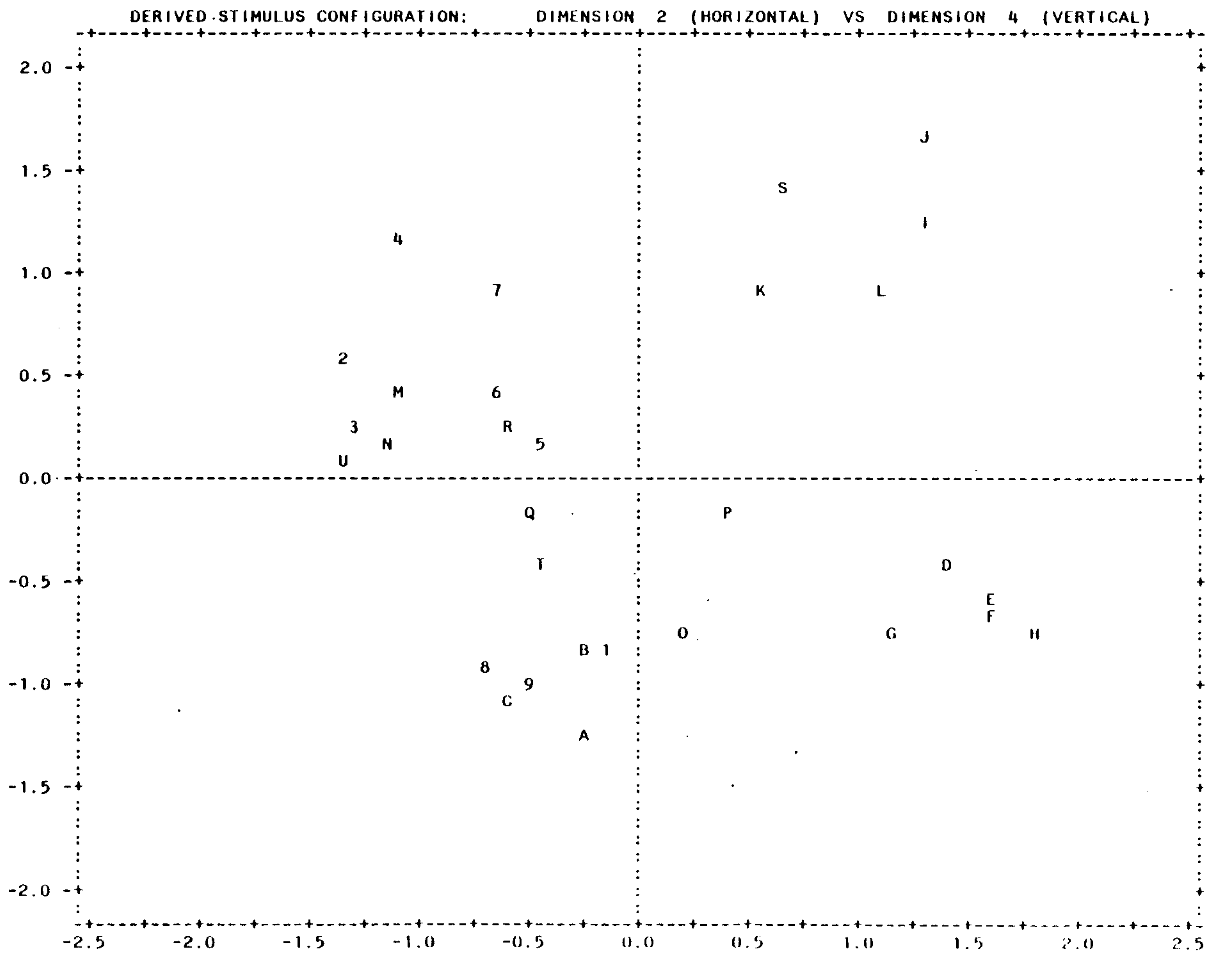


Figure 28: Four-Dimensional MDS Solution for Group A; DIM 3 x DIM 4

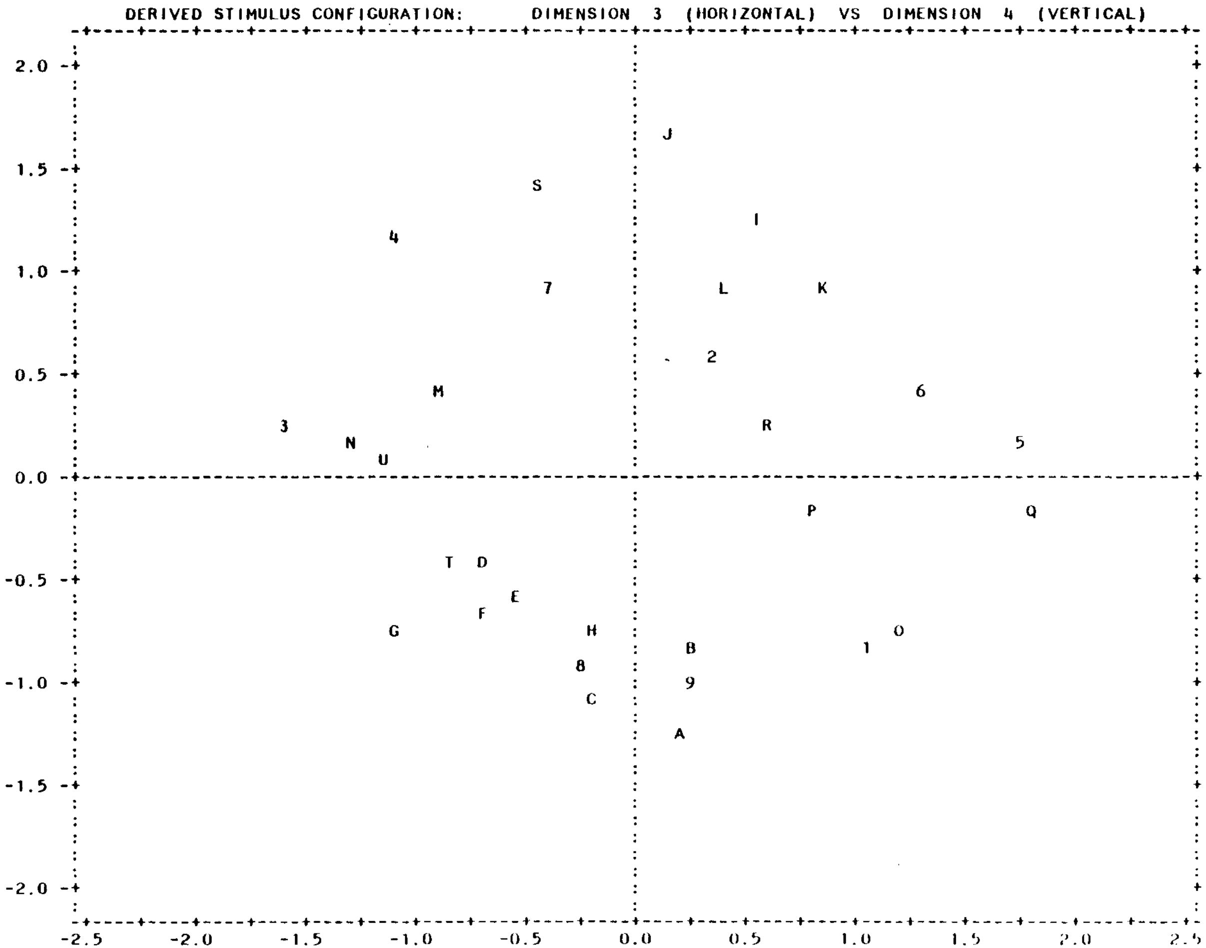


Figure 29: Four-Dimensional MDS Solution for Group A; Linear Fit Plot

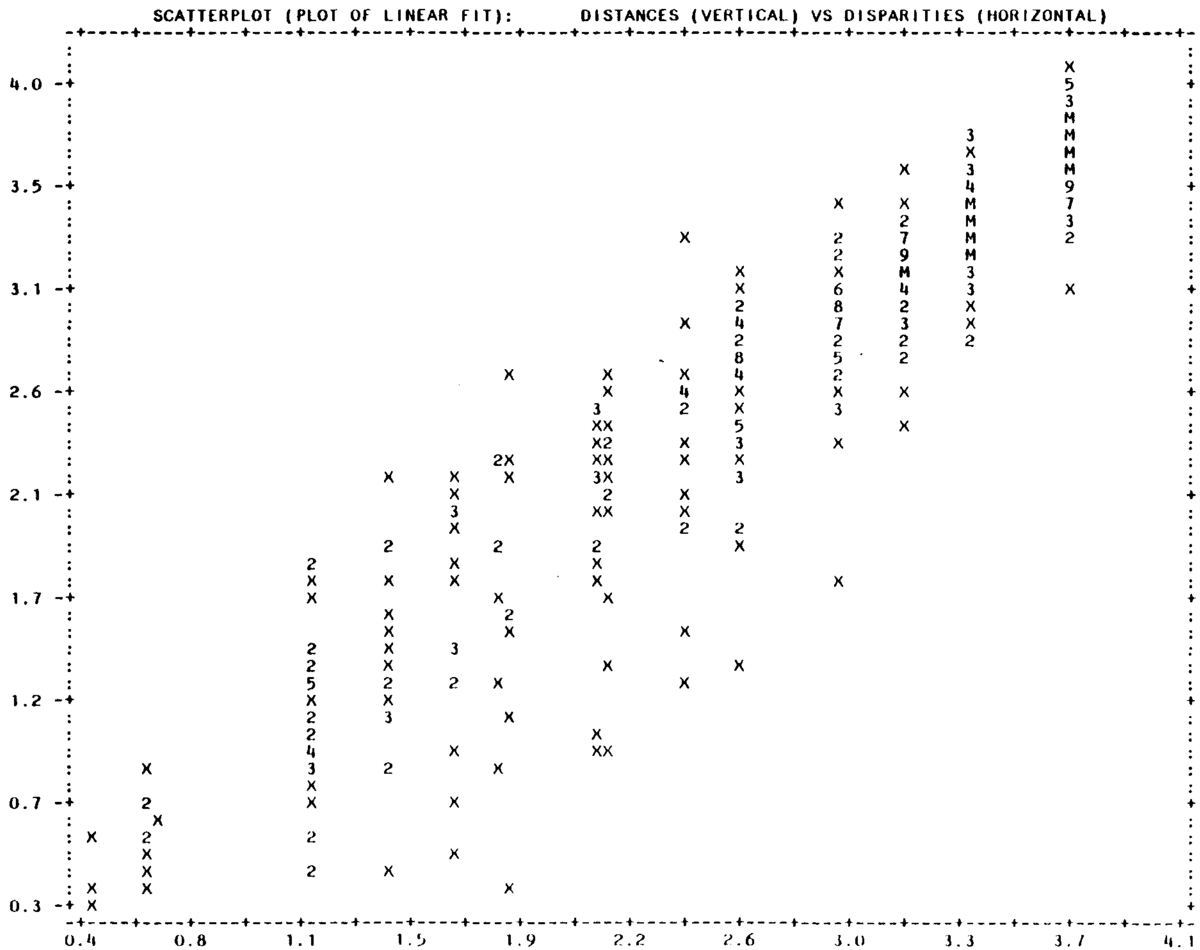


Figure 30: Four-Dimensional MDS Solution for Group A; Nonlinear Fit Plot

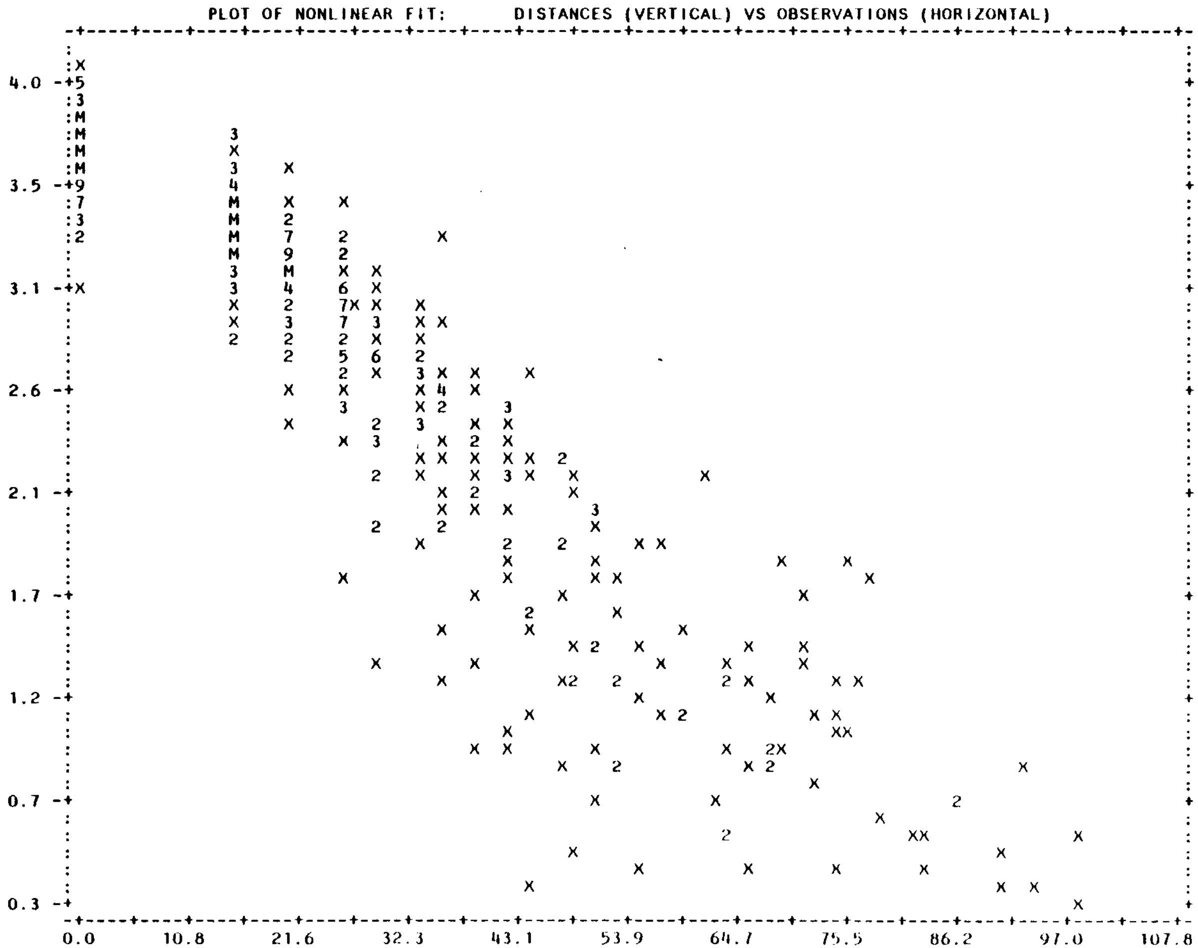


Figure 31: Four-Dimensional MDS Solution for Group A; Transformation Plot

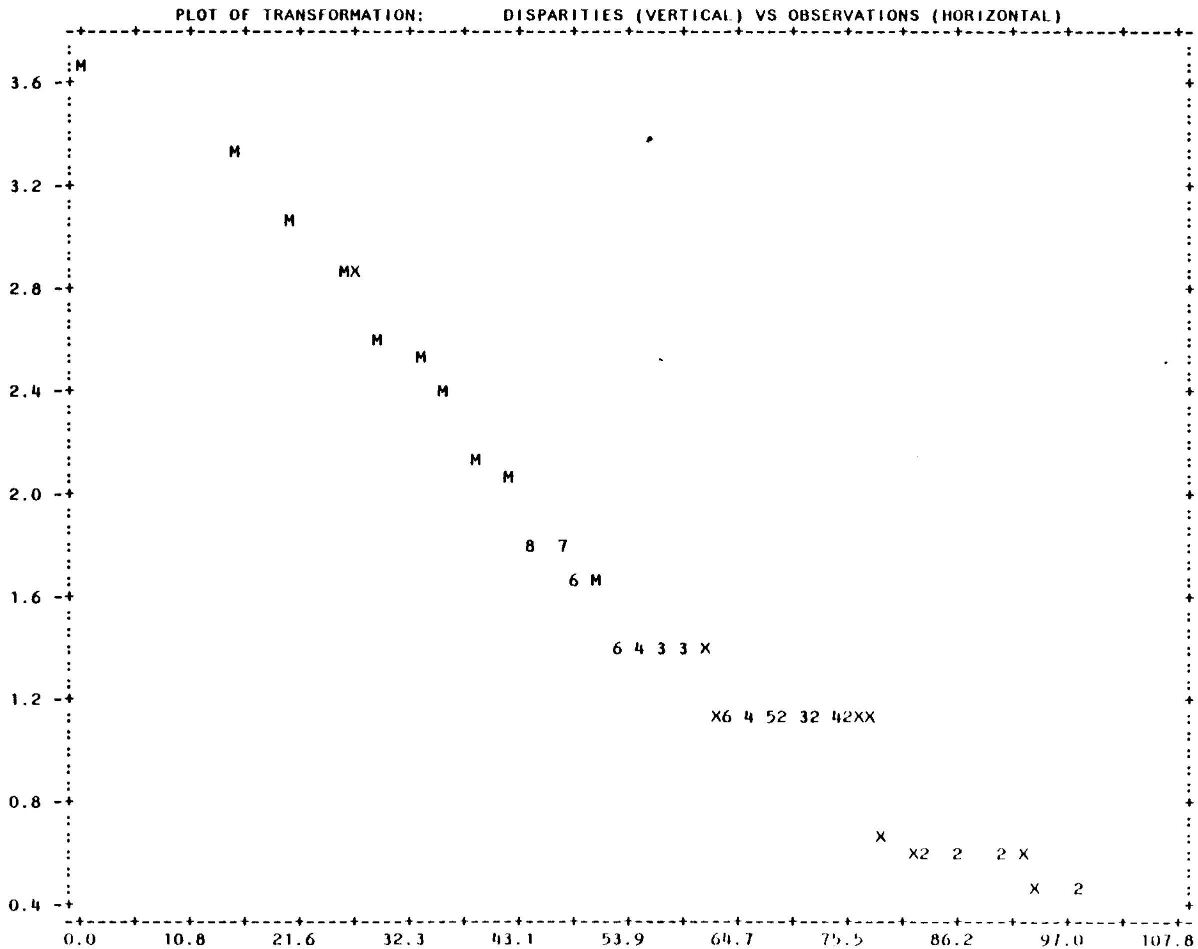


Table 14: Five-Dimensional MDS Solution Coordinates for Group A

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4	5
1	Q6	1	0.9977	0.0982	0.7800	-0.5361	1.5924
2	Q10	2	-1.5284	-1.4613	0.6740	0.5483	-0.0697
3	Q11	3	-0.8809	-1.3625	-1.5652	0.5768	0.7399
4	Q14	4	-1.0265	-1.2946	-1.2446	1.2084	0.0775
5	Q26	5	-1.6830	-0.6420	1.8664	0.0949	-0.5110
6	Q27	6	-1.8328	-0.8078	1.5604	0.3120	-0.5730
7	Q29	7	0.7061	-0.6372	-0.6587	1.1697	0.2389
8	Q32	8	0.8207	-0.7903	-0.2808	-0.9343	0.7830
9	Q35	9	1.2760	-0.3409	0.3142	-1.1695	0.9285
10	Q40	A	1.3440	-0.2825	0.0574	-1.3623	-0.9459
11	Q43	B	1.5370	-0.2706	0.1471	-1.1038	-0.9198
12	Q47	C	1.2746	-0.4875	-0.1617	-1.1432	-1.3537
13	Q50	D	-1.6677	1.5609	-0.7810	-0.5943	-0.0849
14	Q53	E	-1.6116	1.6831	-0.6815	-0.6855	-0.1778
15	Q56	F	-1.4314	1.6953	-0.8058	-0.6891	0.0827
16	Q58	G	-1.6777	1.3825	-1.0772	-0.6591	0.0789
17	Q59	H	-0.7368	1.9189	-0.4649	-0.8037	-0.2181
18	Q64	I	1.0128	1.3175	0.5386	1.5385	-0.1872
19	Q65	J	0.7863	1.3103	0.3237	1.8036	-0.5551
20	Q70	K	1.2662	0.7949	0.8619	0.9406	0.7006
21	Q73	L	1.1239	1.1005	0.5858	1.1092	0.4876
22	Q74	M	0.8874	-1.0214	-0.9381	0.0922	-1.2011
23	Q78	N	-0.4178	-1.1953	-1.3121	0.3570	1.1073
24	Q86	O	0.9509	0.2132	0.8123	-0.6887	1.4681
25	Q87	P	1.4029	0.3935	0.8259	-0.4150	0.9828
26	Q89	Q	-1.5951	-0.6723	1.8790	-0.0634	-0.6554
27	Q95	R	-1.5897	-0.7561	0.8836	0.2413	0.1837
28	Q107	S	0.8941	0.6137	-0.2943	1.4840	-1.0529
29	Q109	T	1.1914	-0.5438	-0.5769	-0.7284	-1.2340
30	Q111	U	0.2078	-1.5165	-1.2676	0.1000	0.2876

Figure 32: Five-Dimensional MDS Solution for Group A; DIM 1 x DIM 2

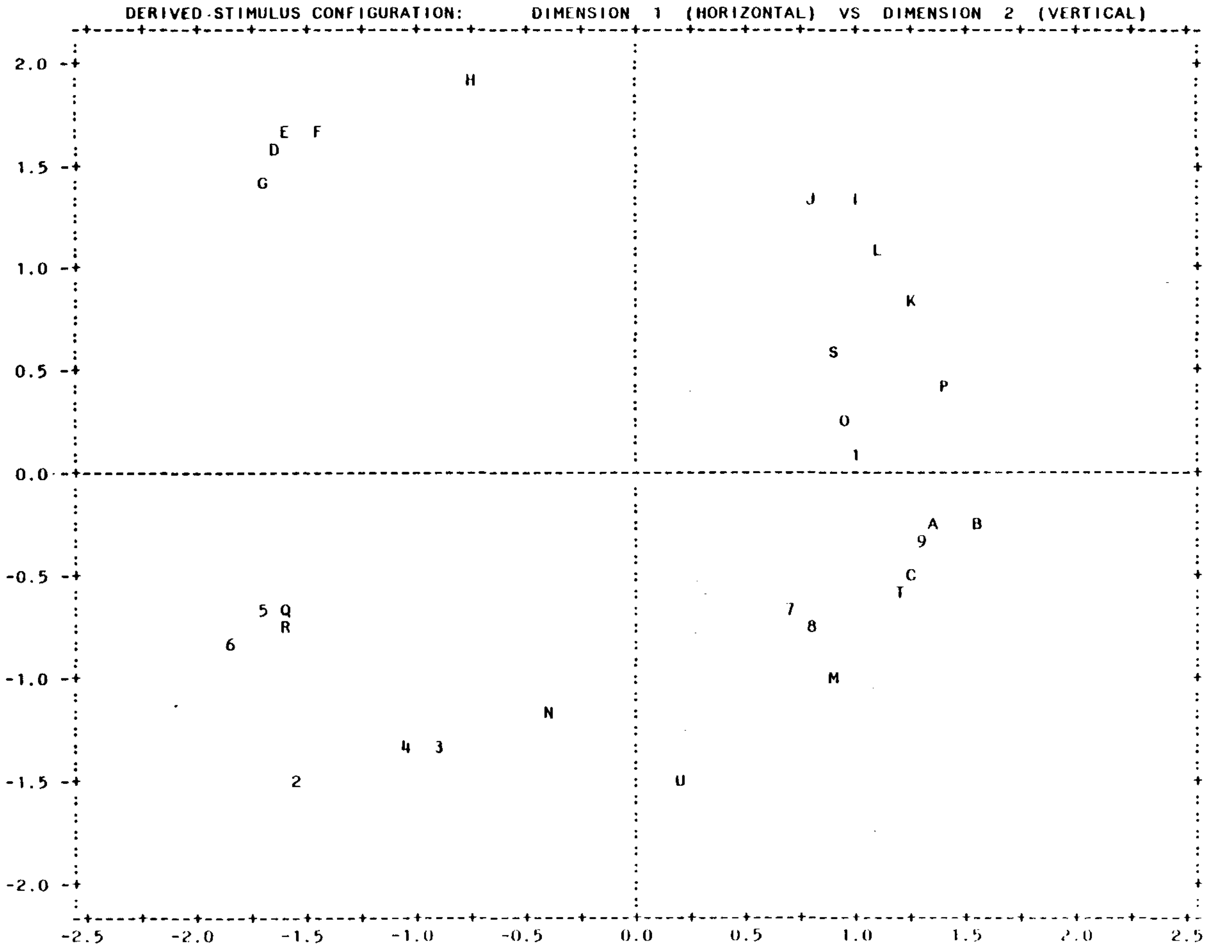


Figure 33: Five-Dimensional MDS Solution for Group A; DIM 1 x DIM 3

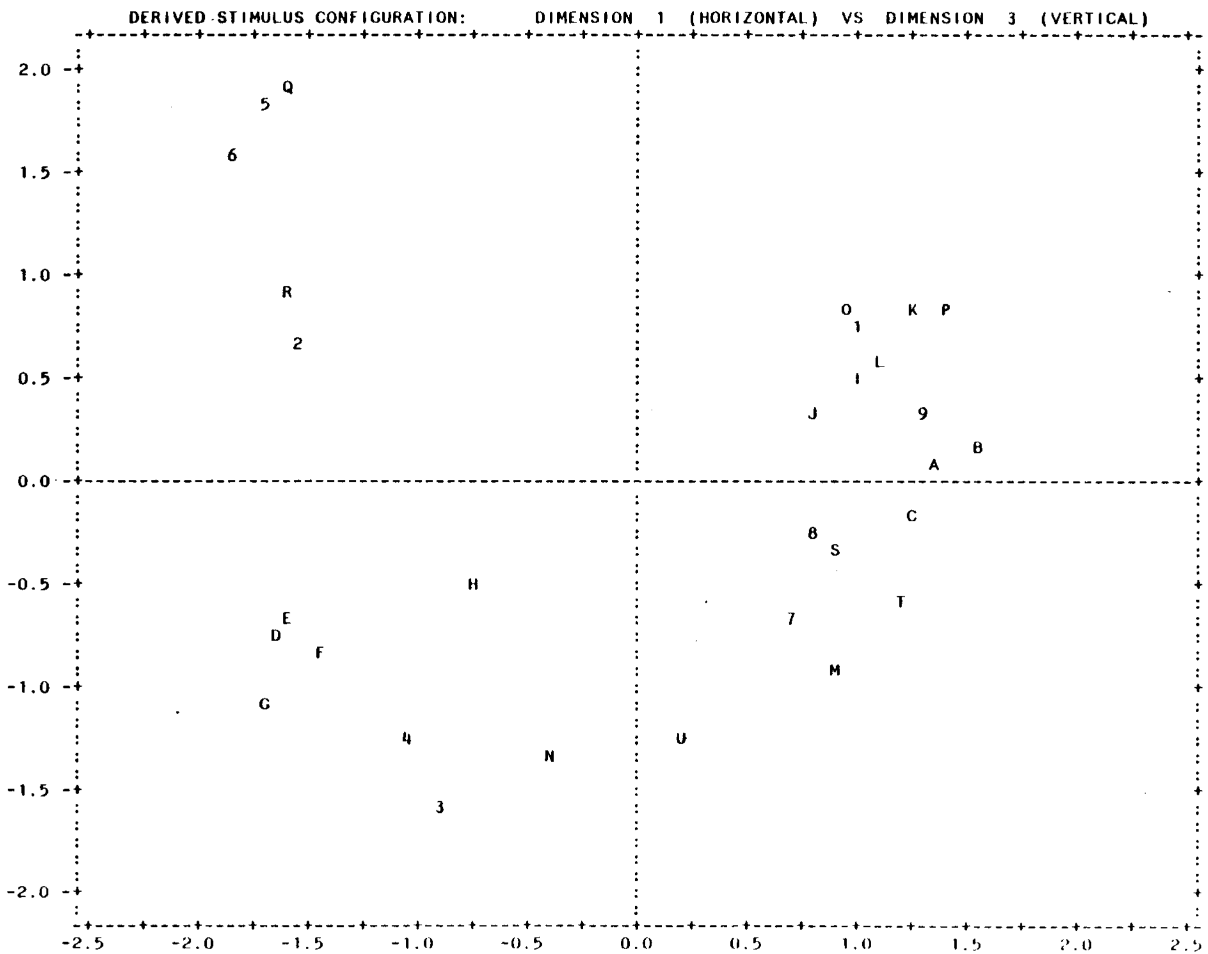


Figure 34: Five-Dimensional MDS Solution for Group A; DIM 2 x DIM 3

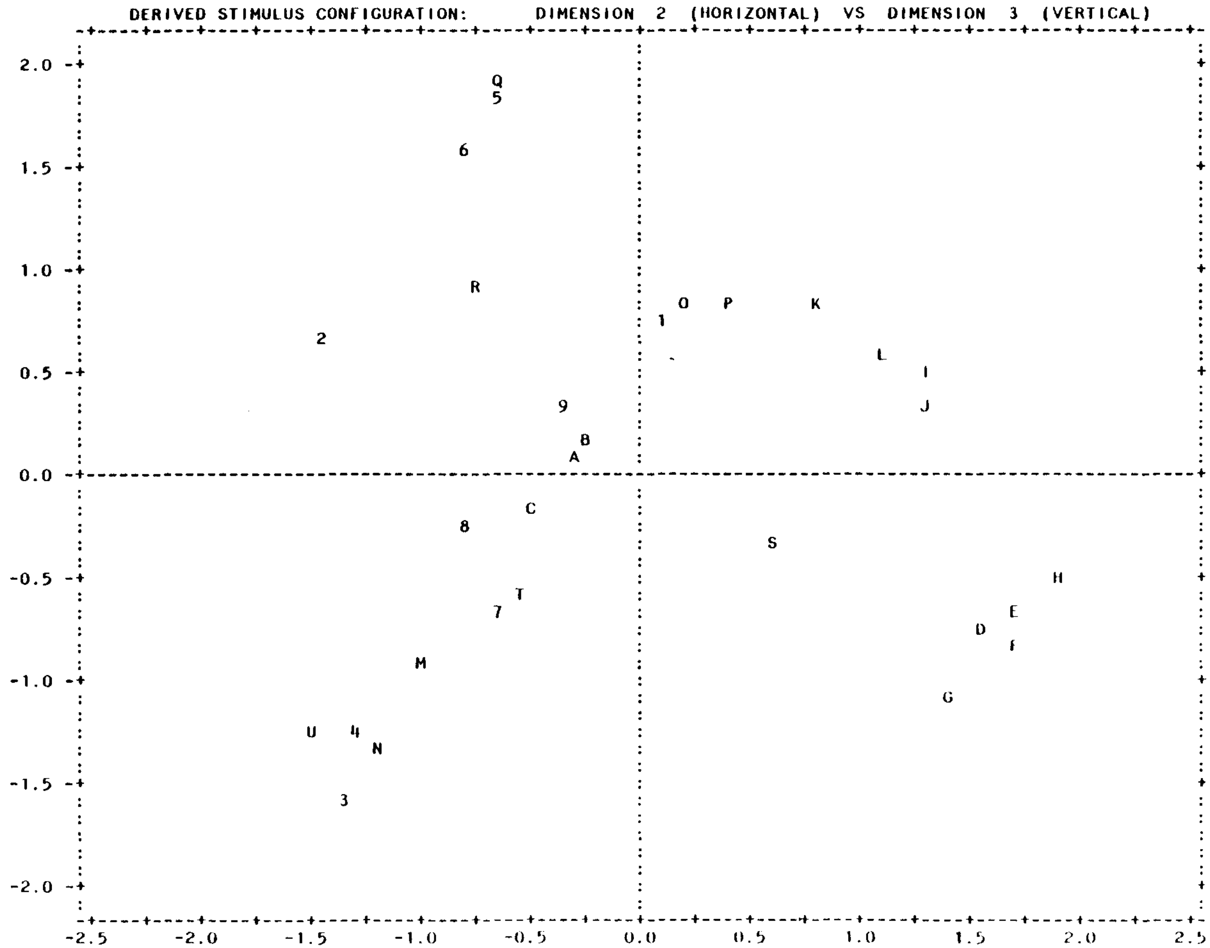


Figure 35: Five-Dimensional MDS Solution for Group A; DIM 1 x DIM 4

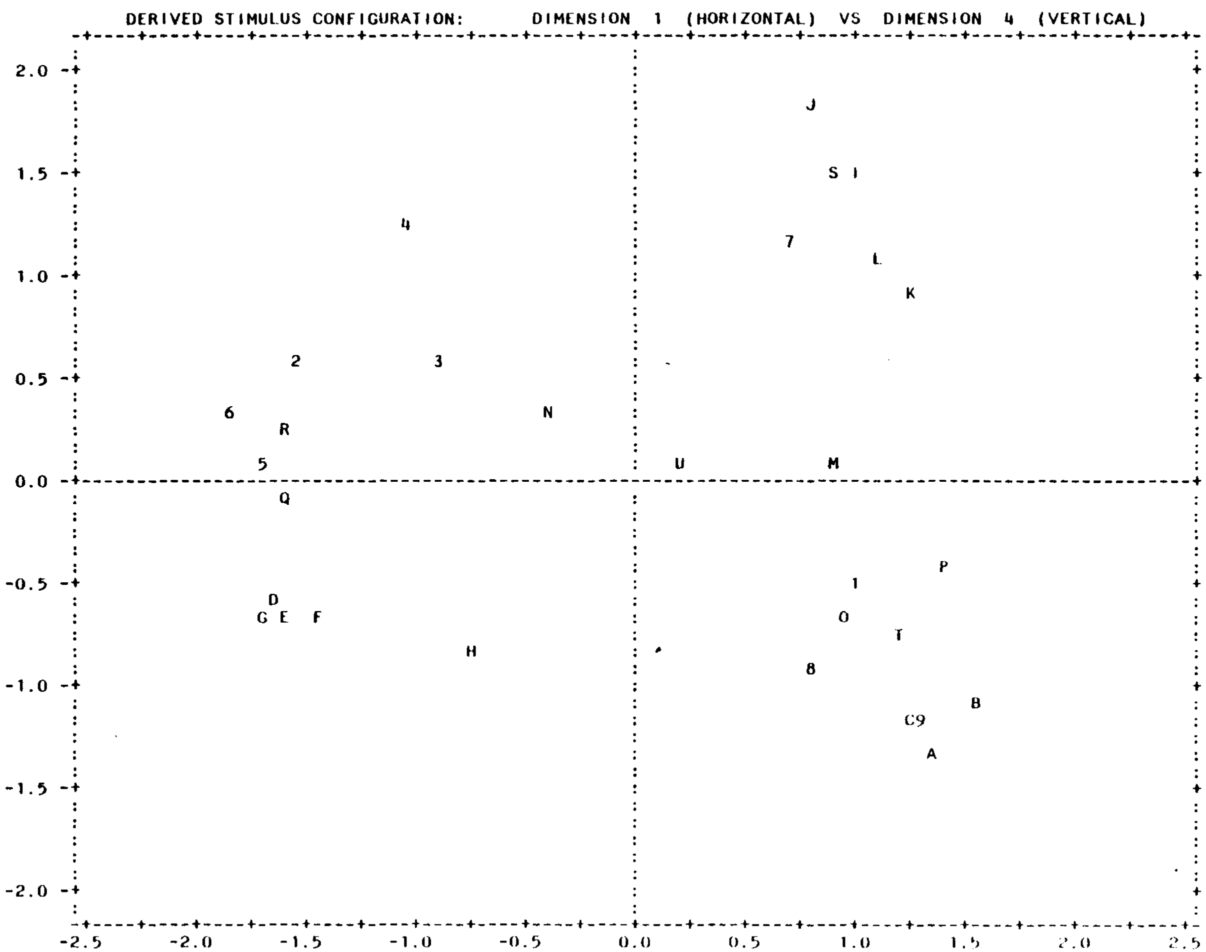


Figure 36: Five-Dimensional MDS Solution for Group A; DIM 2 x DIM 4

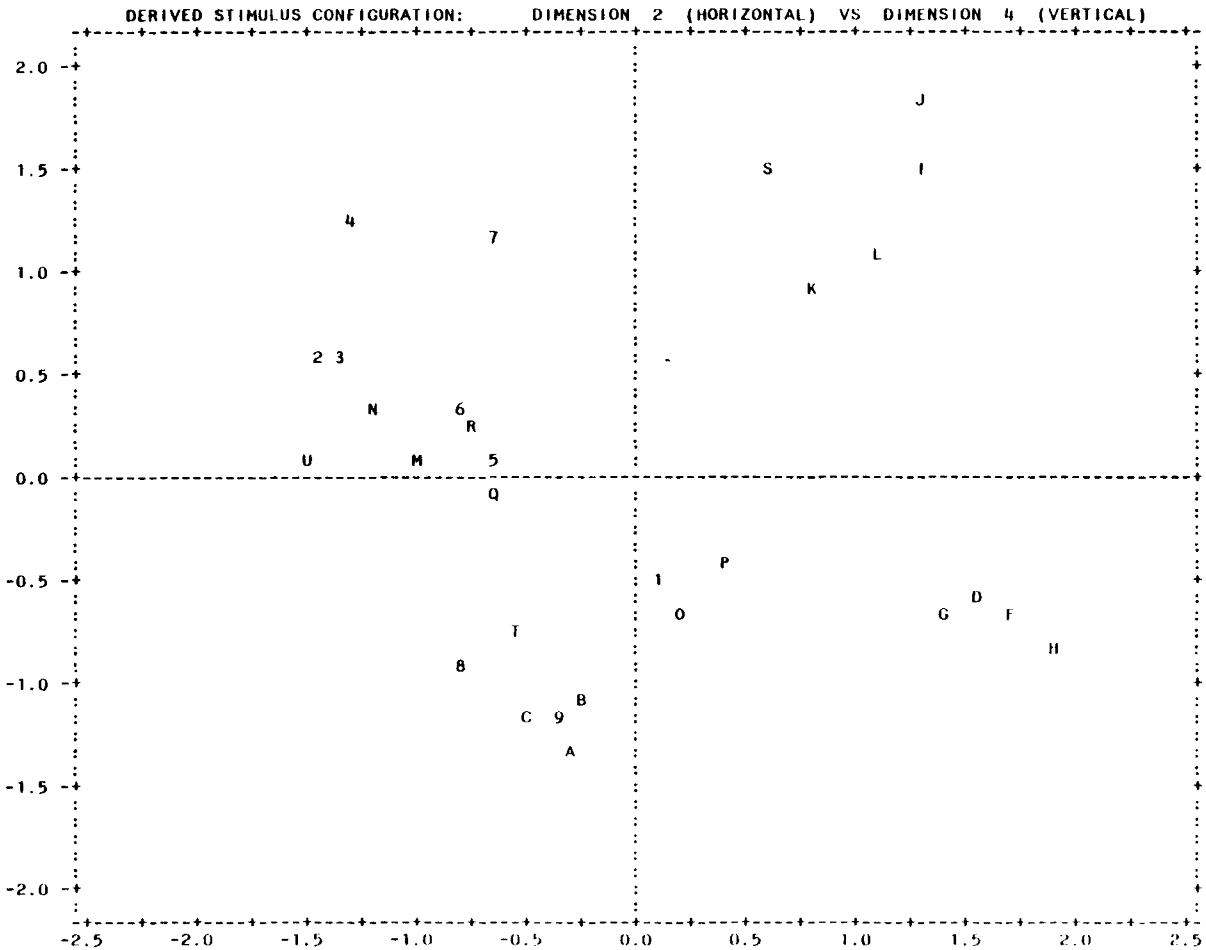


Figure 37: Five-Dimensional MDS Solution for Group A; DIM 3 x DIM 4

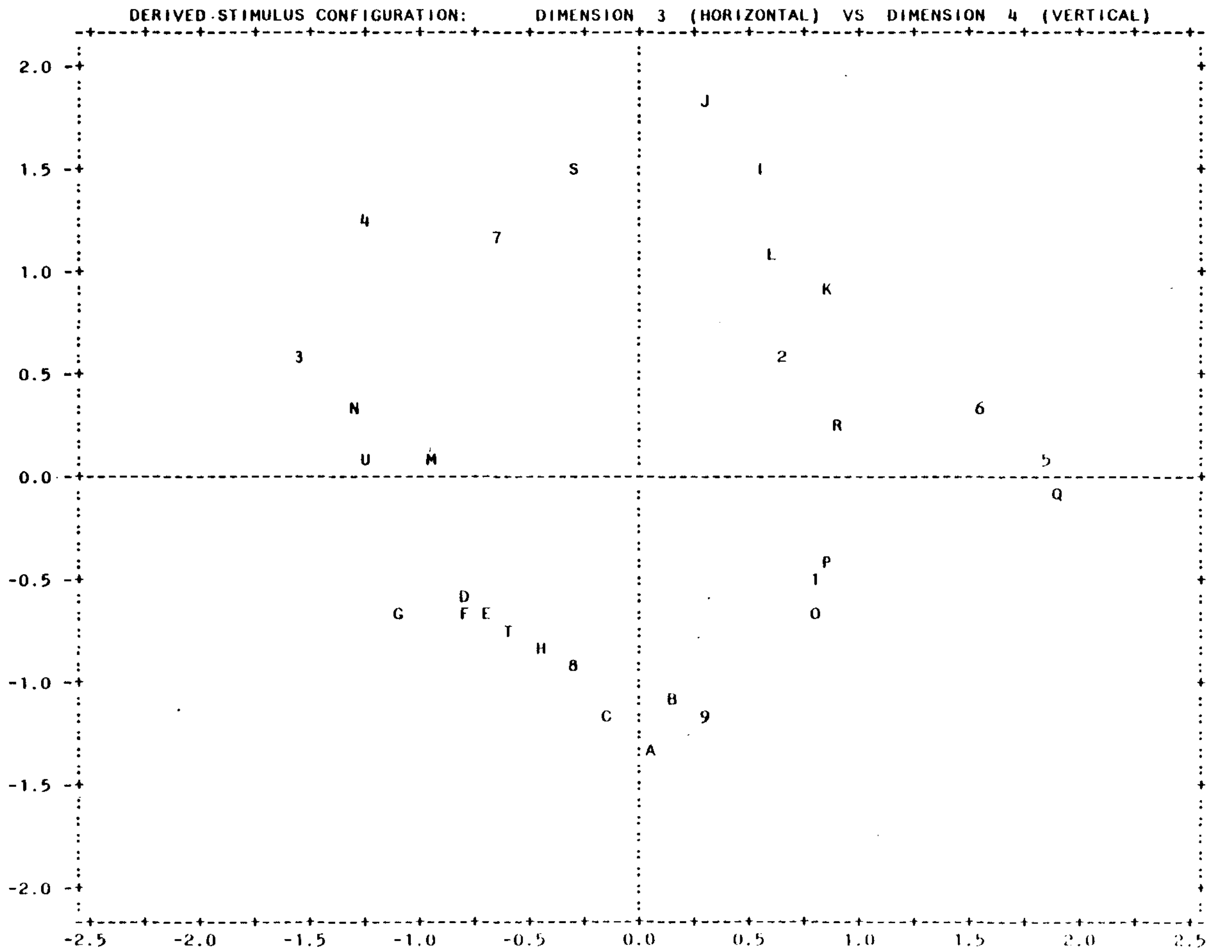


Figure 38: Five-Dimensional MDS Solution for Group A; DIM 1 x DIM 5

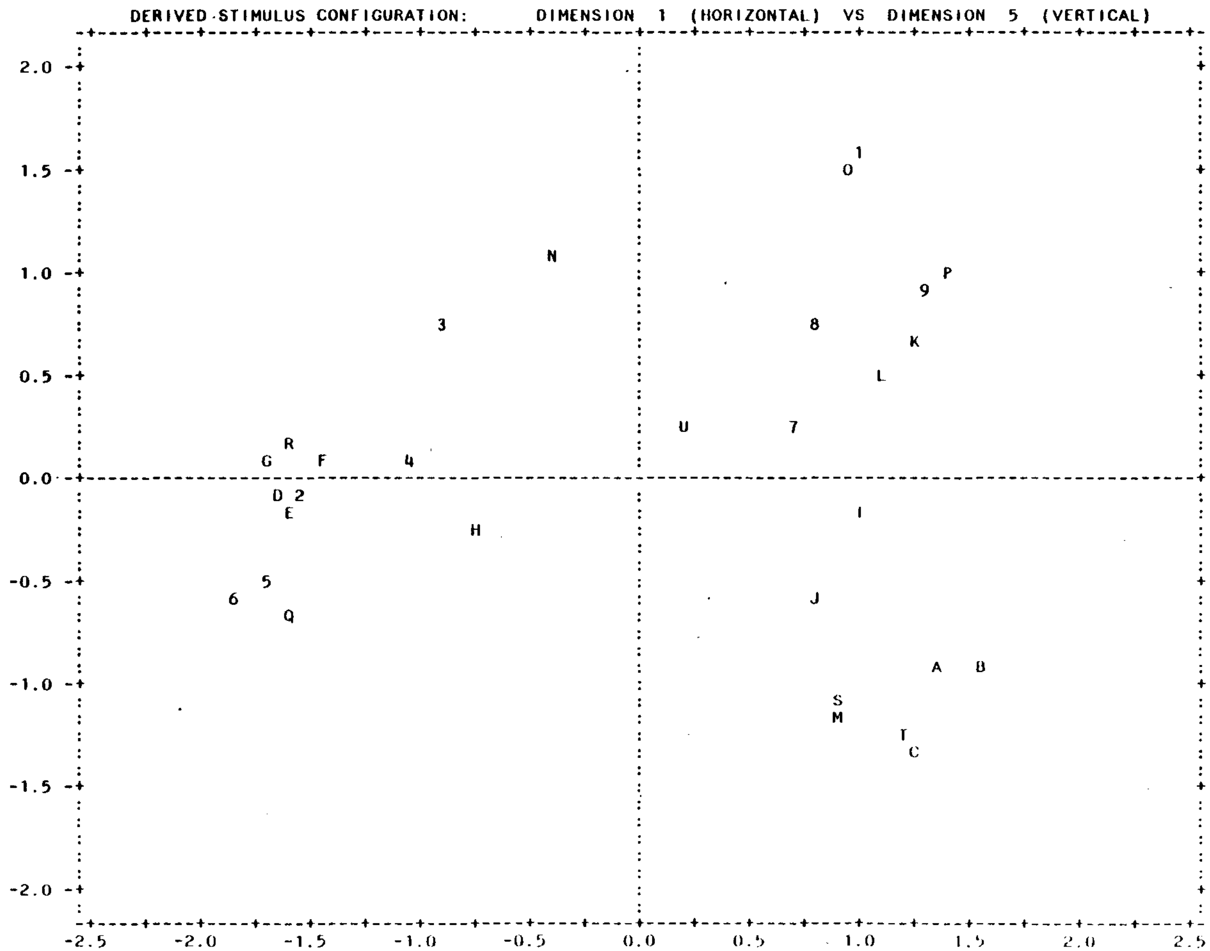


Figure 39: Five-Dimensional MDS Solution for Group A; DIM 2 x DIM 5

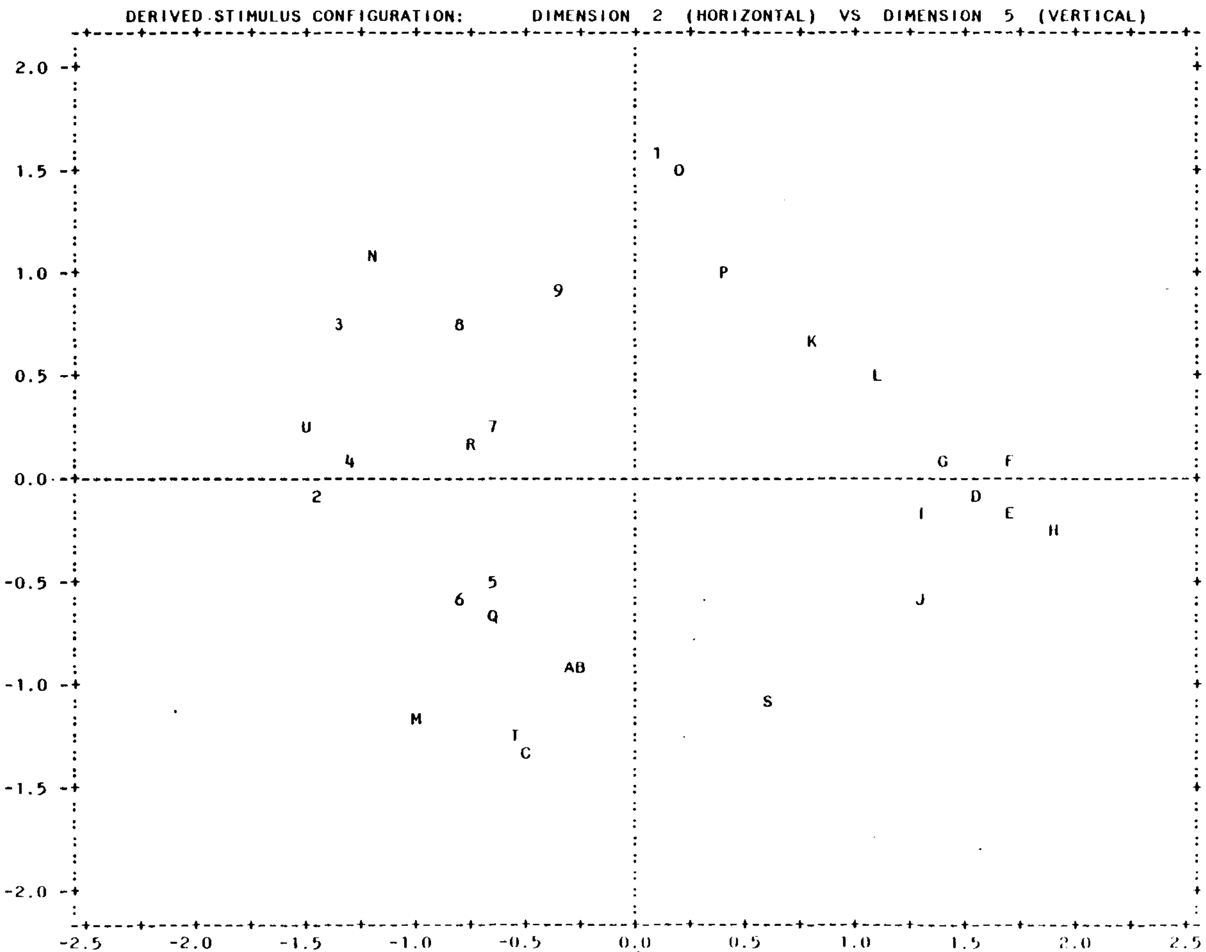


Figure 40: Five-Dimensional MDS Solution for Group A; DIM 3 x DIM 5

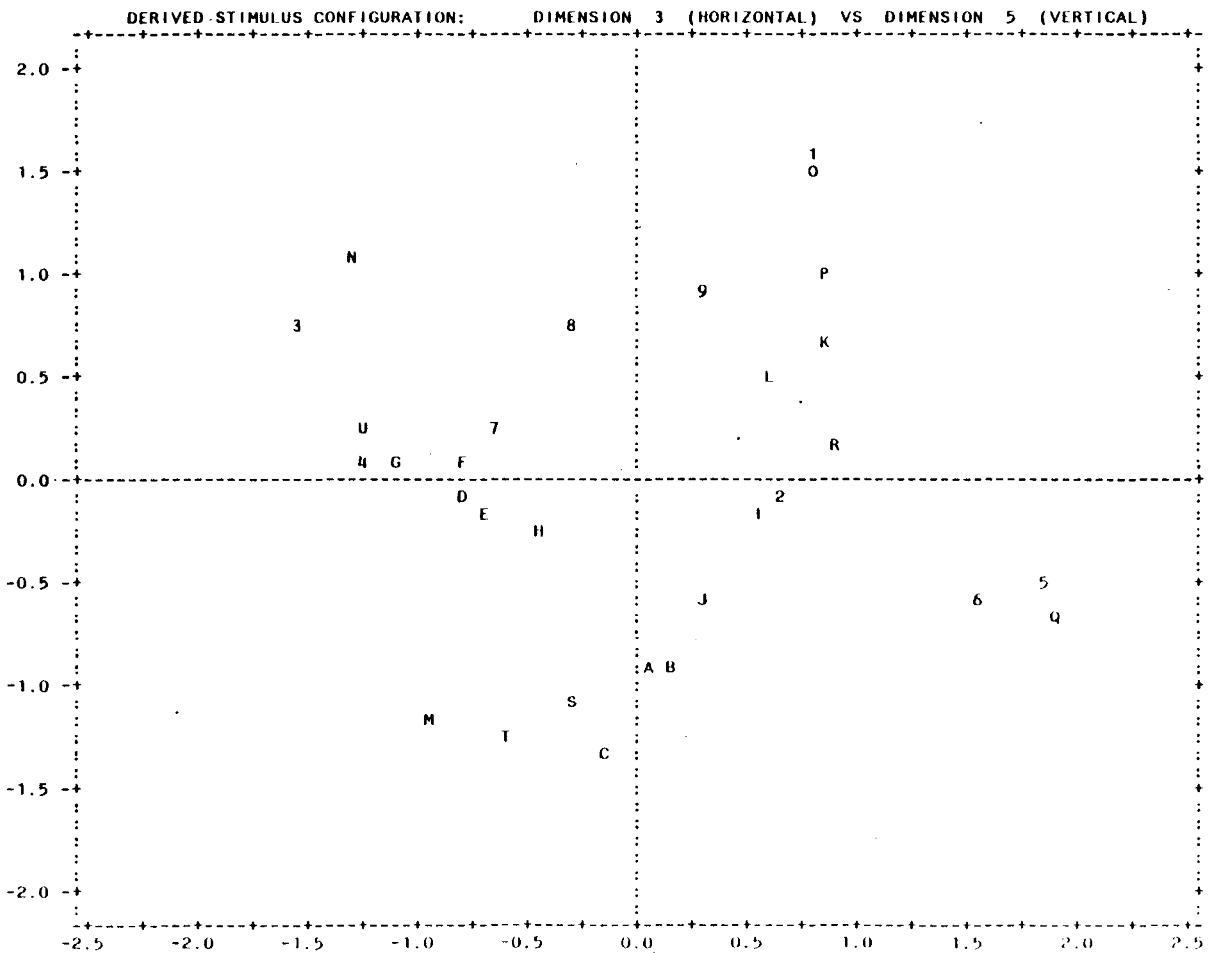


Figure 41: Five-Dimensional MDS Solution for Group A; DIM 4 x DIM 5

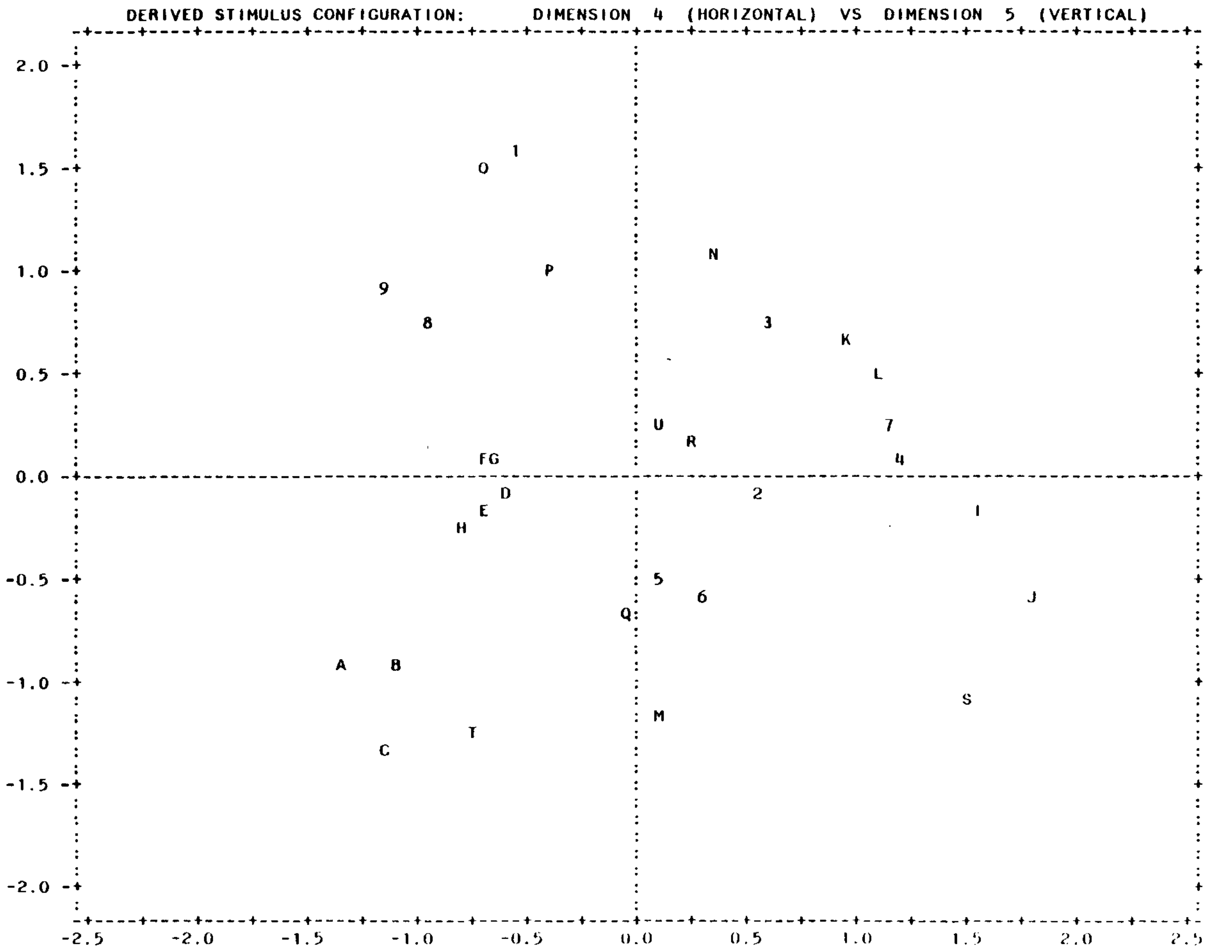


Figure 42: Five-Dimensional MDS Solution for Group A; Linear Fit Plot

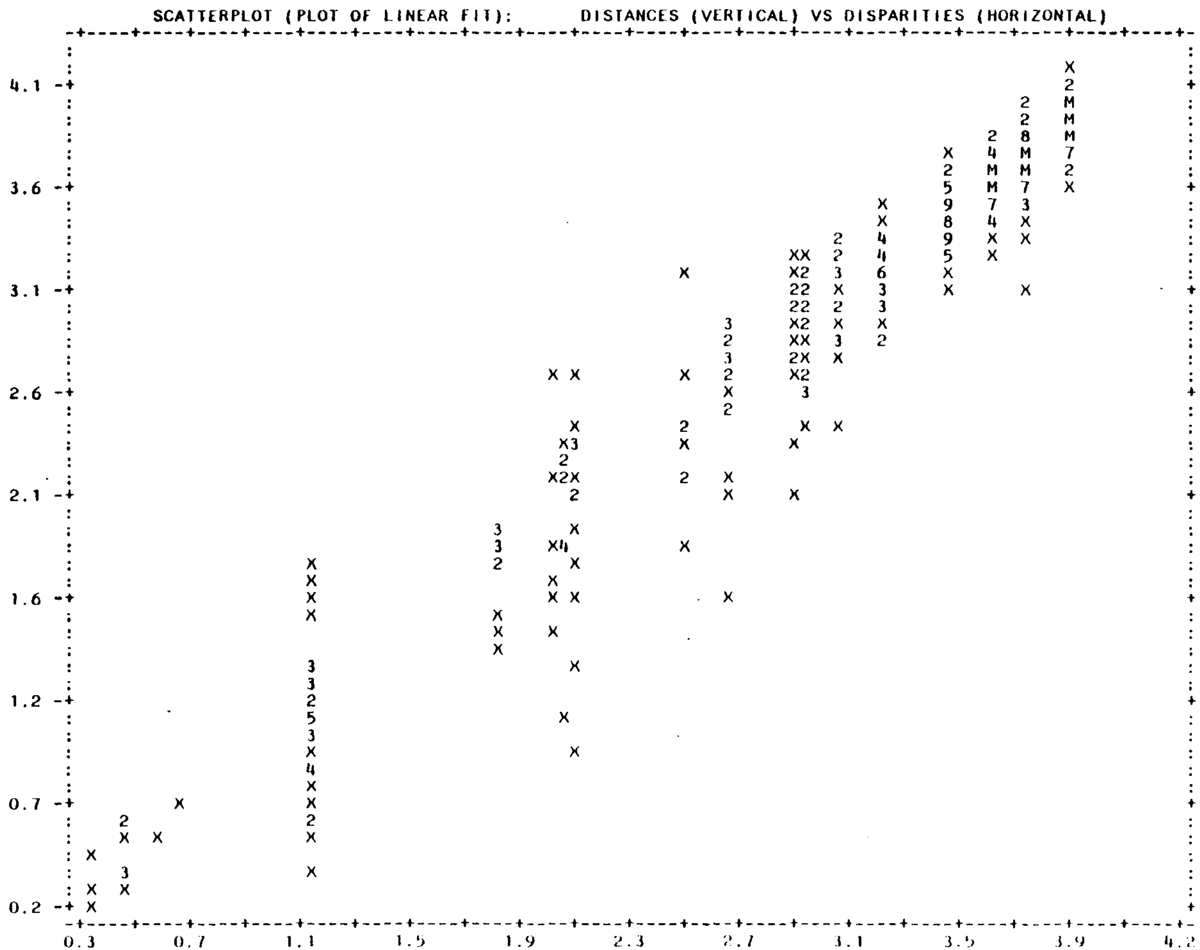


Figure 43: Five-Dimensional MDS Solution for Group A; Nonlinear Fit Plot

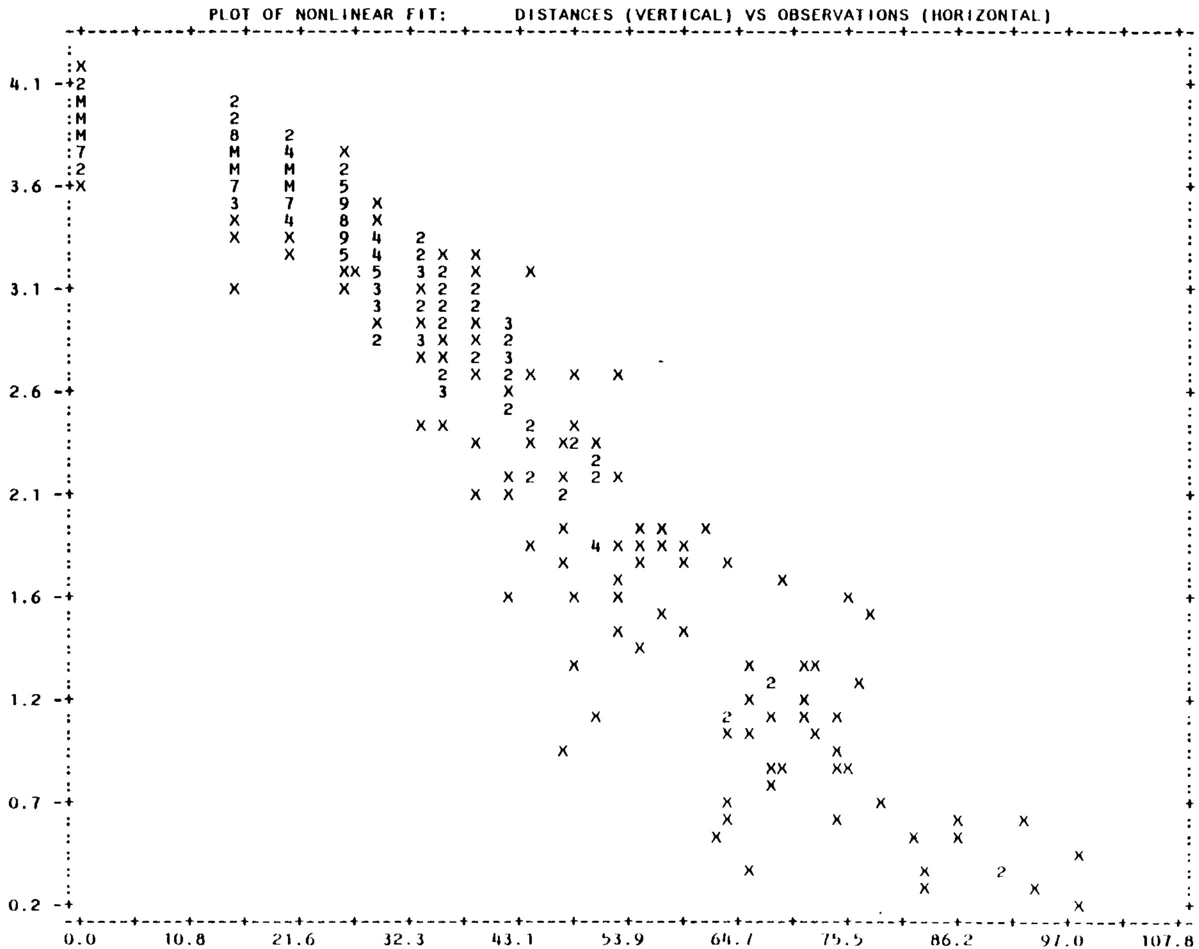


Figure 44: Five-Dimensional MDS Solution for Group A; Transformation Plot

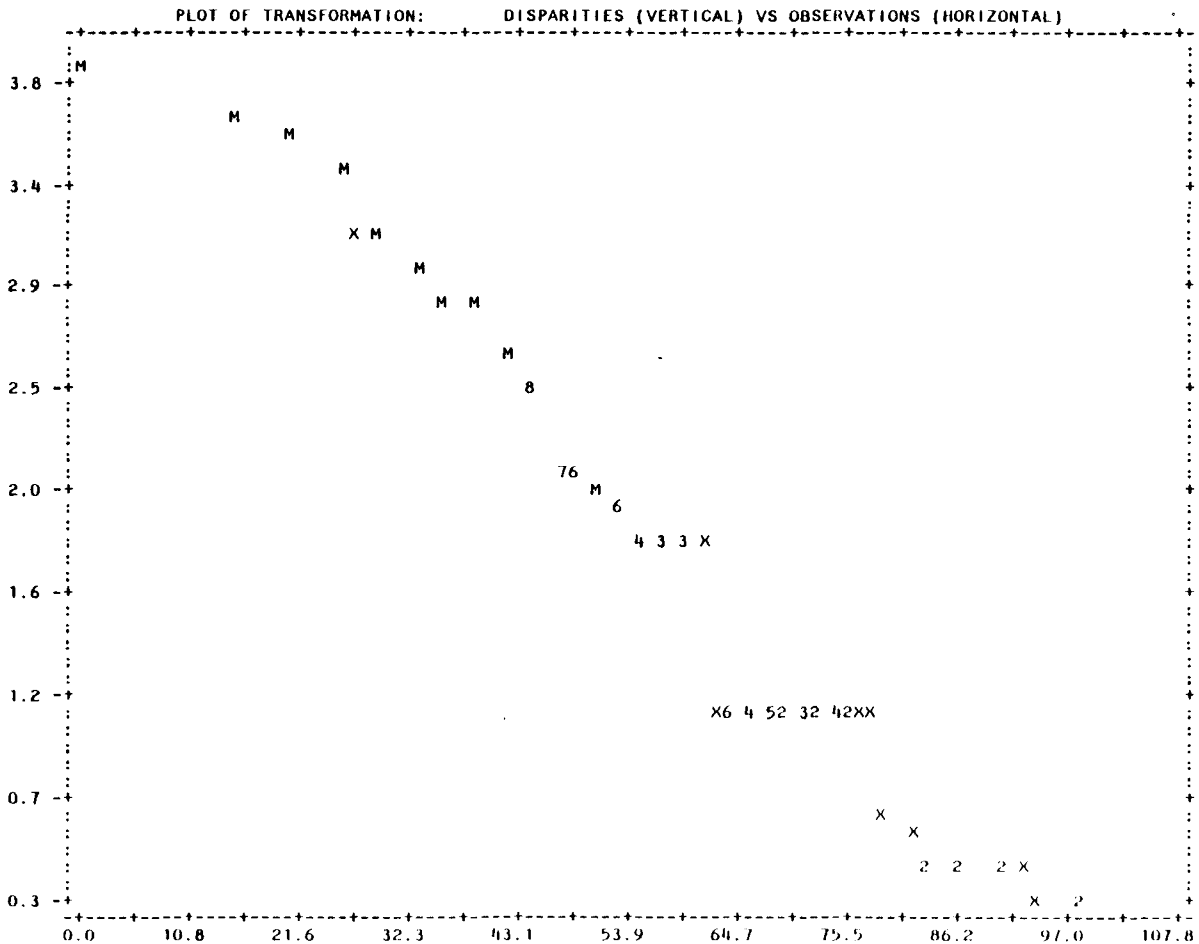


Table 15: Six-Dimensional MDS Solution Coordinates for Group A

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4	5	6
1	Q6	1	1.0651	0.1173	0.7683	-0.5821	1.8235	0.1735
2	Q10	2	-1.6487	-1.5376	0.8333	0.5689	-0.1042	0.1495
3	Q11	3	-0.8883	-1.4243	-1.5067	0.4695	0.5072	-1.2585
4	Q14	4	-0.9901	-1.3374	-1.4556	1.2979	0.2535	0.4266
5	Q26	5	-1.7640	-0.7332	1.9808	0.1217	-0.5181	0.2559
6	Q27	6	-1.8980	-0.8933	1.6830	0.3406	-0.5360	0.3979
7	Q29	7	0.7407	-0.6759	-0.8345	1.3285	0.4119	0.2341
8	Q32	8	0.7953	-0.8854	-0.2391	-1.0080	0.5465	-1.0869
9	Q35	9	1.3277	-0.3075	0.3361	-1.1645	1.2522	0.4495
10	Q40	A	1.4340	-0.3708	0.0654	-1.5014	-1.0828	-0.1057
11	Q43	B	1.6139	-0.3328	0.1567	-1.2642	-1.0741	-0.1316
12	Q47	C	1.3517	-0.5763	-0.1595	-1.2702	-1.4704	-0.2384
13	Q50	D	-1.7524	1.6845	-0.8604	-0.6789	-0.1065	0.0379
14	Q53	E	-1.6875	1.8099	-0.7627	-0.7464	-0.1619	0.2302
15	Q56	F	-1.5190	1.8213	-0.8923	-0.7628	0.0678	0.0626
16	Q58	G	-1.7389	1.5392	-1.1461	-0.7501	0.0484	-0.0252
17	Q59	H	-0.8742	2.0400	-0.5600	-0.8979	-0.2031	0.0128
18	Q64	I	1.0501	1.3533	0.6326	1.5934	-0.2969	-0.7137
19	Q65	J	0.8385	1.3393	0.4401	1.8124	-0.7134	-0.7341
20	Q70	K	1.3200	0.8710	0.9474	0.9960	0.6167	-0.7159
21	Q73	L	1.1890	1.1831	0.6718	1.2171	0.3891	-0.5654
22	Q74	M	0.9458	-0.9591	-1.0310	0.1871	-1.0824	1.0867
23	Q78	N	-0.4637	-1.2982	-1.3121	0.2932	0.8517	-1.2051
24	Q86	O	1.0337	0.2112	0.8069	-0.7119	1.7104	0.1202
25	Q87	P	1.4352	0.4312	0.7554	-0.3509	1.2400	0.7461
26	Q89	Q	-1.6835	-0.7694	1.9969	-0.0237	-0.6524	0.2476
27	Q95	R	-1.6955	-0.8882	1.0307	0.2984	0.1609	0.2137
28	Q107	S	0.9500	0.6873	-0.3234	1.6659	-1.0472	0.5119
29	Q109	T	1.3080	-0.5848	-0.6043	-0.7630	-1.2577	0.7028
30	Q111	U	0.2051	-1.5145	-1.4176	0.2854	0.4273	0.7207

Figure 45: Six-Dimensional MDS Solution for Group A; DIM 1 x DIM 2

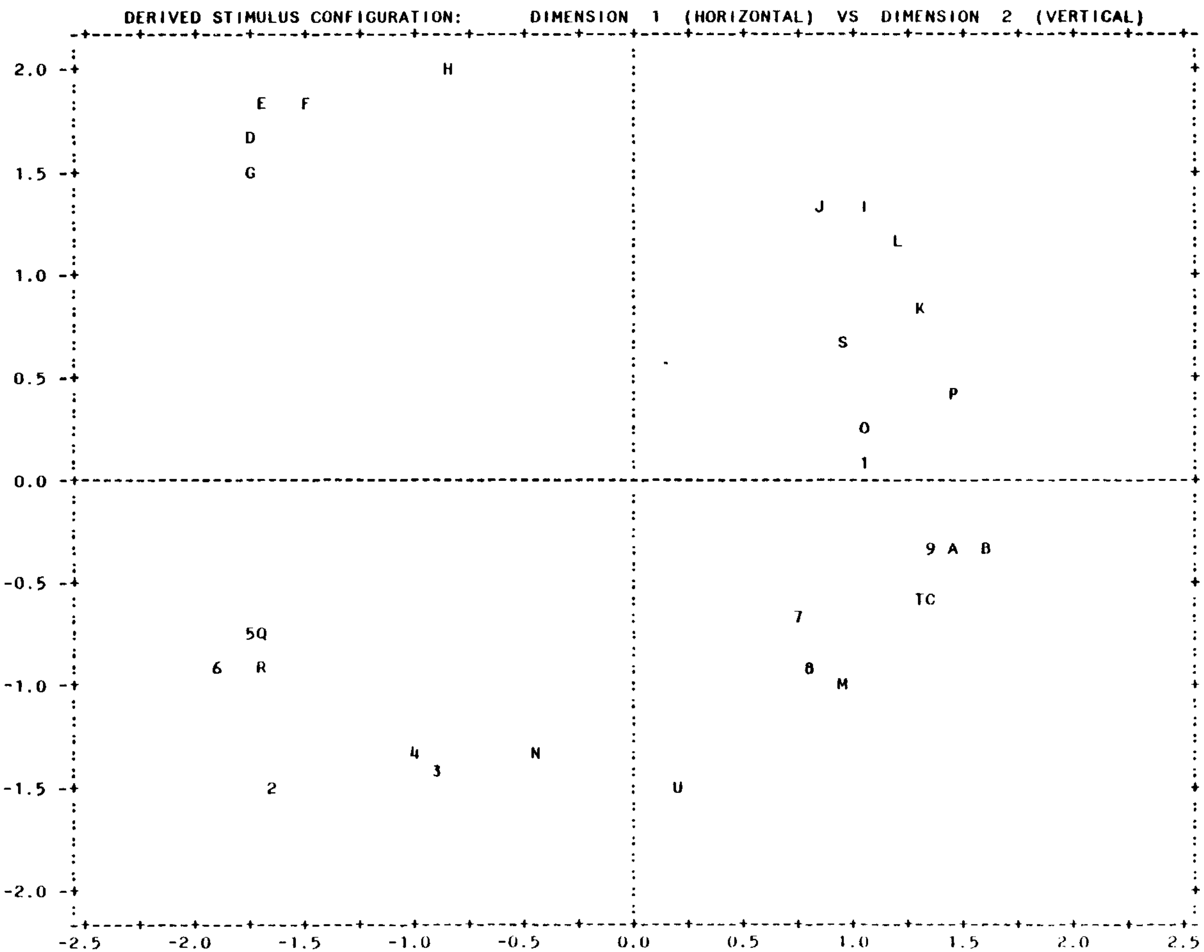


Figure 46: Six-Dimensional MDS Solution for Group A; DIM 1 x DIM 3

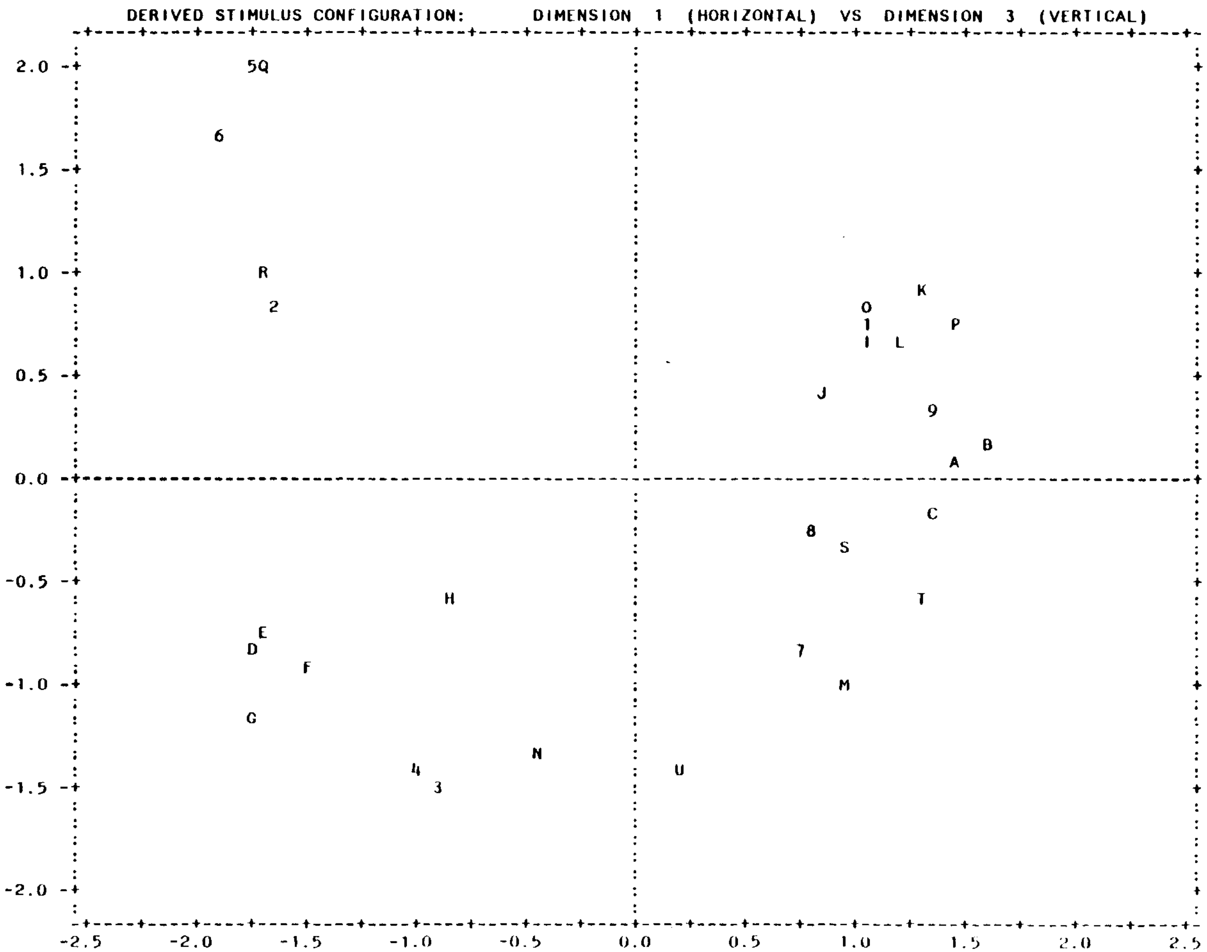


Figure 47: Six-Dimensional MDS Solution for Group A; DIM 2 x DIM 3

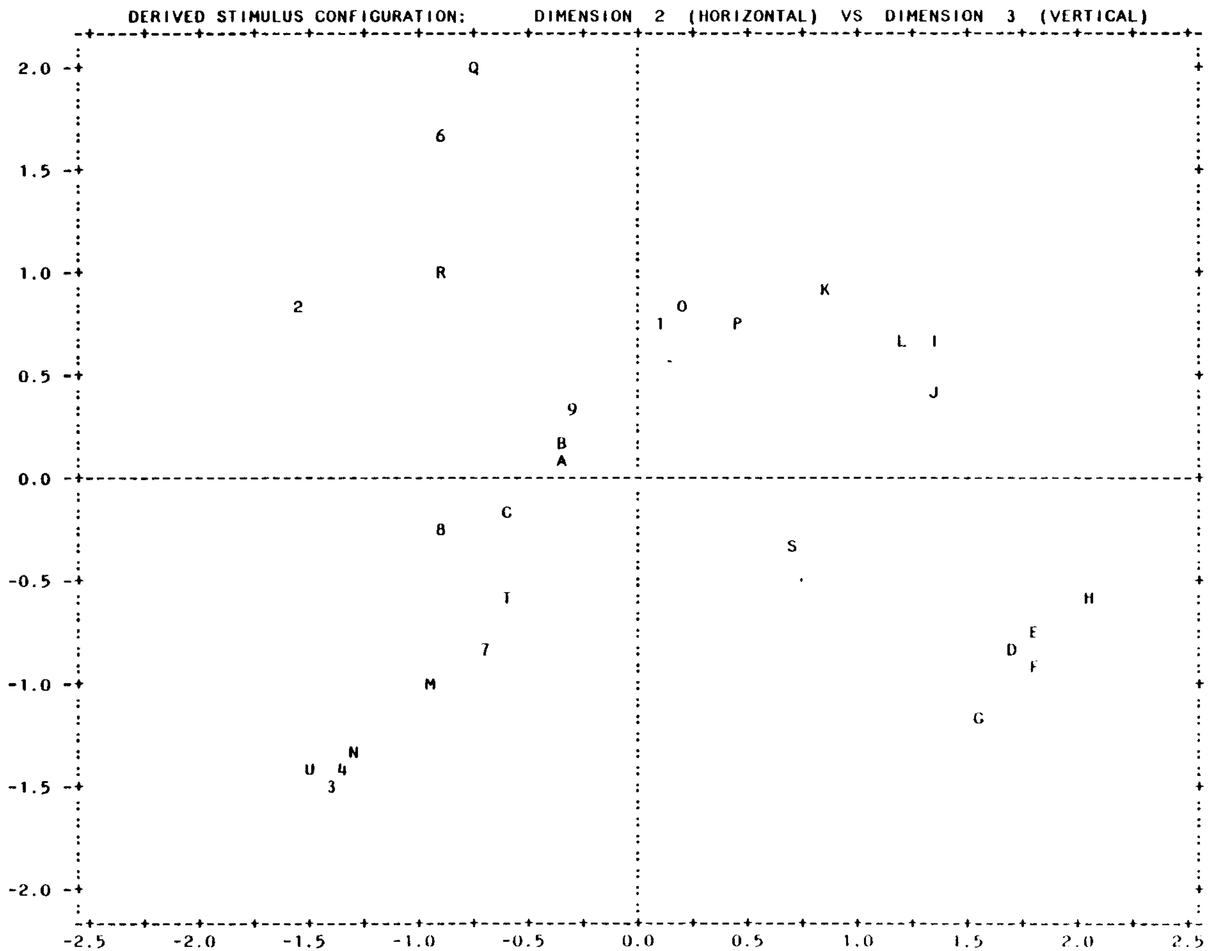


Figure 48: Six-Dimensional MDS Solution for Group A; DIM 1 x DIM 4

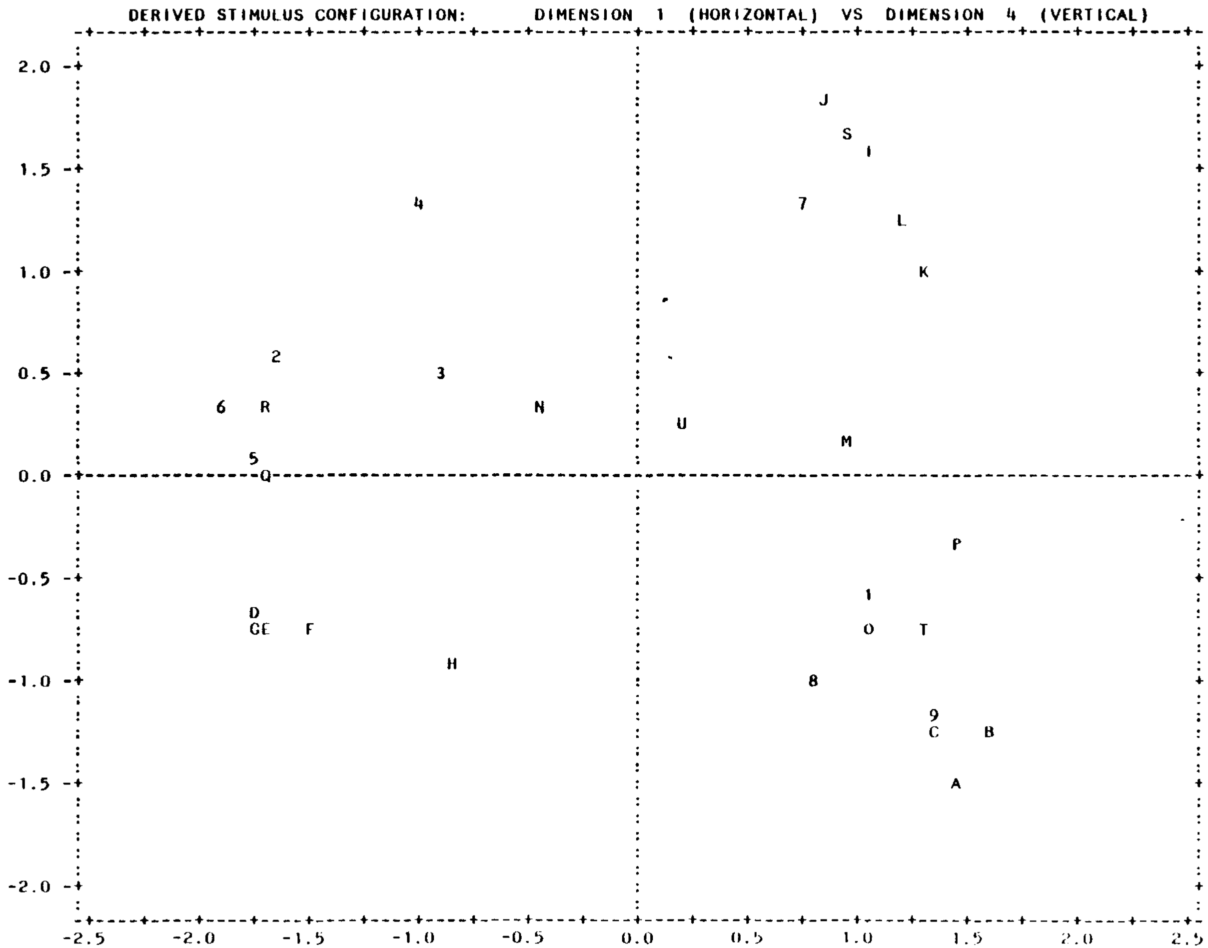


Figure 49: Six-Dimensional MDS Solution for Group A; DIM 2 x DIM 4

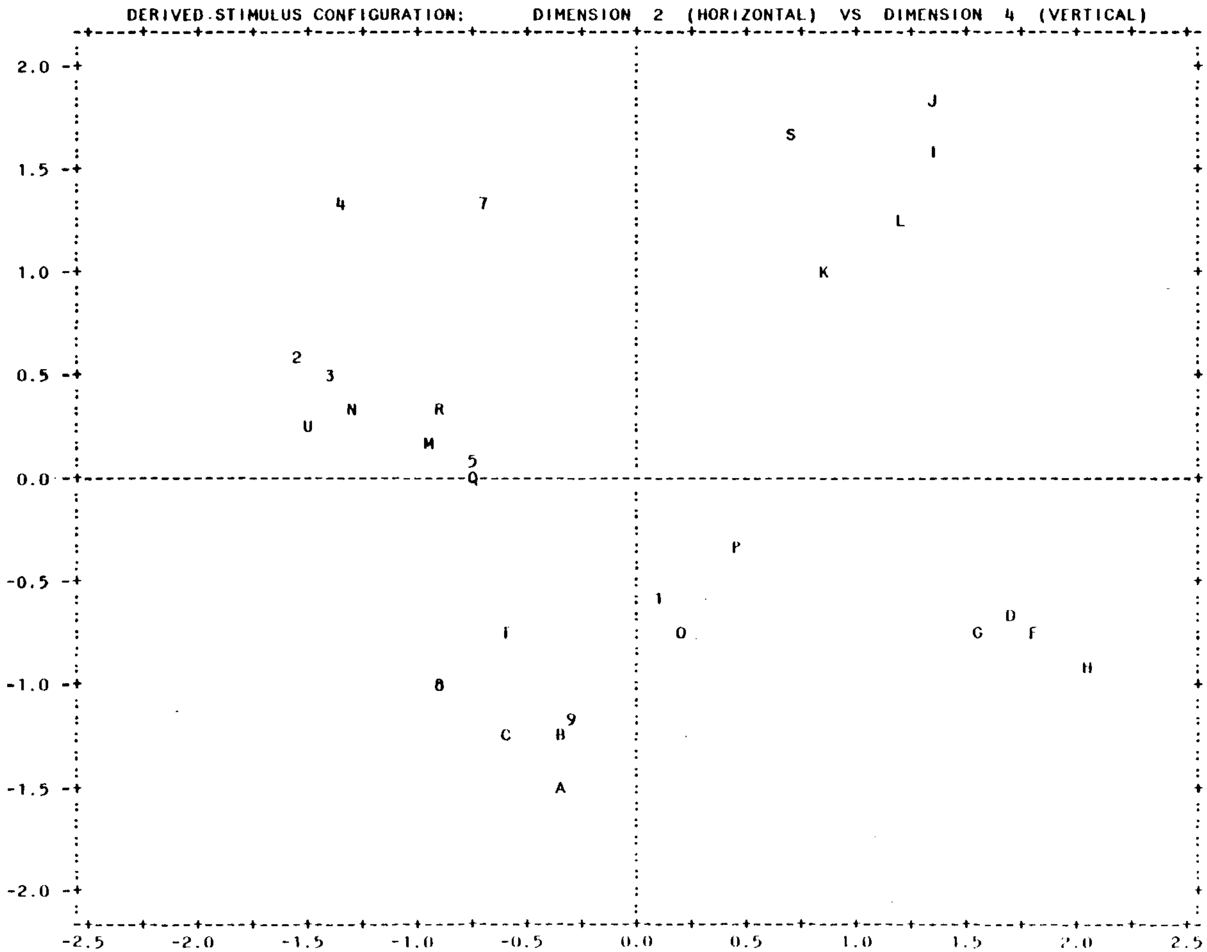


Figure 50: Six-Dimensional MDS Solution for Group A; DIM 3 x DIM 4

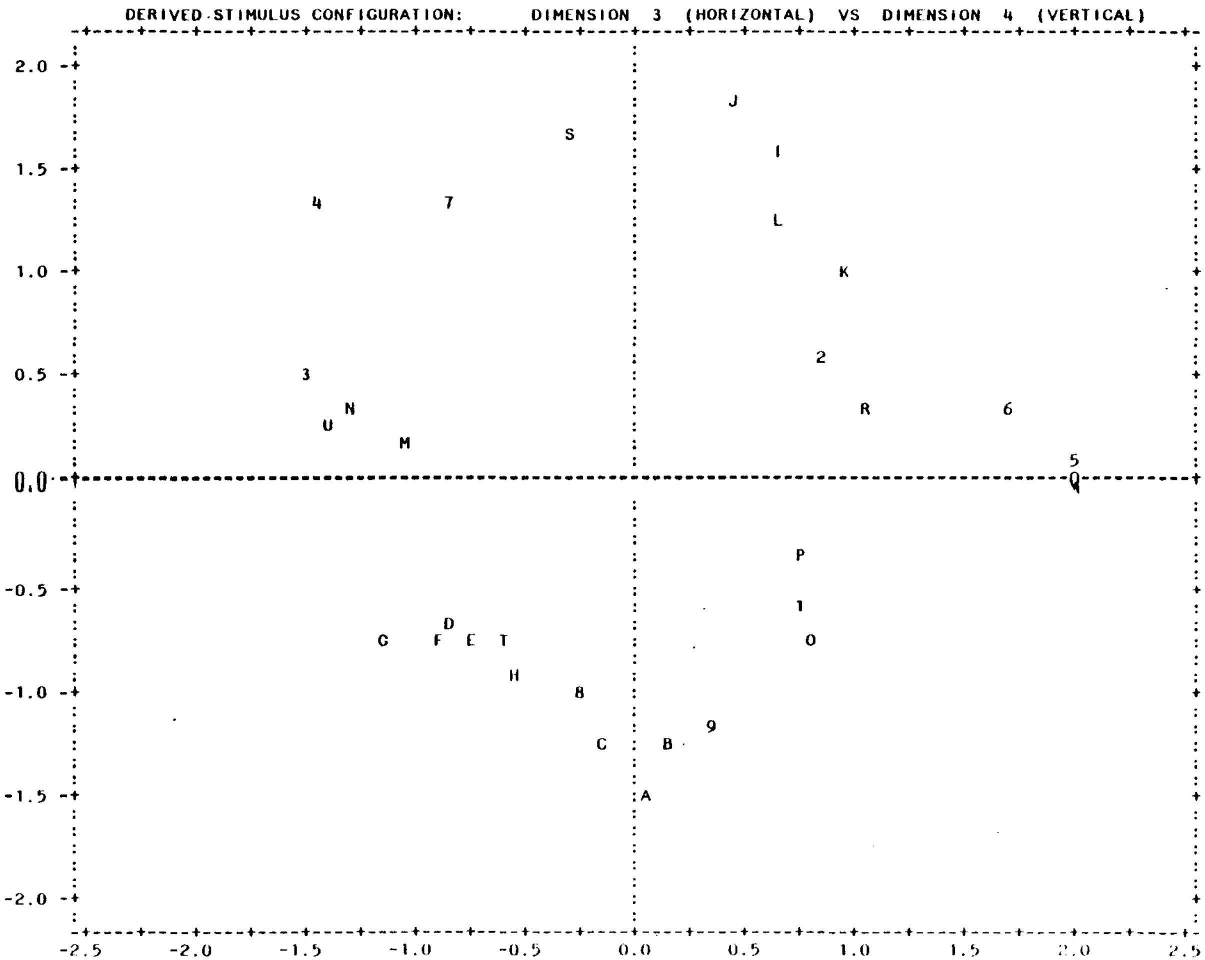


Figure 51: Six-Dimensional MDS Solution for Group A; DIM 1 x DIM 5

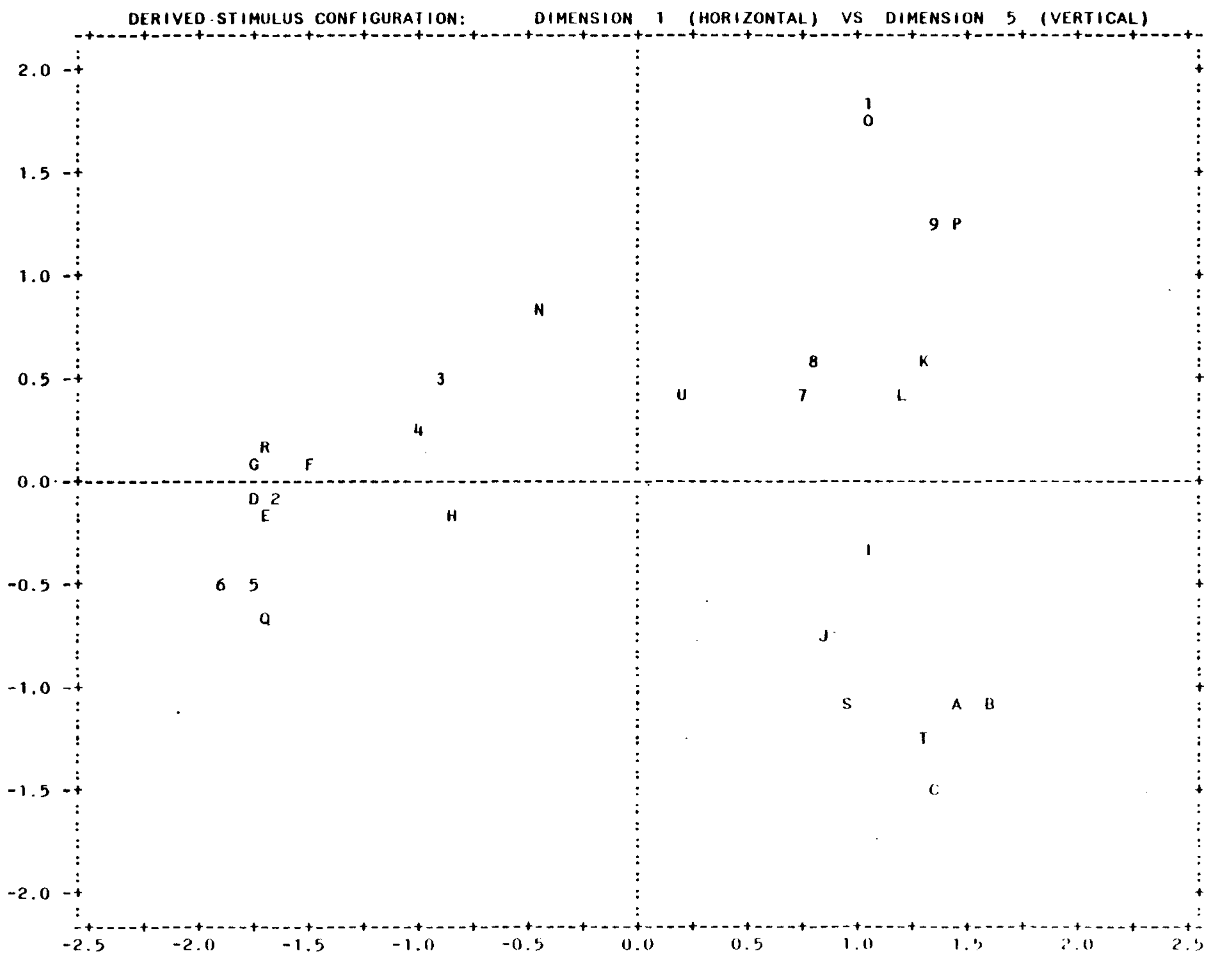


Figure 52: Six-Dimensional MDS Solution for Group A; DIM 2 x DIM 5

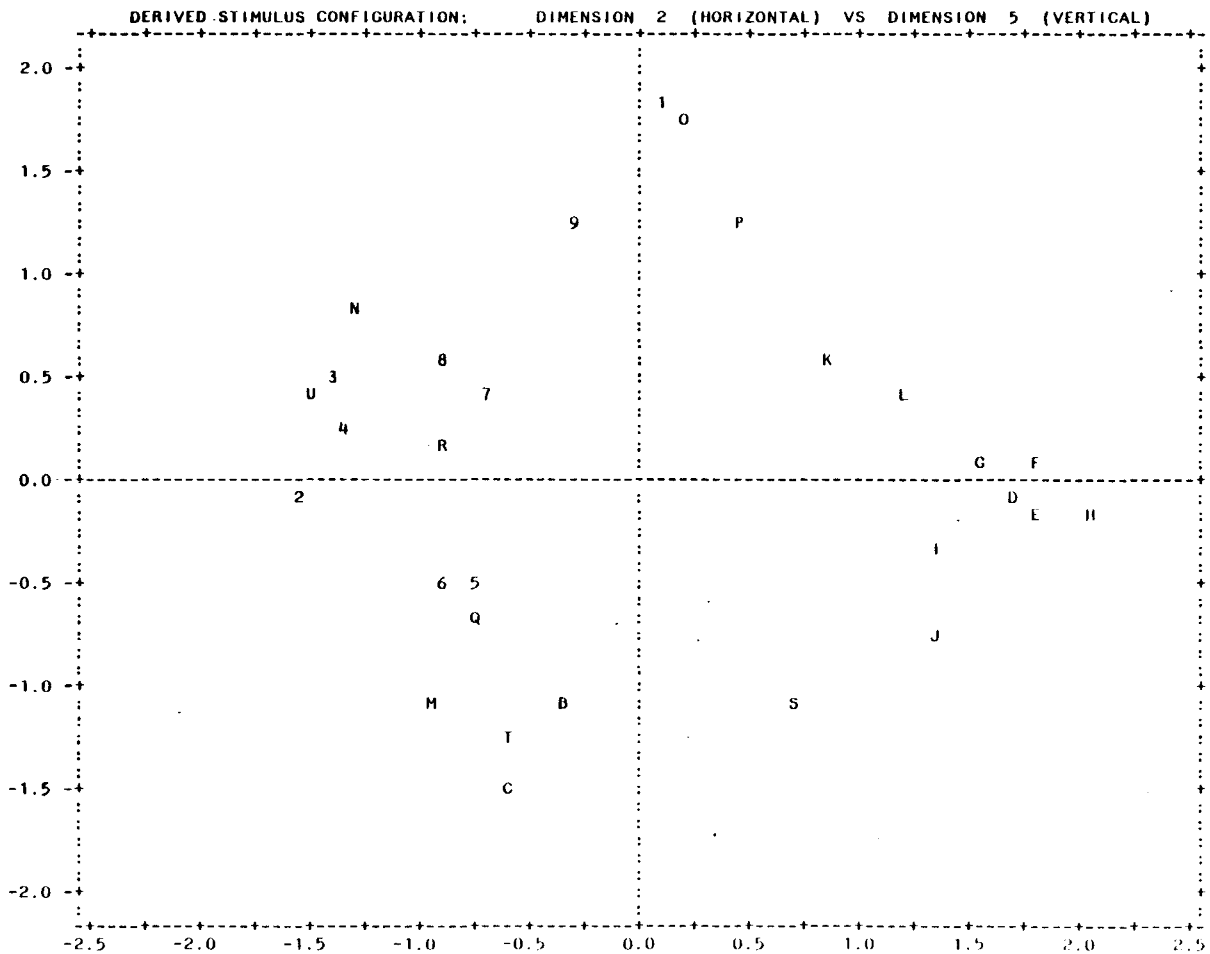


Figure 53: Six-Dimensional MDS Solution for Group A; DIM 3 x DIM 5

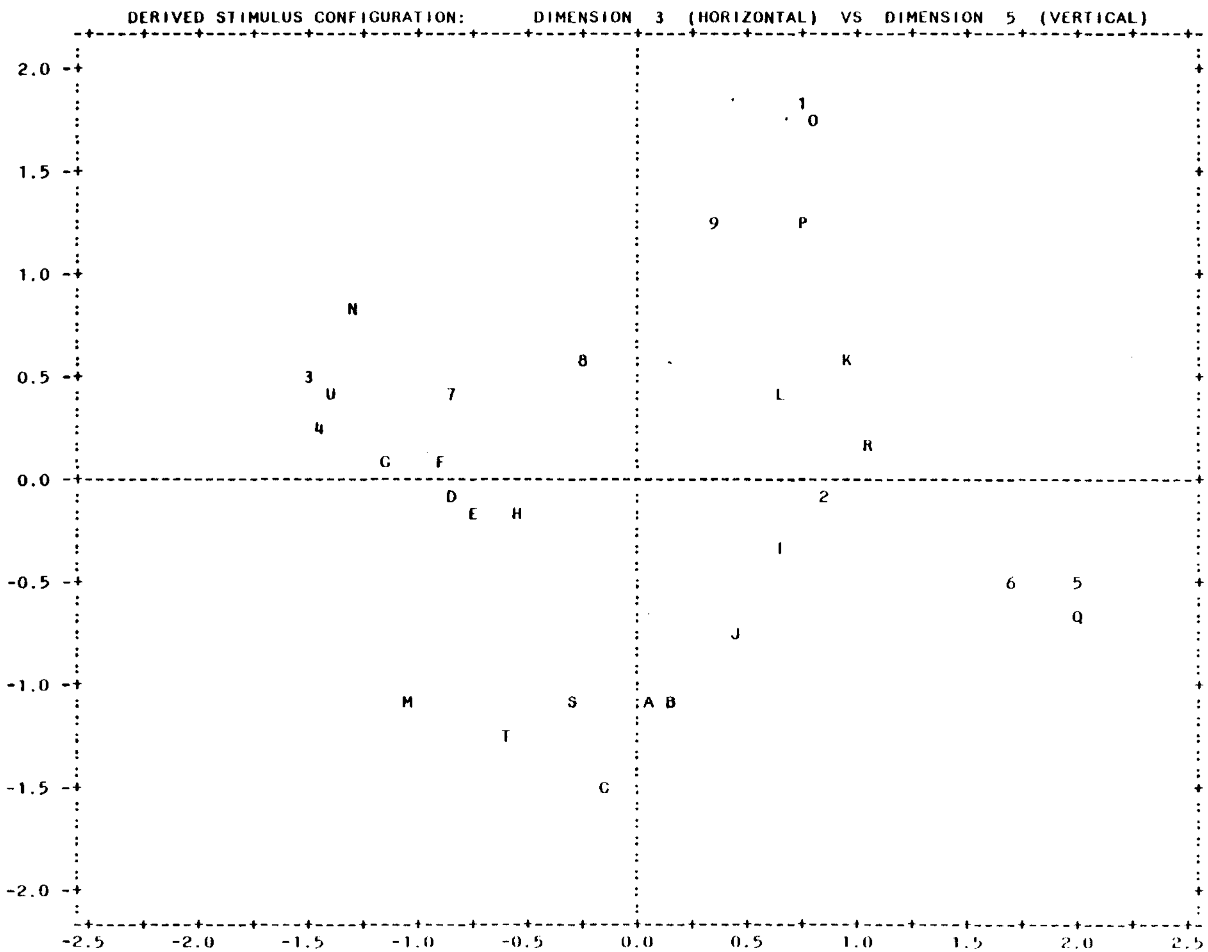


Figure 54: Six-Dimensional MDS Solution for Group A; DIM 4 x DIM 5

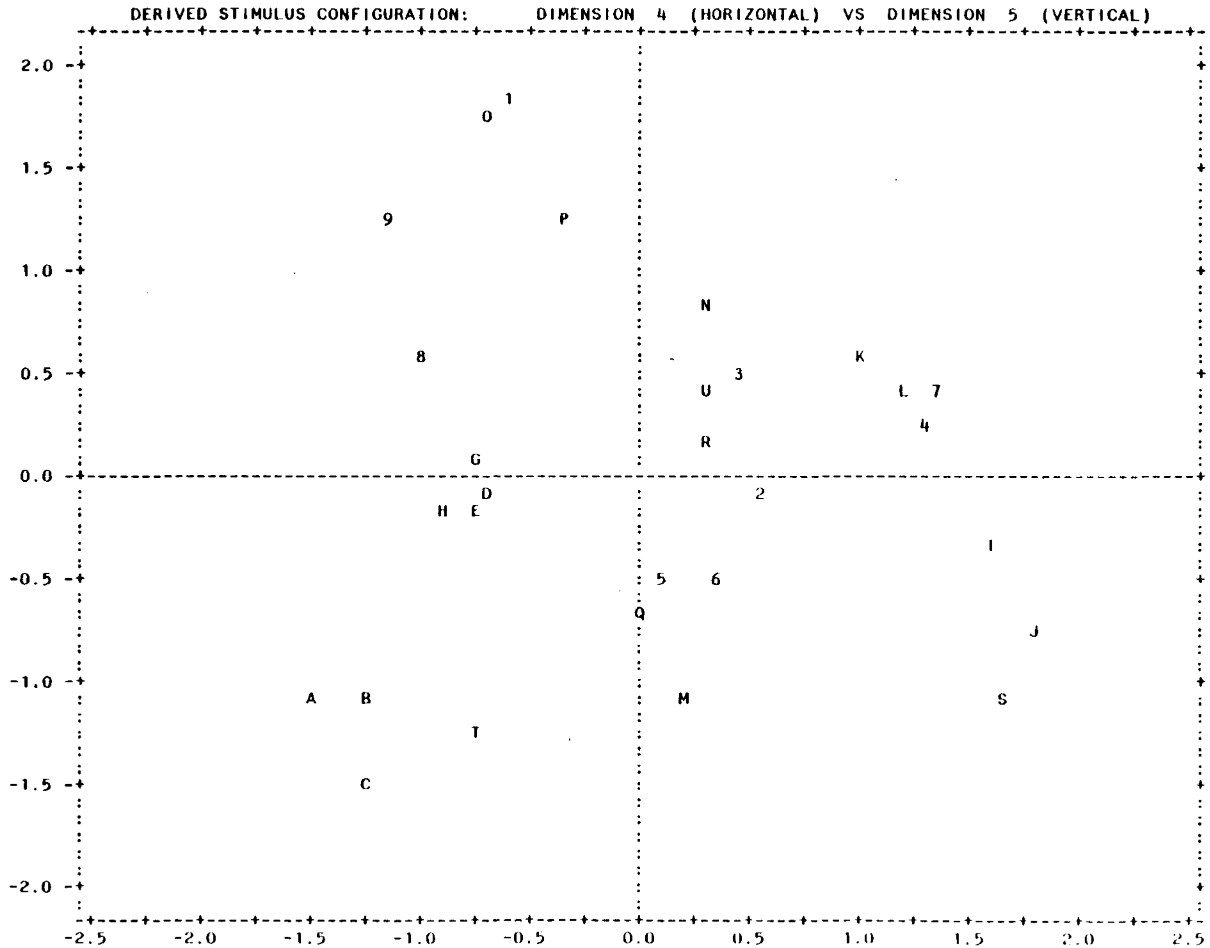


Figure 55: Six-Dimensional MDS Solution for Group A; DIM 1 x DIM 6

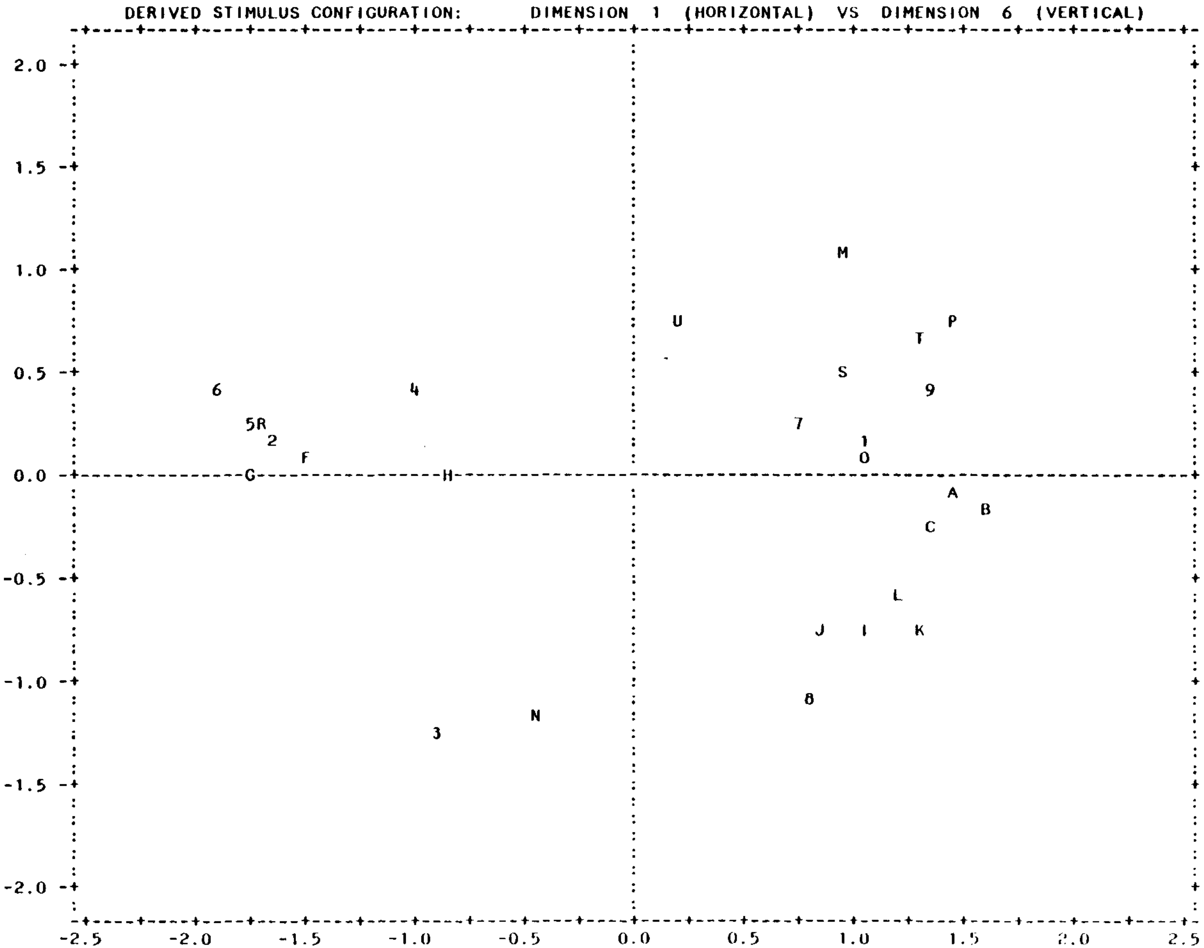


Figure 56: Six-Dimensional MDS Solution for Group A; DIM 2 x DIM 6

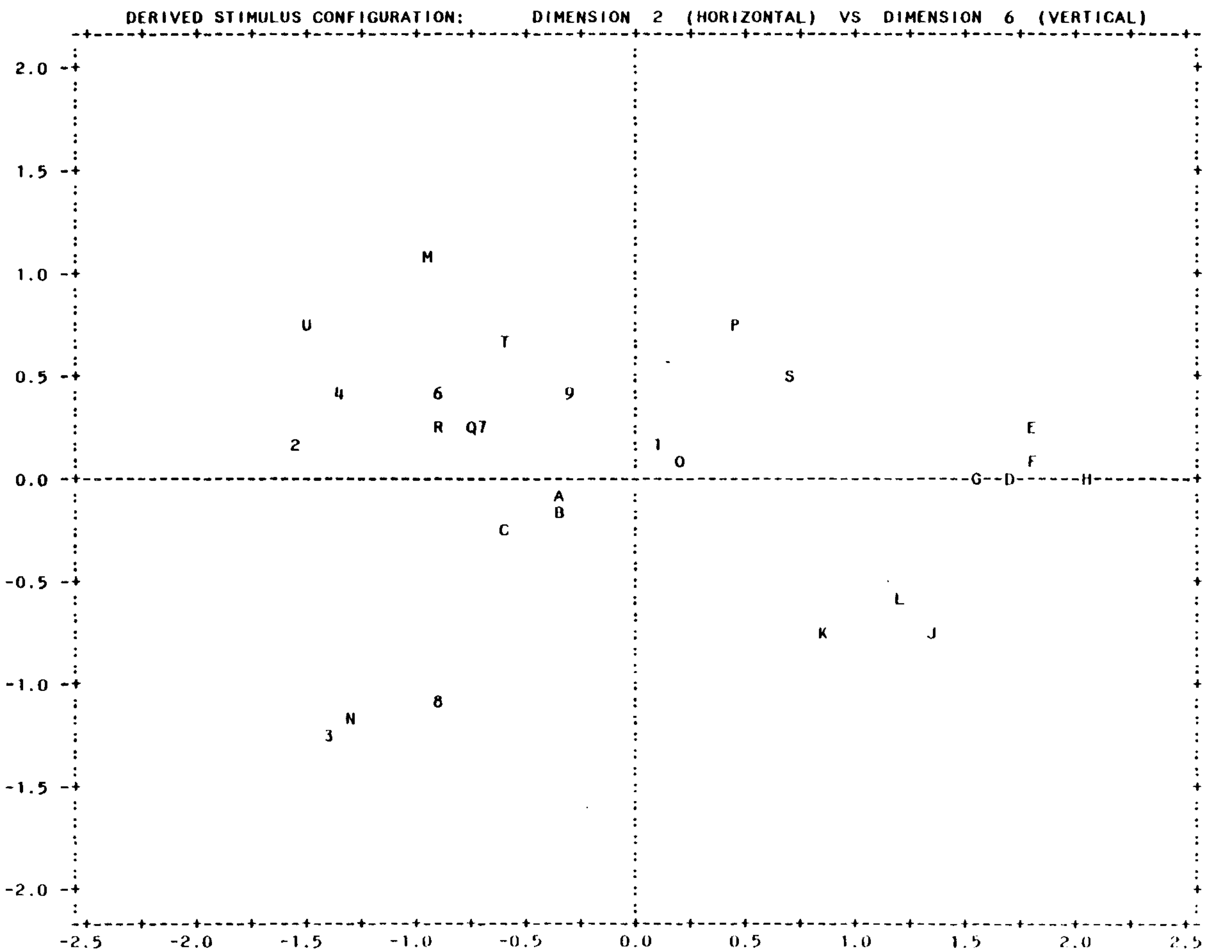


Figure 57: Six-Dimensional MDS Solution for Group A; DIM 3 x DIM 6

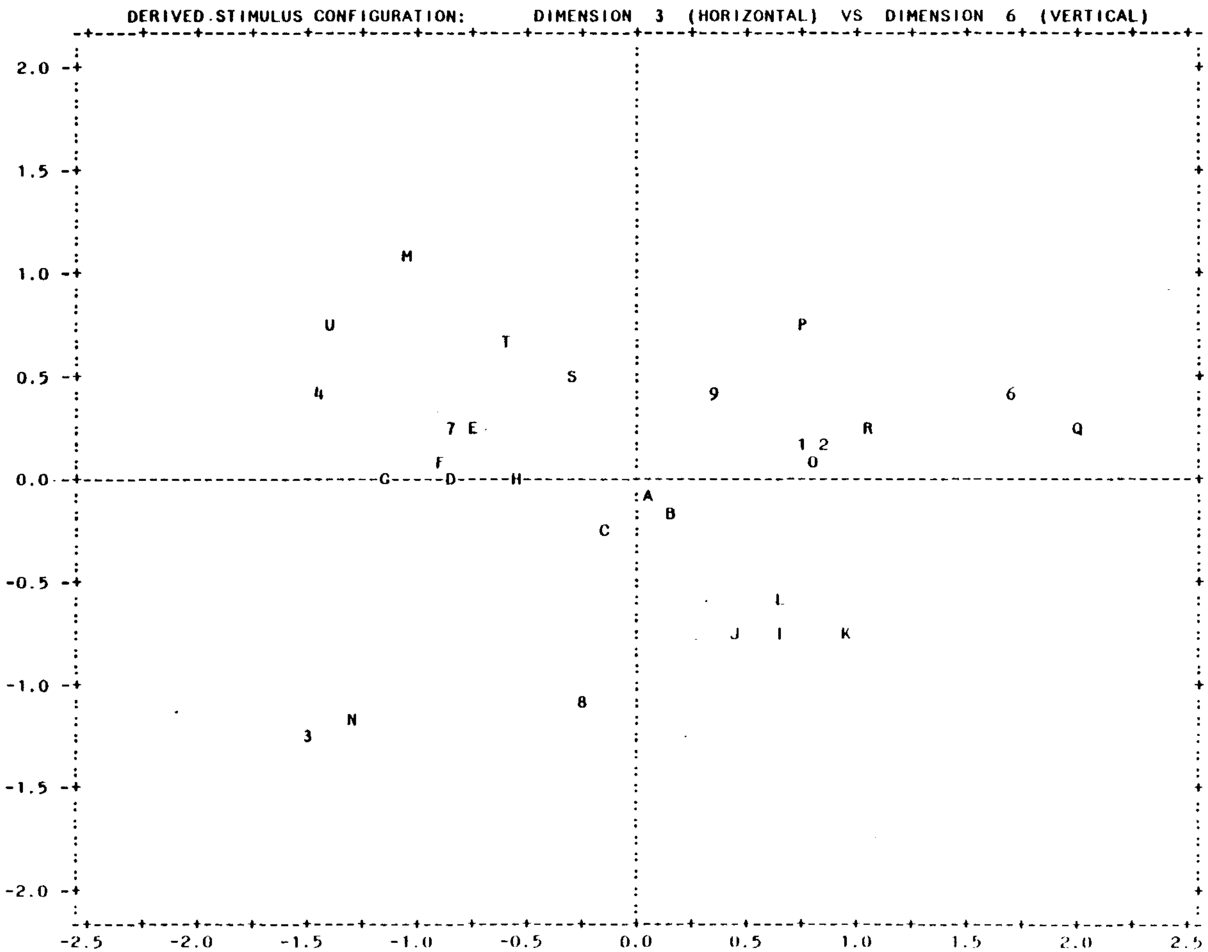


Figure 58: Six-Dimensional MDS Solution for Group A; DIM 4 x DIM 6

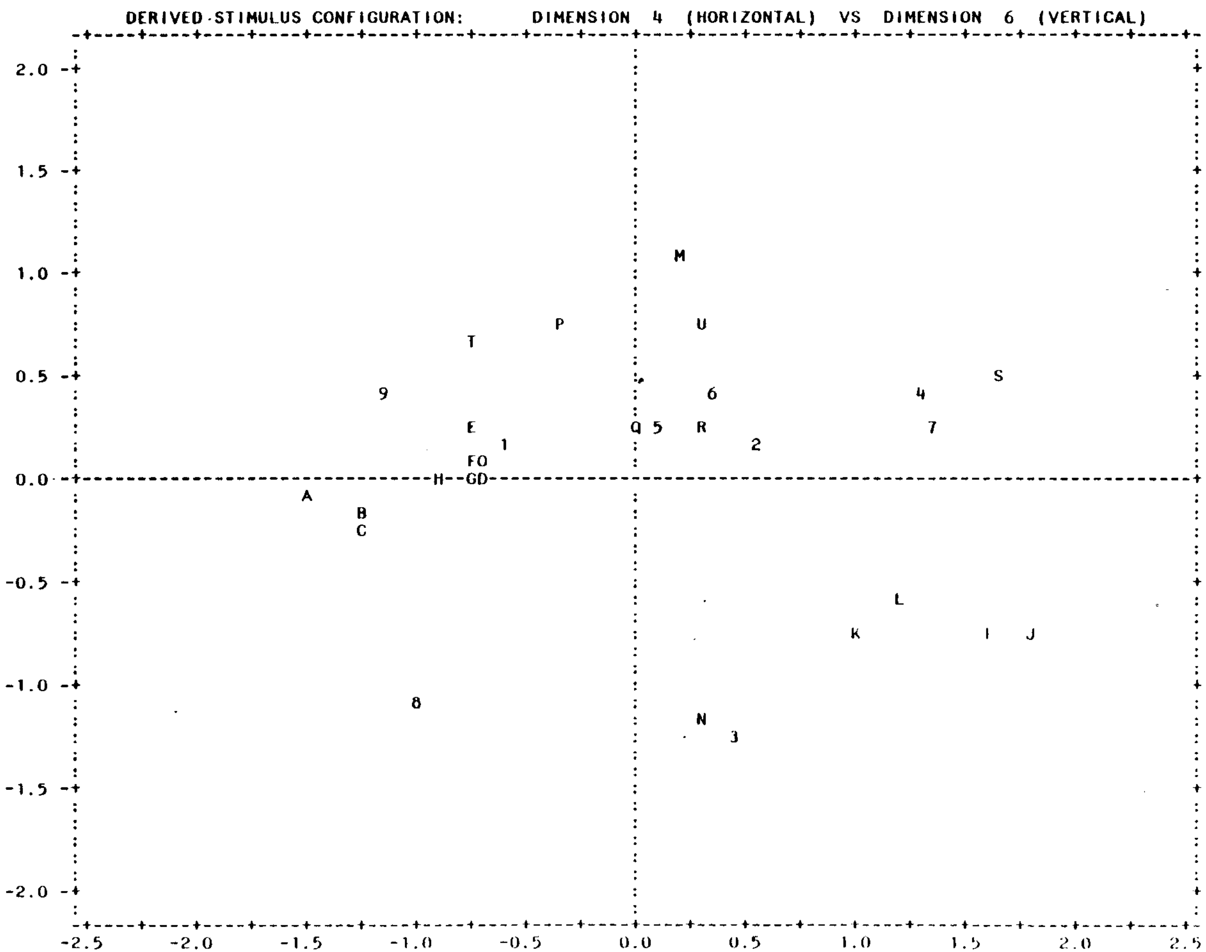


Figure 59: Six-Dimensional MDS Solution for Group A; DIM 5 x DIM 6

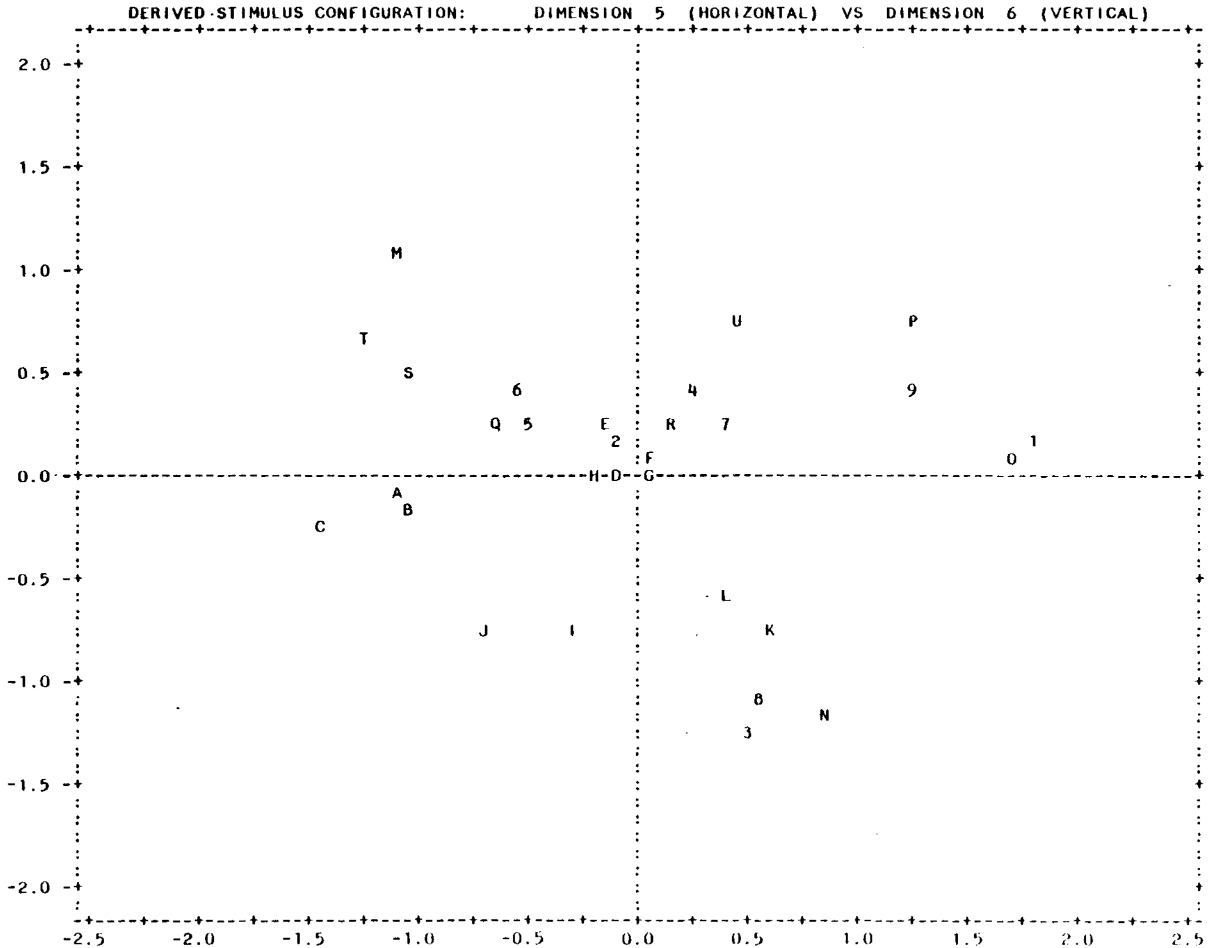


Figure 60: Six-Dimensional MDS Solution for Group A; Linear Fit Plot

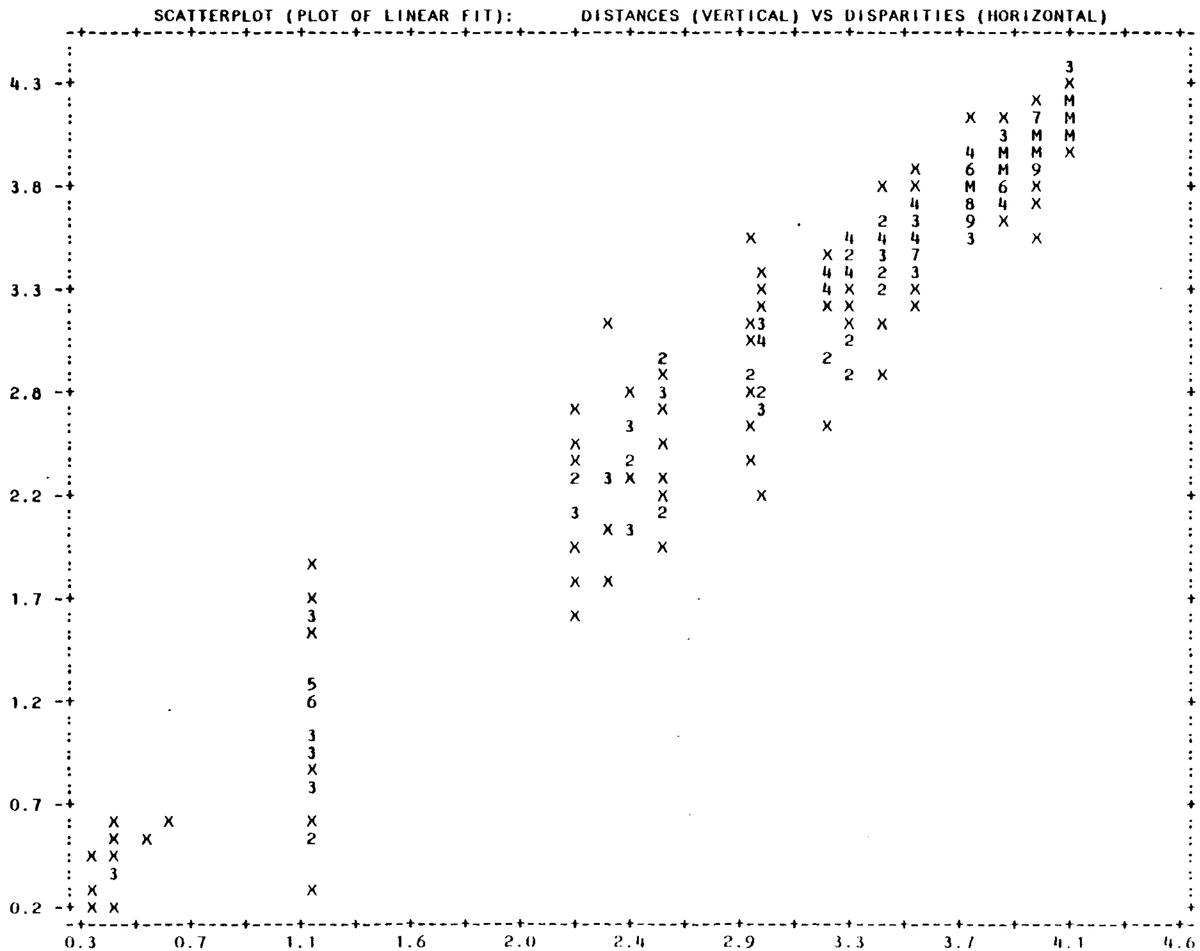


Figure 61: Six-Dimensional MDS Solution for Group A; Nonlinear Fit Plot

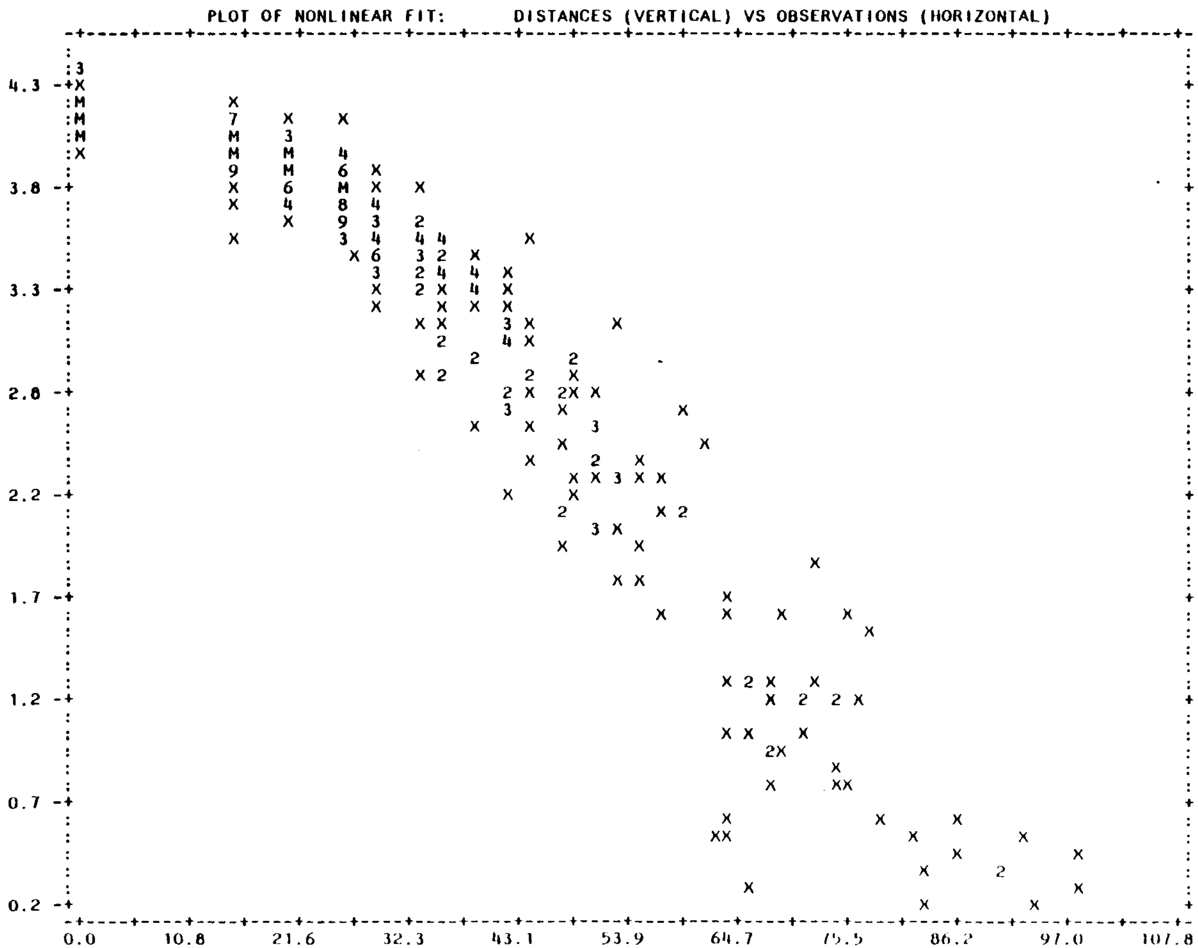
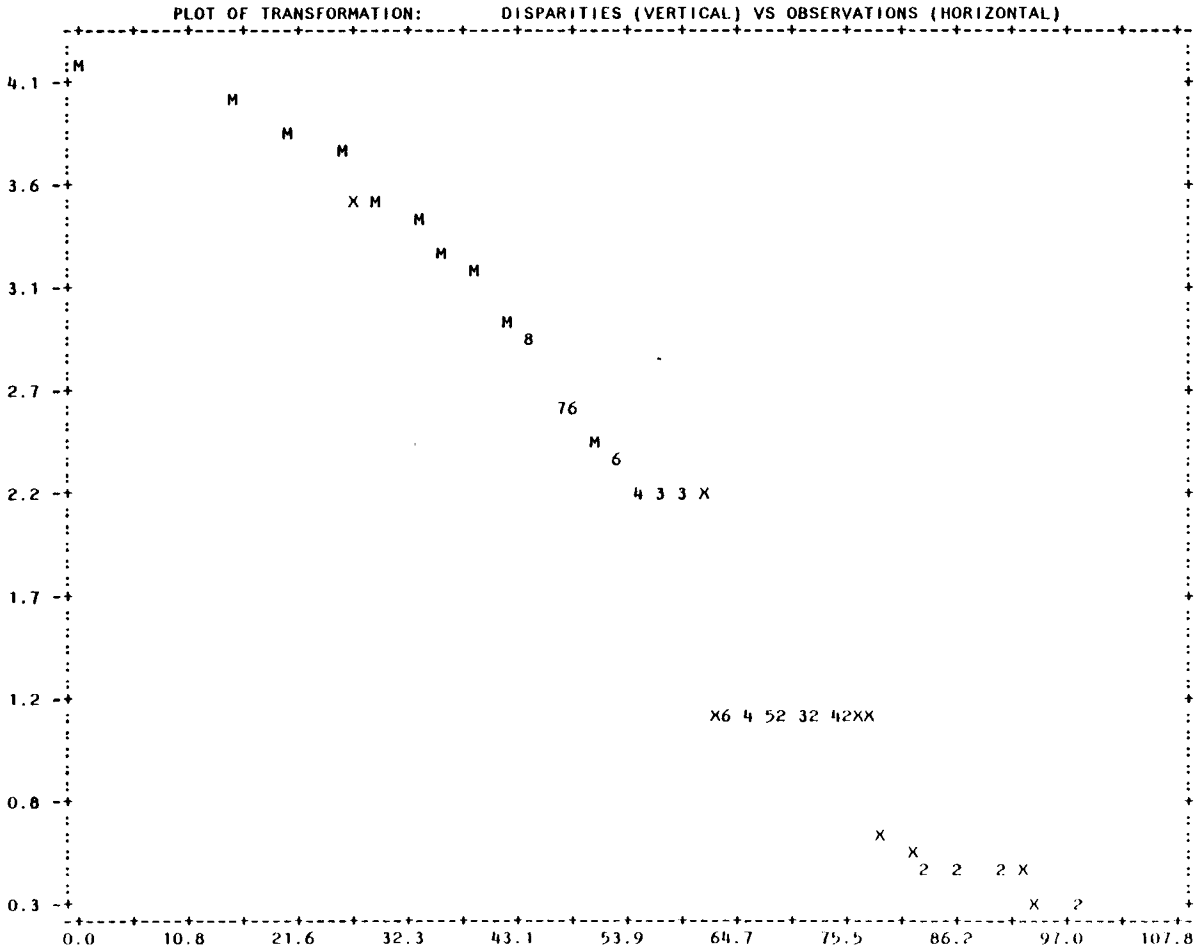


Figure 62: Six-Dimensional MDS Solution for Group A; Transformation Plot



Appendix B

Table 16: Two-Dimensional MDS Solution Coordinates for Group B

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	DIMENSION 2
1	Q7	1	-0.4653	-1.0321
2	Q9	2	0.2406	-1.4147
3	Q12	3	0.9357	-1.1943
4	Q16	4	0.3582	-1.3520
5	Q21	5	0.9930	-1.2316
6	Q24	6	1.3127	-0.2377
7	Q28	7	1.8077	0.0522
8	Q36	8	-0.4201	-0.7051
9	Q39	9	-1.3748	0.3181
10	Q42	A	-1.4207	-0.0461
11	Q44	B	-1.3317	0.2839
12	Q46	C	-1.0959	-0.5612
13	Q48	D	-1.2328	-0.1180
14	Q49	E	-0.7107	-0.6794
15	Q51	F	1.1604	1.2937
16	Q52	G	1.3832	1.0732
17	Q55	H	1.2256	1.1807
18	Q57	I	1.4101	0.6471
19	Q60	J	-0.0354	1.4528
20	Q68	K	-0.7905	1.5068
21	Q69	L	-1.0809	0.5768
22	Q71	M	-1.2853	0.5207
23	Q77	N	-0.7029	-0.5673
24	Q80	O	-1.0956	0.5661
25	Q83	P	-1.1345	-0.3188
26	Q88	Q	1.5208	-0.1937
27	Q90	R	1.3810	-0.6463
28	Q103	S	-0.7673	-0.4816
29	Q105	T	-0.4392	1.5097
30	Q108	U	1.6546	-0.2017

Figure 63: Two-Dimensional MDS Solution for Group B; DIM 1 x DIM 2

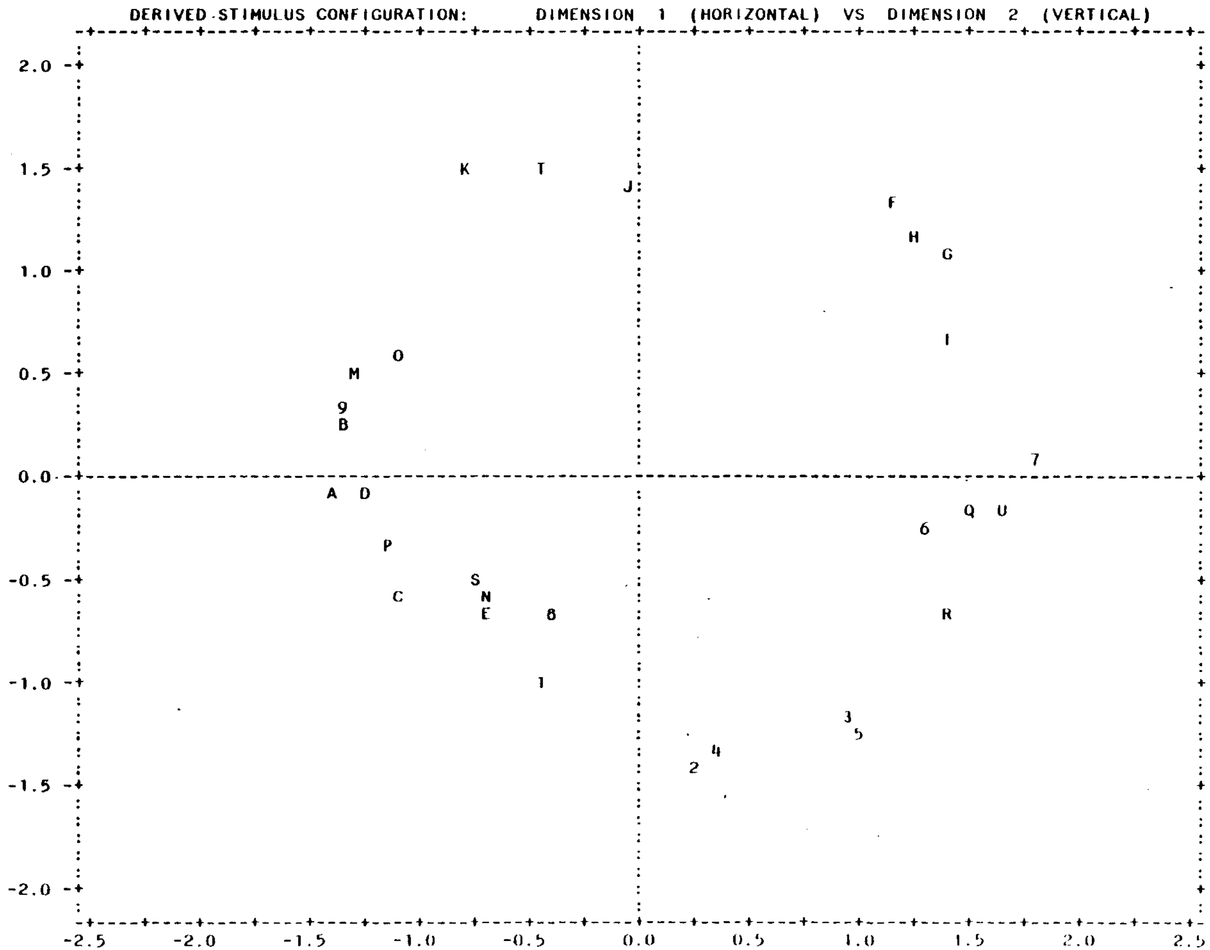


Figure 64: Two-Dimensional MDS Solution for Group B; Linear Fit Plot

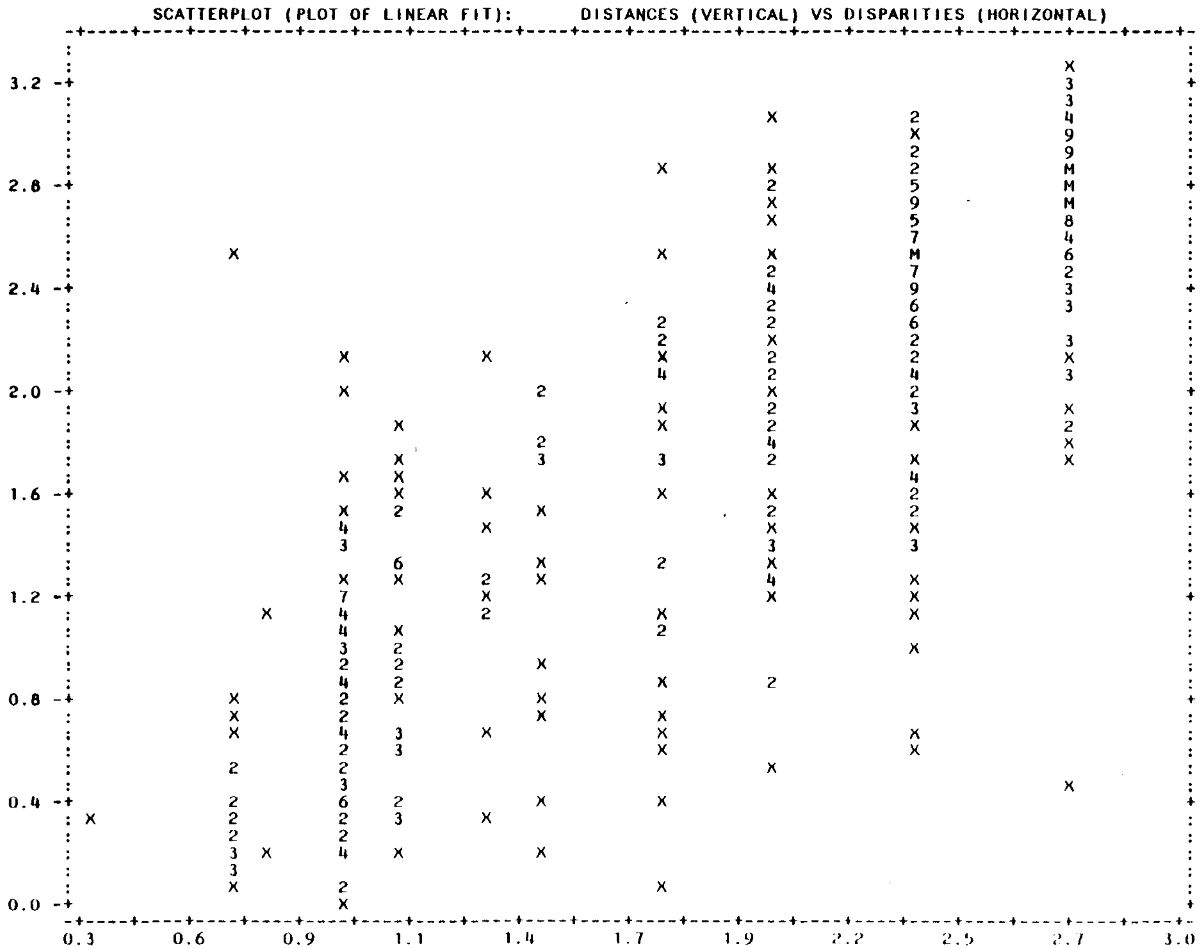


Figure 65: Two-Dimensional MDS Solution for Group B; Nonlinear Fit Plot

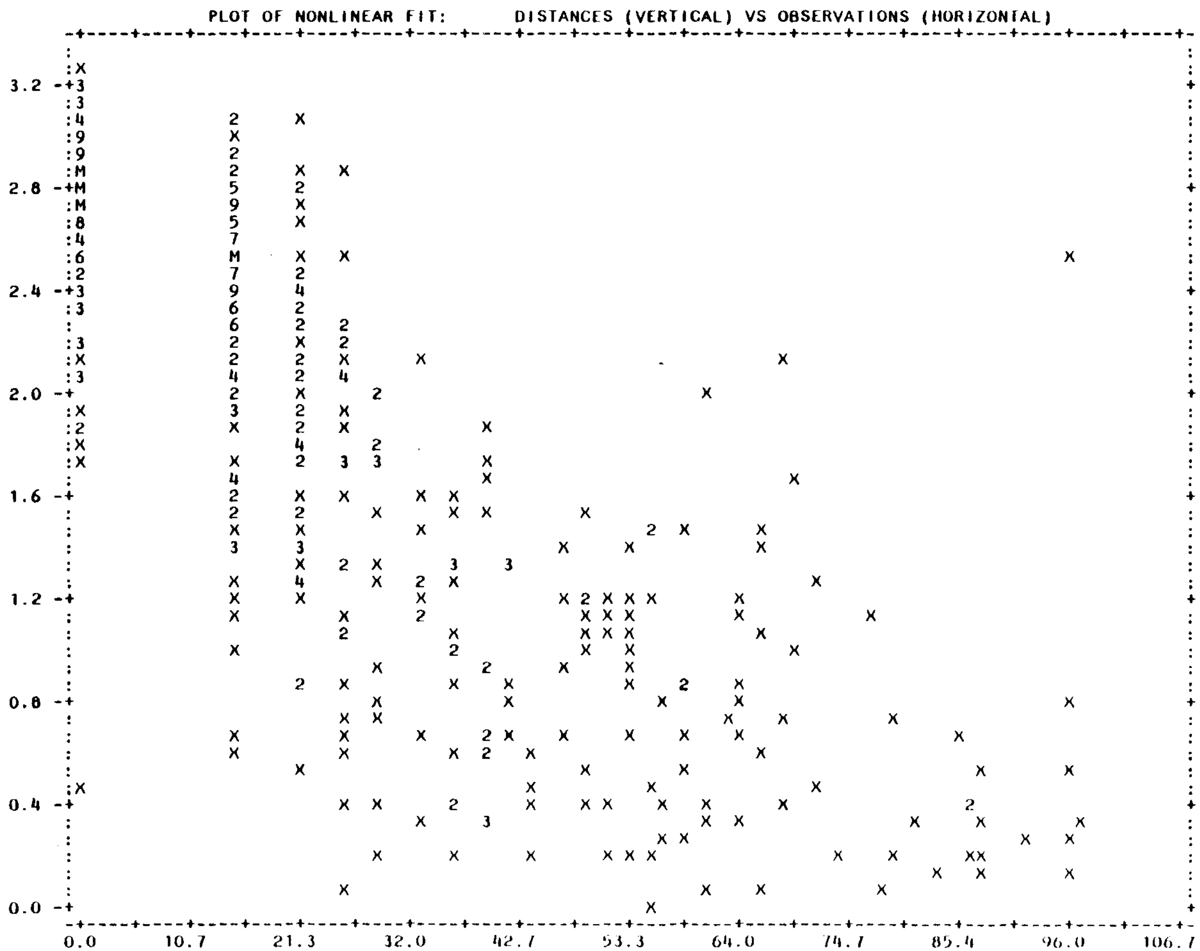


Figure 66: Two-Dimensional MDS Solution for Group B; Transformation Plot

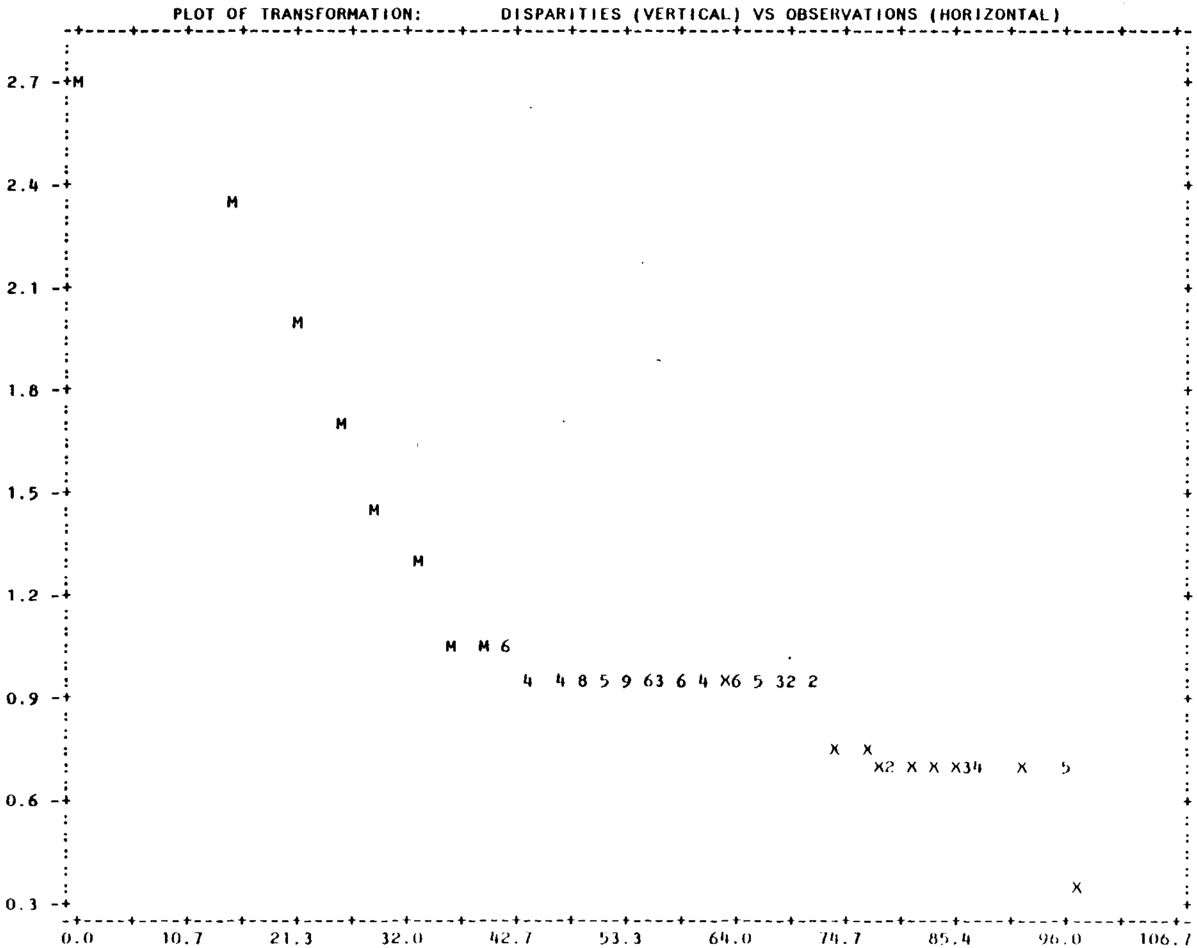


Table 17: Four-Dimensional MDS Solution Coordinates for Group B

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4
1	Q7	1	-0.2623	1.1312	1.2265	0.2796
2	Q9	2	0.6319	0.8283	1.7812	-0.5013
3	Q12	3	1.1025	0.7863	1.5523	-0.7011
4	Q16	4	0.6232	1.0732	1.5972	-0.4608
5	Q21	5	1.4280	1.4303	0.1217	-0.5417
6	Q24	6	1.5688	0.7227	-1.1054	0.0597
7	Q28	7	1.7606	0.5647	-1.4594	0.1345
8	Q36	8	-0.8147	0.8621	0.3002	0.5173
9	Q39	9	-1.5067	-0.1207	-0.3469	0.9605
10	Q42	A	-1.5800	0.2936	-0.4884	0.8079
11	Q44	B	-1.5501	0.0702	-0.4553	0.7055
12	Q46	C	-1.2548	0.7802	0.7296	-0.0745
13	Q48	D	-1.1602	0.3654	0.1602	1.3688
14	Q49	E	-0.9824	0.8326	0.4830	0.6954
15	Q51	F	1.2936	-1.7776	0.6050	0.5744
16	Q52	G	1.4486	-1.6159	0.3516	0.7946
17	Q55	H	1.3483	-1.7050	0.6577	0.4648
18	Q57	I	1.5295	-1.3361	0.7810	0.3983
19	Q60	J	0.2691	-1.9314	0.0479	0.5102
20	Q68	K	-0.7156	-1.2265	-0.4930	-1.7160
21	Q69	L	-1.3460	-0.7682	-0.2599	-0.6226
22	Q71	M	-1.5901	-0.4562	-0.6239	0.2765
23	Q77	N	-0.8894	0.5213	0.5314	0.9872
24	Q80	O	-1.3333	-0.5597	-0.3913	-0.9749
25	Q83	P	-1.4174	0.5503	-0.2868	0.0809
26	Q88	Q	1.4926	0.6611	-1.5415	0.5033
27	Q90	R	1.1709	0.7160	-1.1629	-1.3109
28	Q103	S	-0.3778	-0.1138	-0.1123	-1.9420
29	Q105	T	-0.5055	-1.2525	-0.6599	-1.6344
30	Q108	U	1.6187	0.6742	-1.5396	0.3607

Figure 67: Four-Dimensional MDS Solution for Group B; DIM 1 x DIM 2

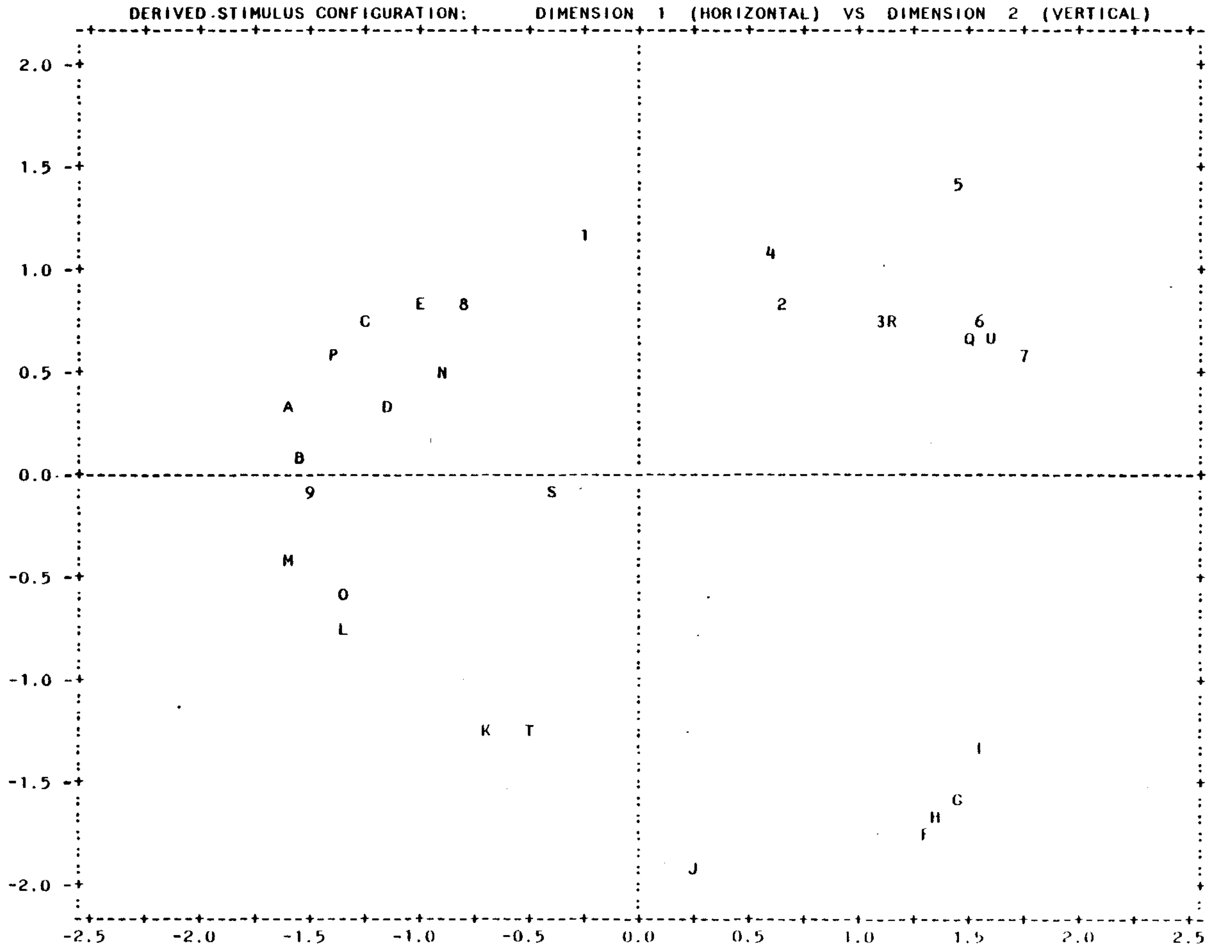


Figure 68: Four-Dimensional MDS Solution for Group B; DIM 1 x DIM 3

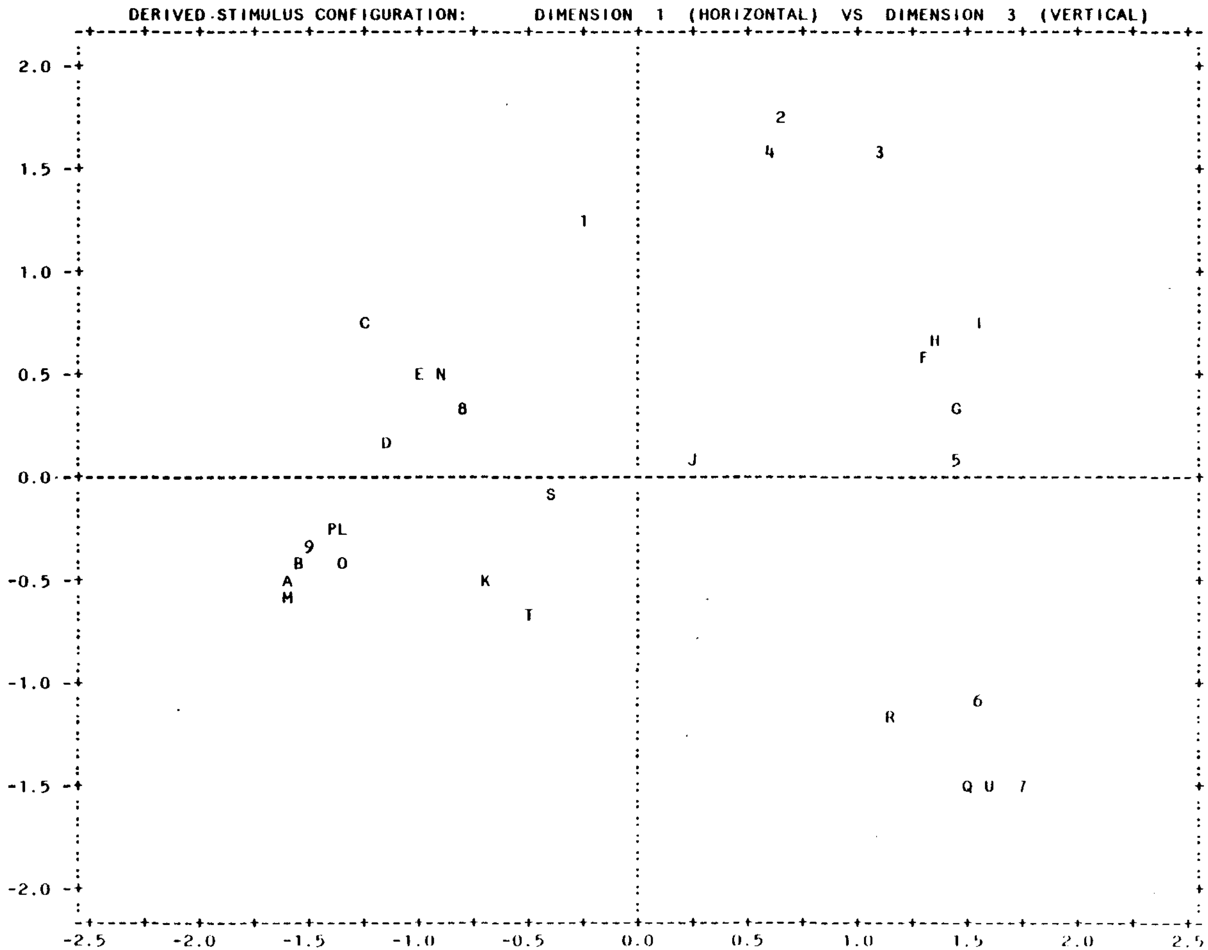


Figure 69: Four-Dimensional MDS Solution for Group B; DIM 2 x DIM 3

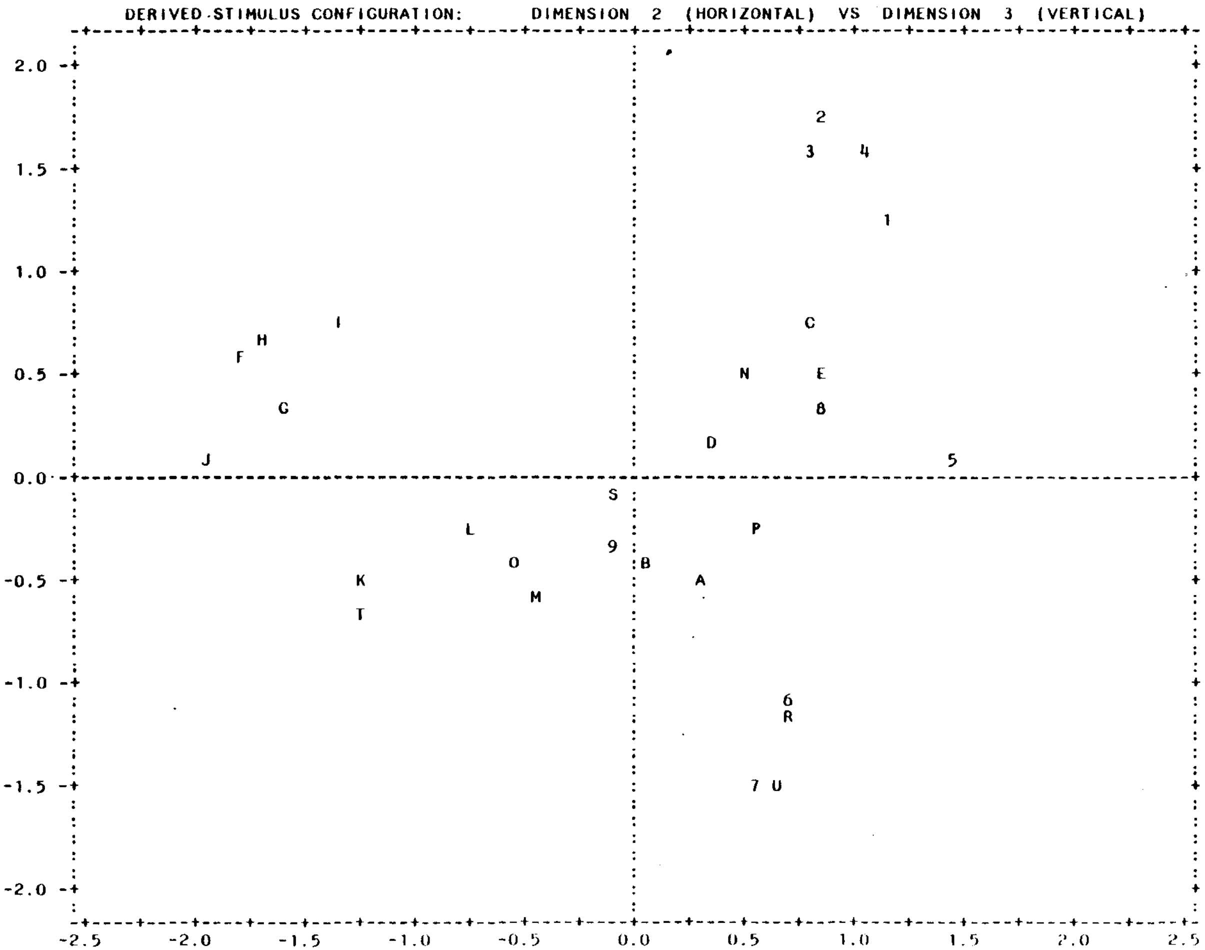


Figure 70: Four-Dimensional MDS Solution for Group B; DIM 1 x DIM 4

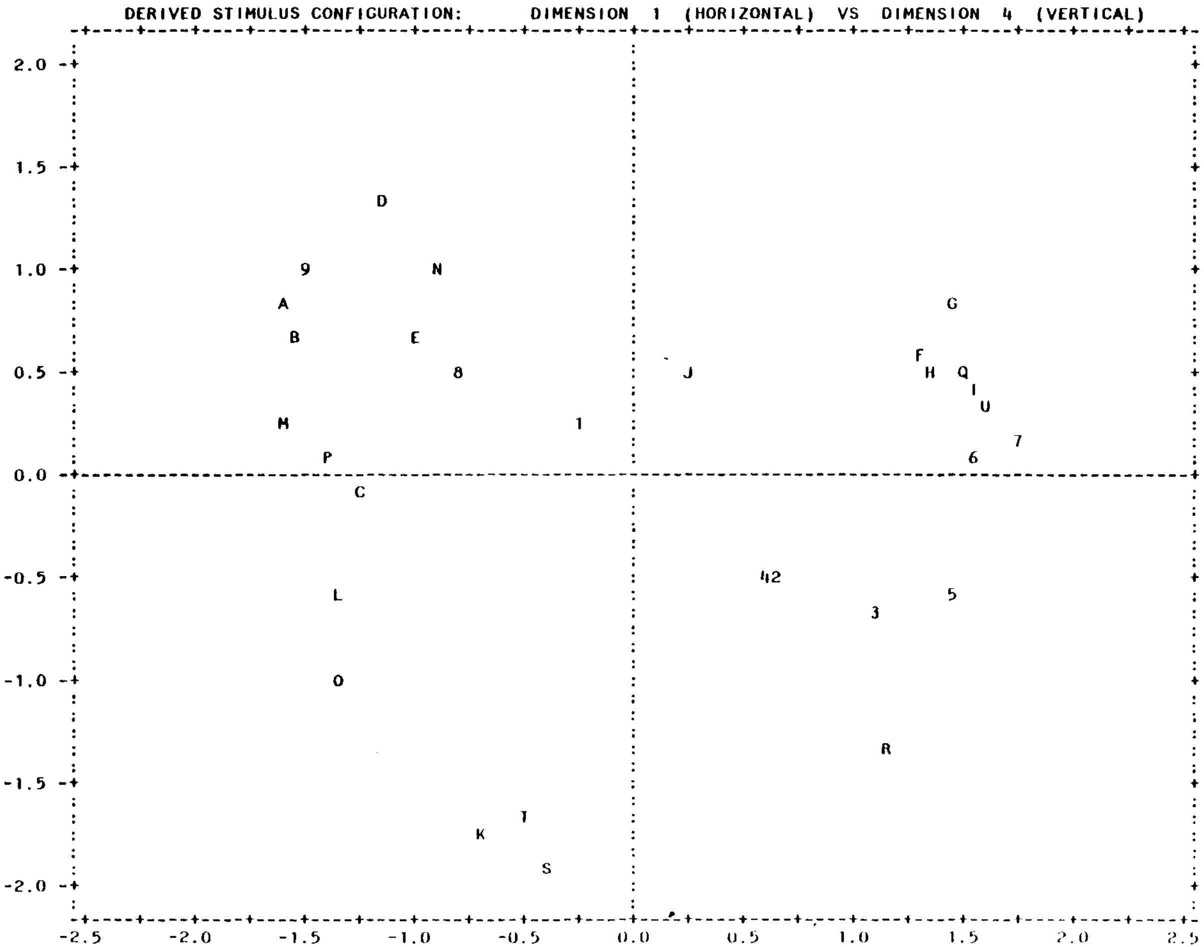


Figure 71: Four-Dimensional MDS Solution for Group B; DIM 2 x DIM 4

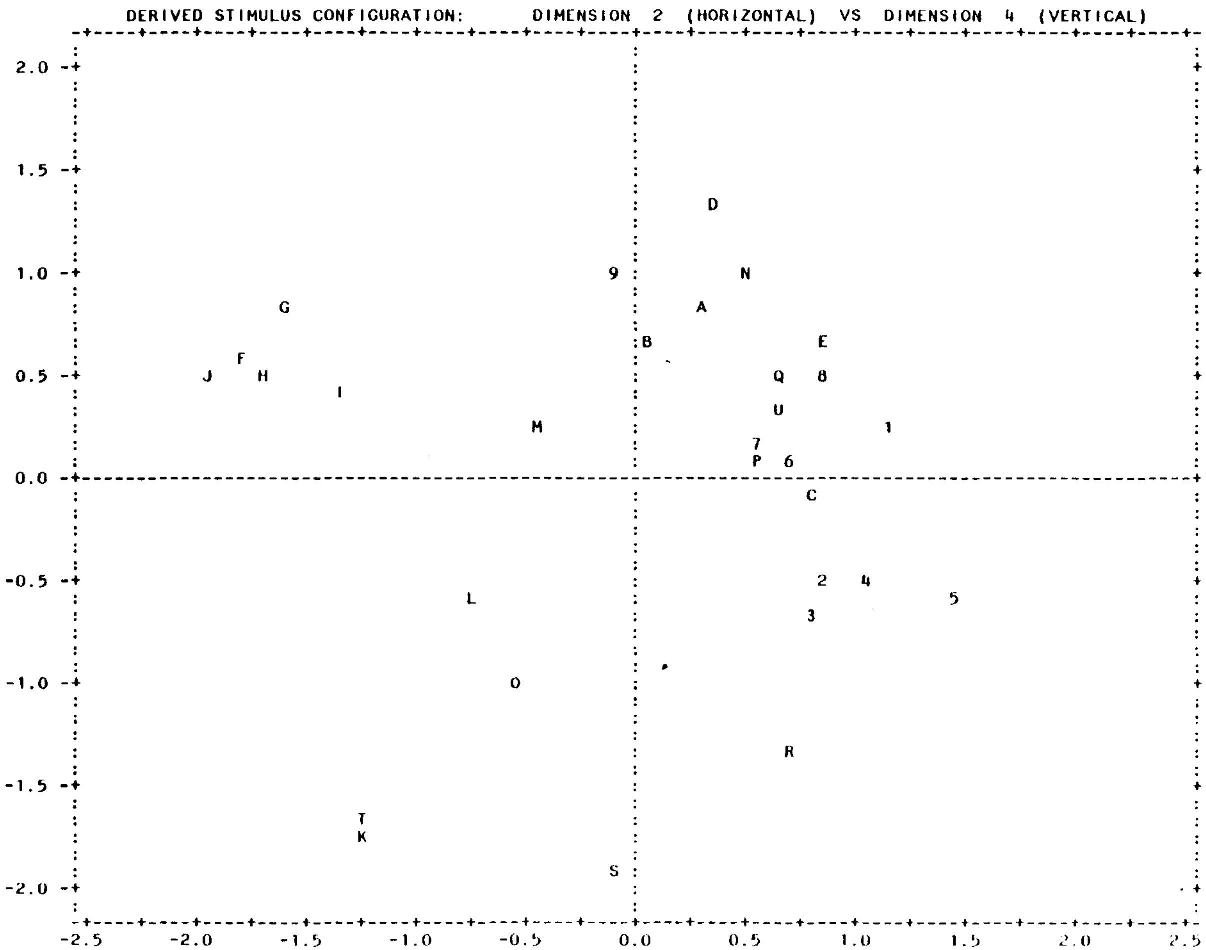


Figure 72: Four-Dimensional MDS Solution for Group B; DIM 3 x DIM 4

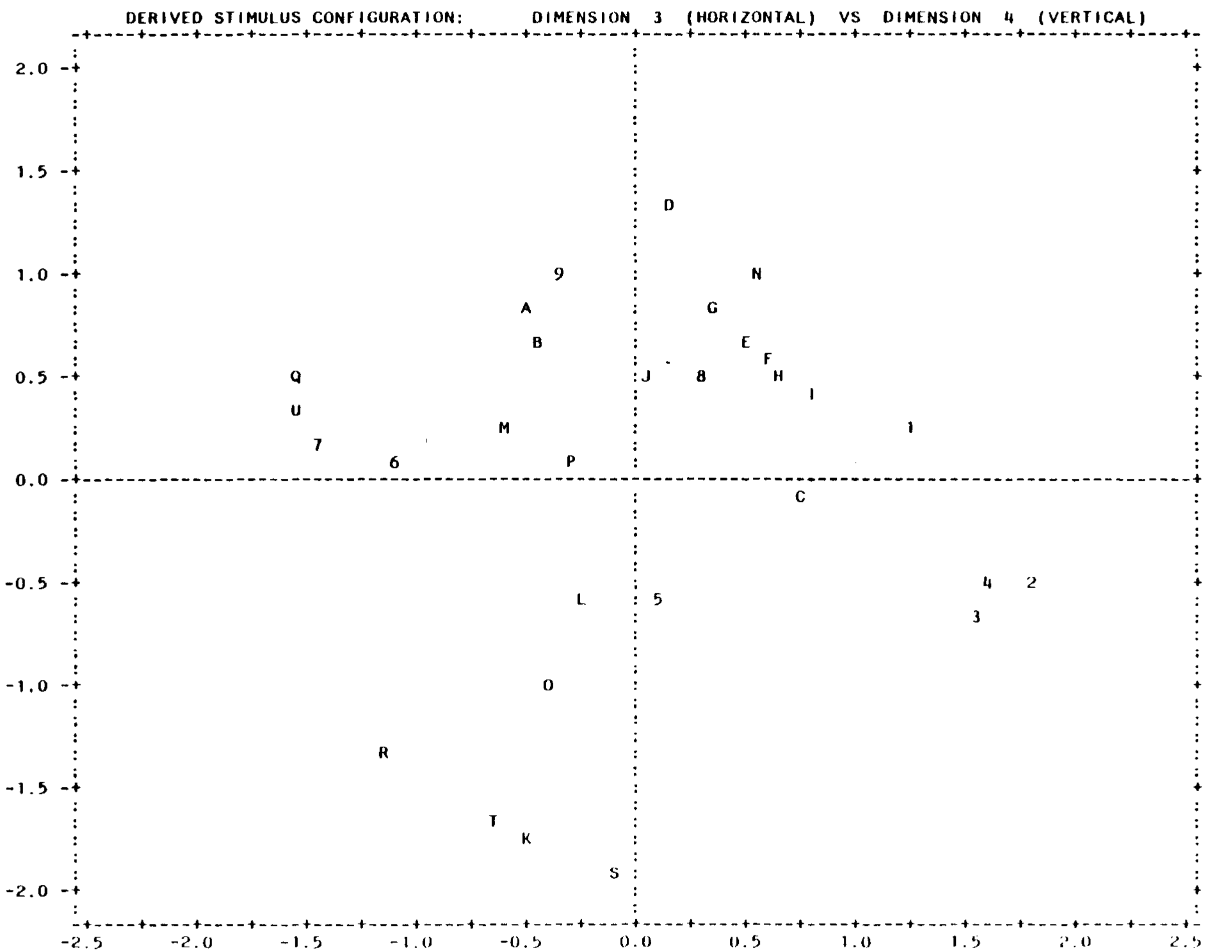


Figure 73: Four-Dimensional MDS Solution for Group B; Linear Fit Plot

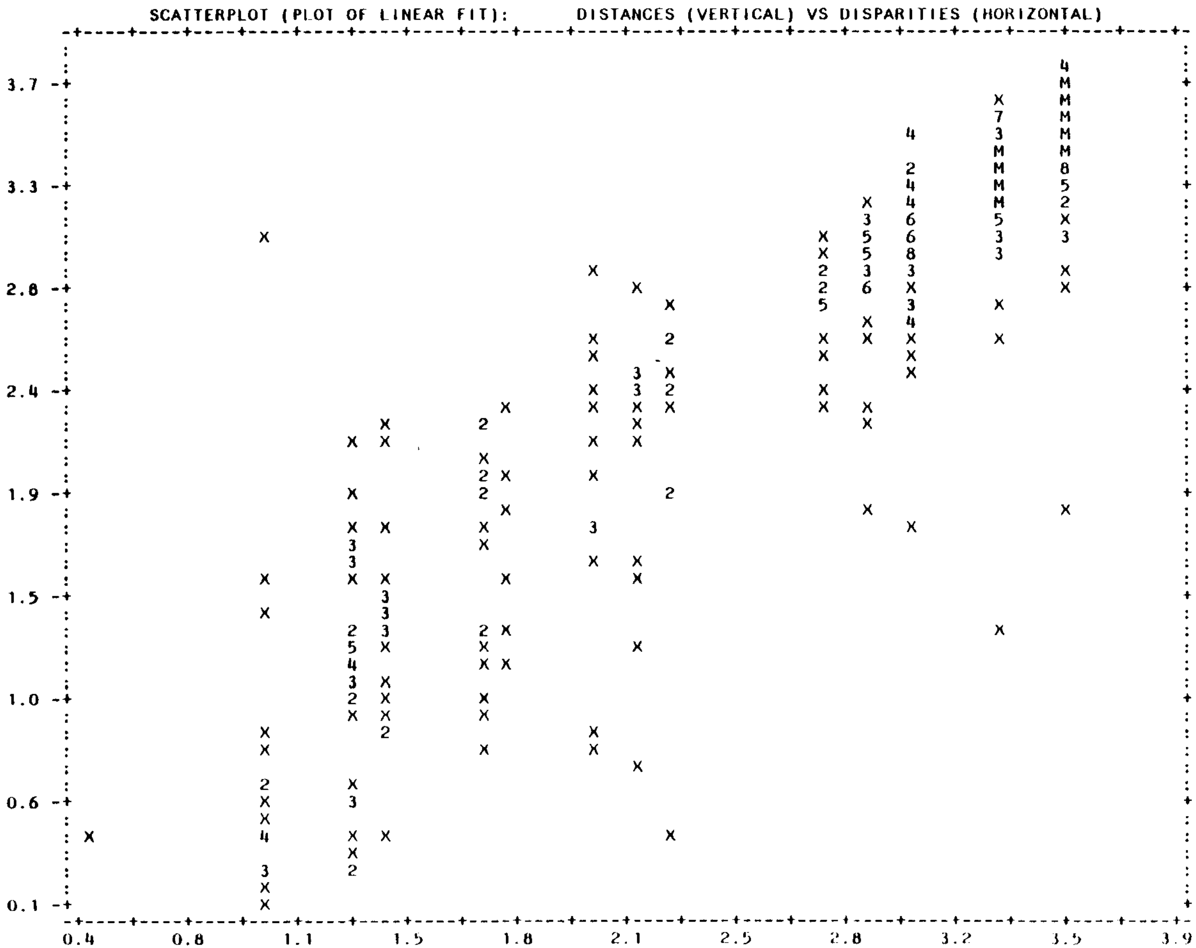


Figure 74: Four-Dimensional MDS Solution for Group B; Nonlinear Fit Plot

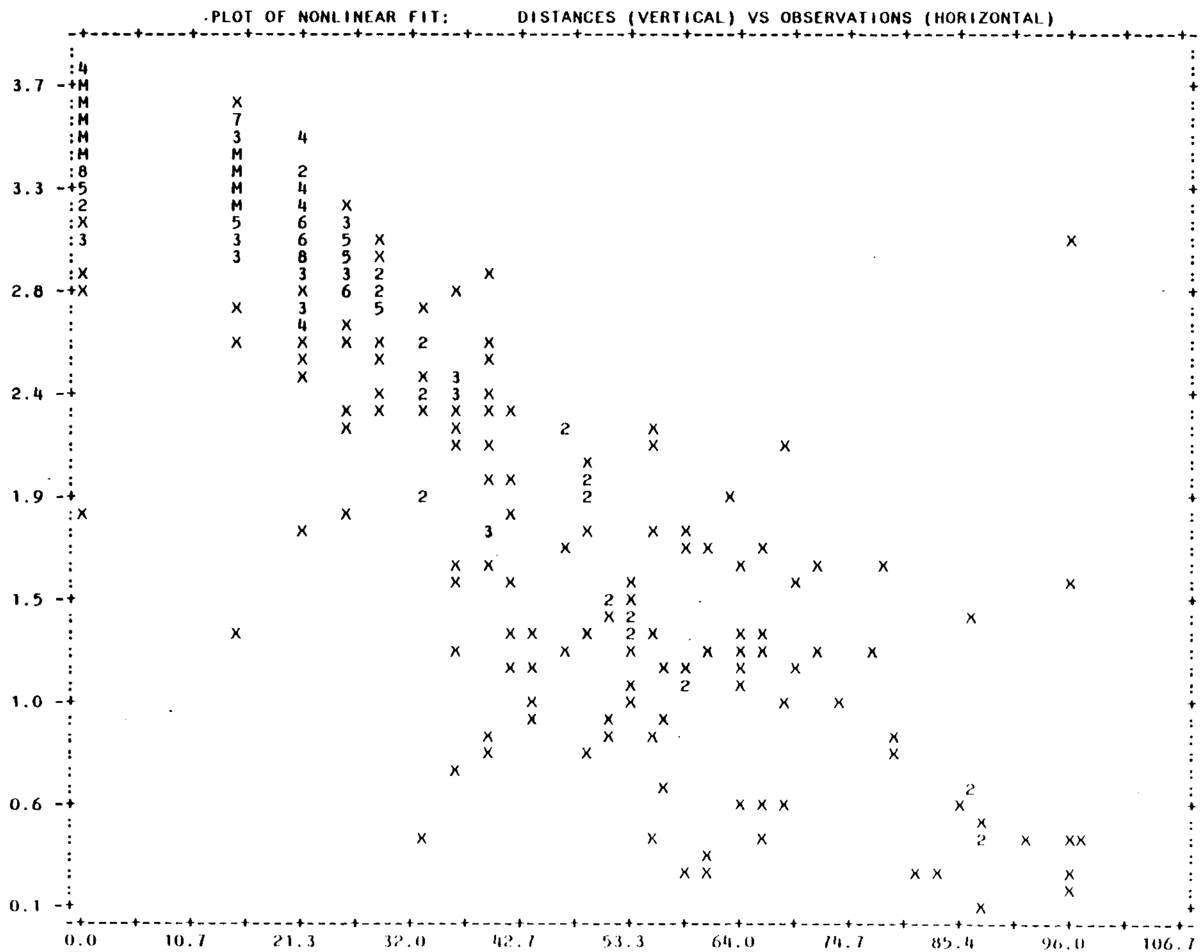


Figure 75: Four-Dimensional MDS Solution for Group B; Transformation Plot

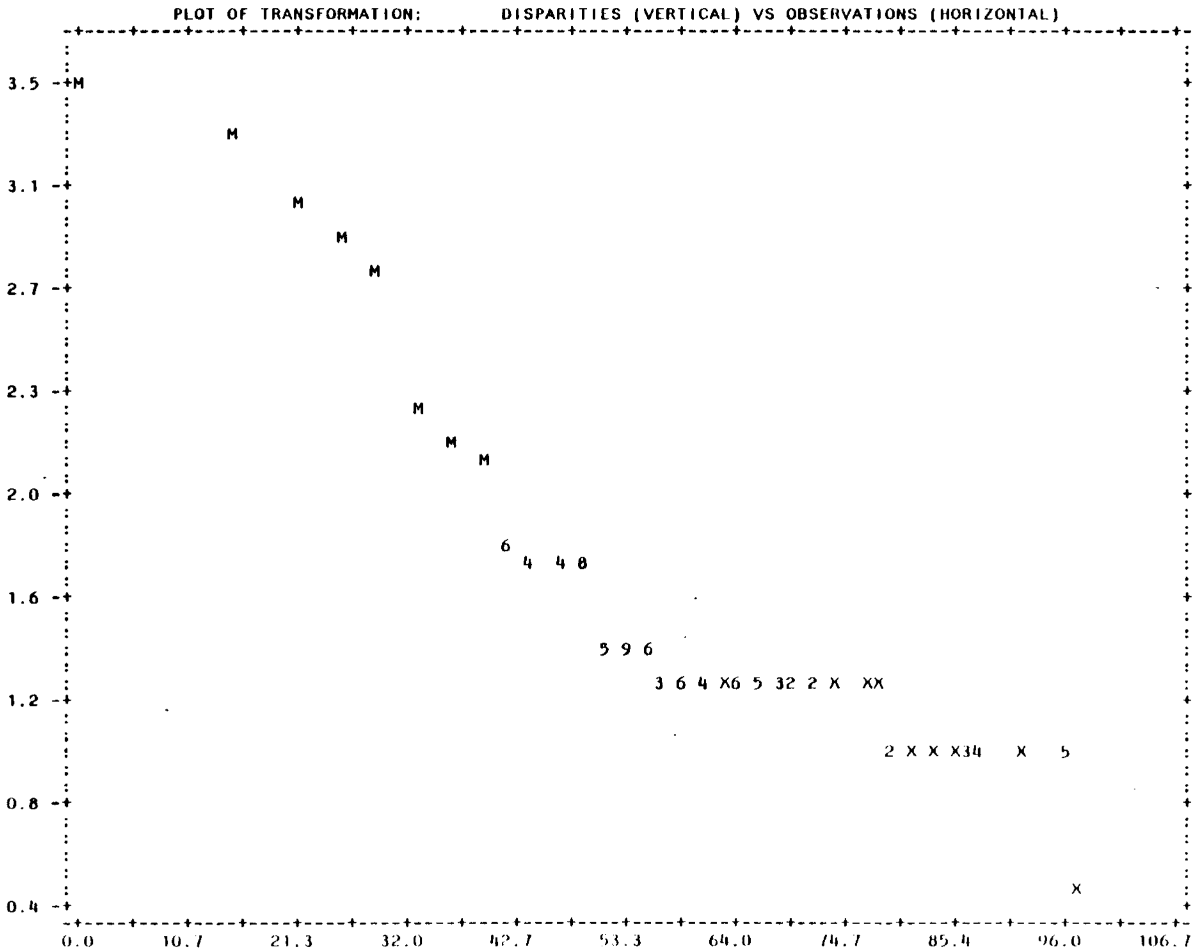


Table 18: Five-Dimensional MDS Solution Coordinates for Group B

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4	5
1	Q7	1	-0.2457	-1.2947	-1.3550	-0.2012	0.0610
2	Q9	2	0.6471	-0.9772	-1.9196	0.6785	0.0995
3	Q12	3	1.1485	-0.9304	-1.6427	0.7546	-0.5507
4	Q16	4	0.6597	-1.1570	-1.7236	0.4564	-0.6013
5	Q21	5	1.5282	-1.5215	-0.1484	0.6312	-0.4980
6	Q24	6	1.6949	-0.7798	1.3107	-0.0047	-0.0279
7	Q28	7	1.9139	-0.5993	1.6111	-0.0508	0.0912
8	Q36	8	-0.8762	-0.9919	-0.3020	-0.4112	0.6862
9	Q39	9	-1.6704	0.0102	0.4365	-1.0602	0.1151
10	Q42	A	-1.6207	-0.3795	0.6310	-0.7026	0.8714
11	Q44	B	-1.5923	-0.1346	0.4392	-0.9003	-0.8093
12	Q46	C	-1.2950	-0.6620	-0.4755	-0.1723	-1.2302
13	Q48	D	-1.2896	-0.4476	-0.1378	-1.5004	0.0887
14	Q49	E	-1.0616	-0.9835	-0.4893	-0.7446	0.2919
15	Q51	F	1.3552	1.9125	-0.7061	-0.6561	0.3134
16	Q52	G	1.5176	1.7469	-0.4356	-0.8966	0.4092
17	Q55	H	1.3898	1.8740	-0.7151	-0.5950	0.3528
18	Q57	I	1.6068	1.4993	-0.8542	-0.5092	-0.0310
19	Q60	J	0.3192	2.0902	-0.0918	-0.6912	-0.0334
20	Q68	K	-0.7990	1.3136	0.5366	1.7580	-0.7873
21	Q69	L	-1.4892	0.8213	0.3361	0.7898	-0.0285
22	Q71	M	-1.6442	0.3687	0.6282	0.0038	0.9497
23	Q77	N	-1.0039	-0.6236	-0.4789	-1.1914	-0.0977
24	Q80	O	-1.3917	0.6602	0.4345	1.2043	-0.3427
25	Q83	P	-1.2145	-0.4676	0.1685	0.0560	1.4228
26	Q88	Q	1.4916	-0.6558	1.5987	-0.4312	-1.0940
27	Q90	R	1.1782	-0.4935	0.8794	1.1792	1.6617
28	Q103	S	-0.3891	0.2754	0.1482	2.0617	0.6773
29	Q105	T	-0.5787	1.2517	0.6181	1.4262	-1.3843
30	Q108	U	1.7114	-0.7246	1.6988	-0.2805	-0.5757

Figure 76: Five-Dimensional MDS Solution for Group B; DIM 1 x DIM 2

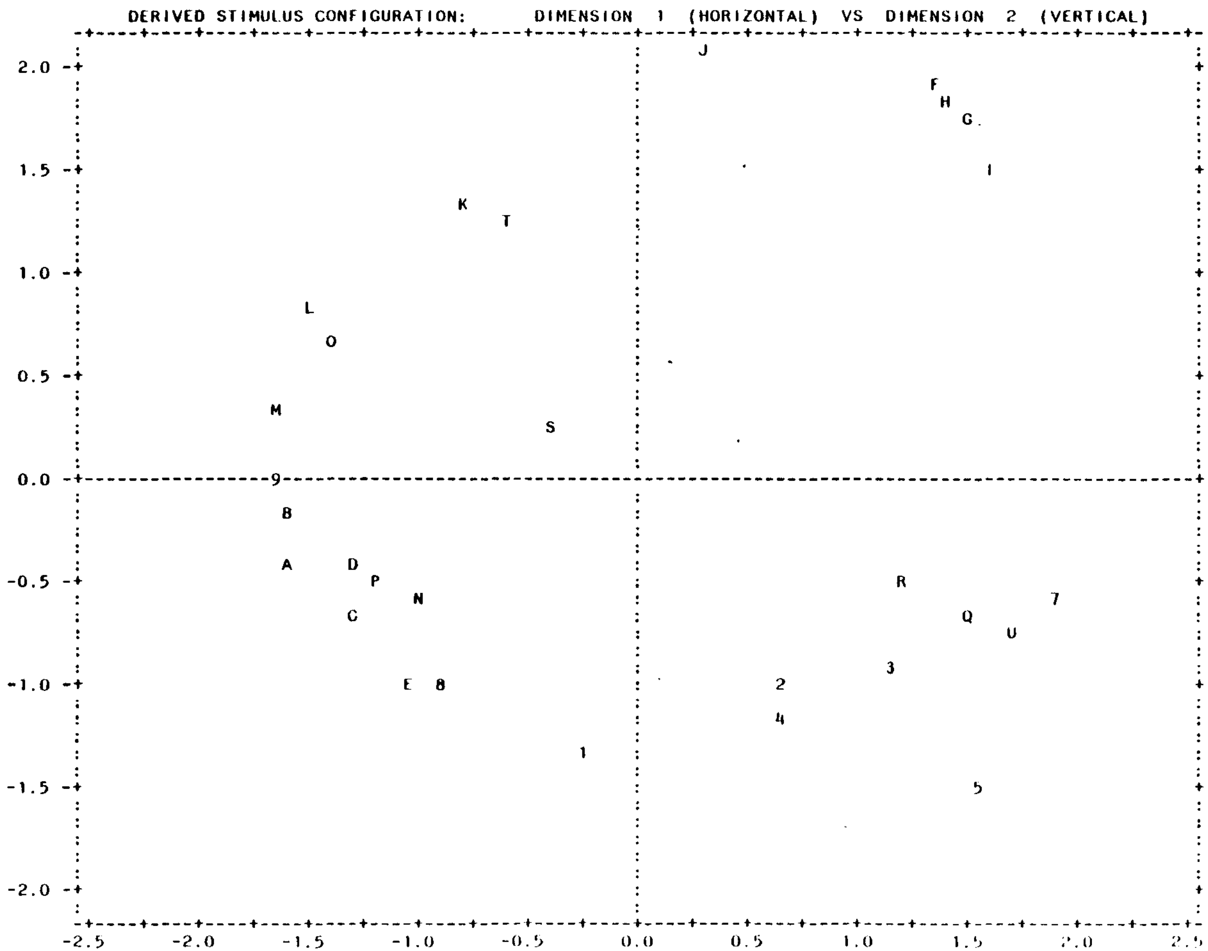


Figure 77: Five-Dimensional MDS Solution for Group B; DIM 1 x DIM 3

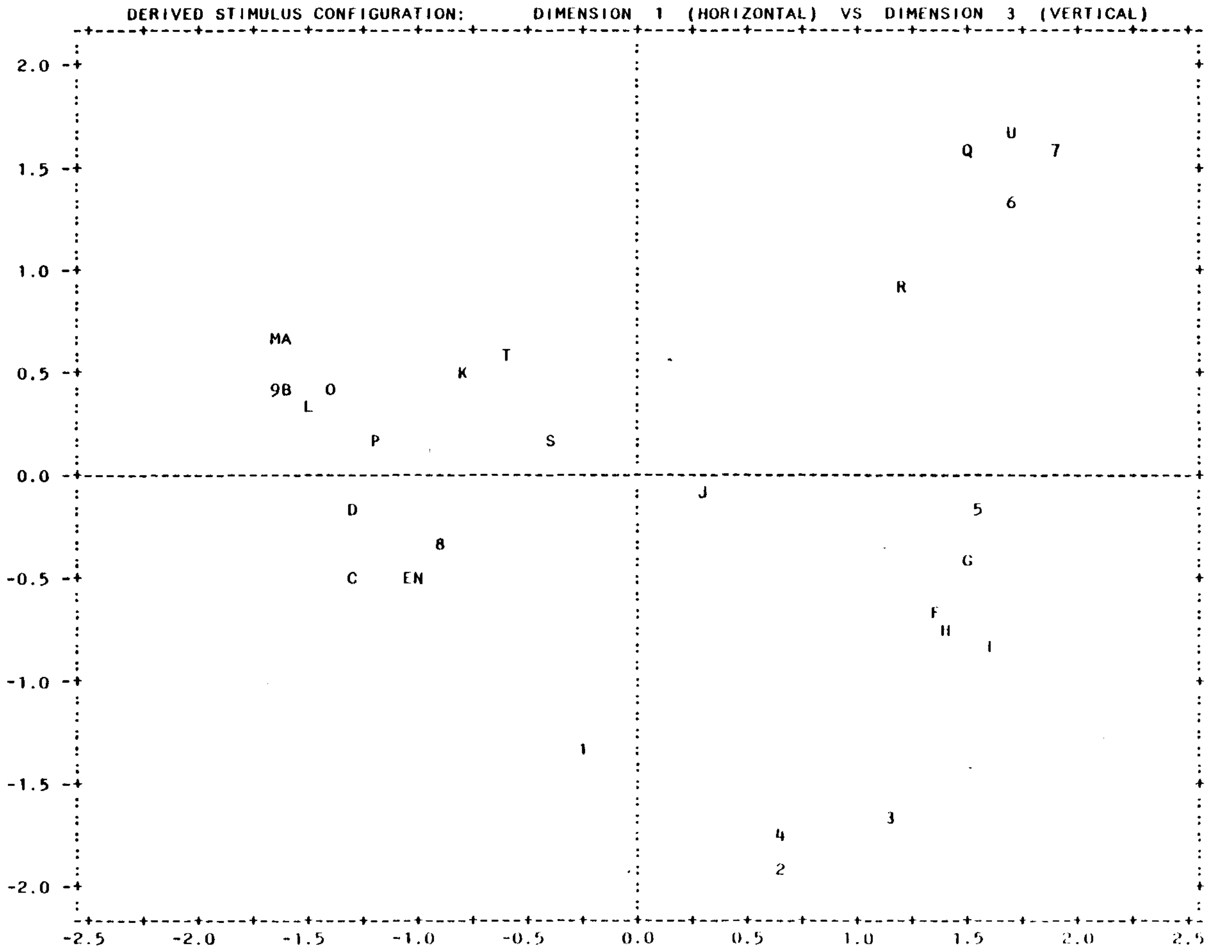


Figure 78: Five-Dimensional MDS Solution for Group B; DIM 2 x DIM 3

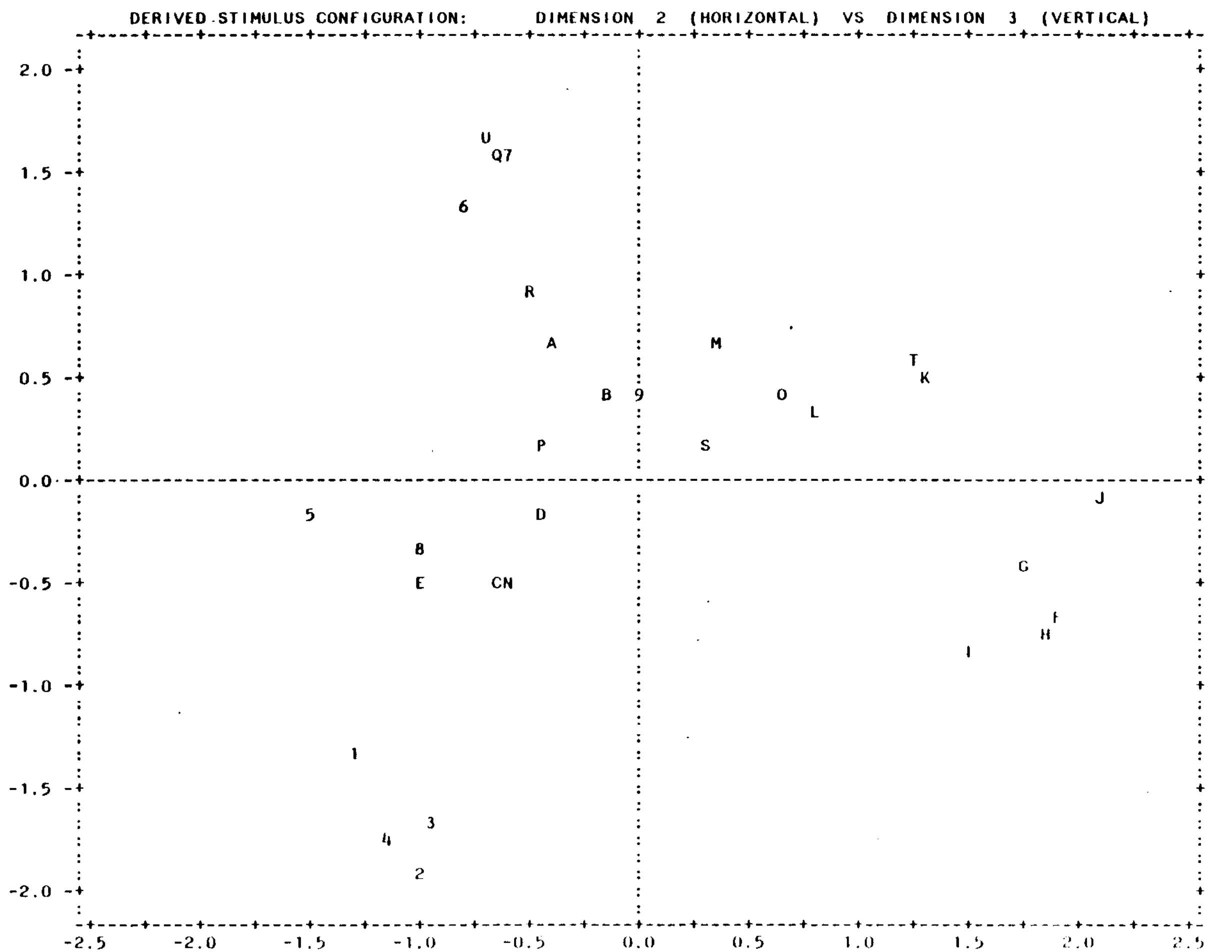


Figure 79: Five-Dimensional MDS Solution for Group B; DIM 1 x DIM 4

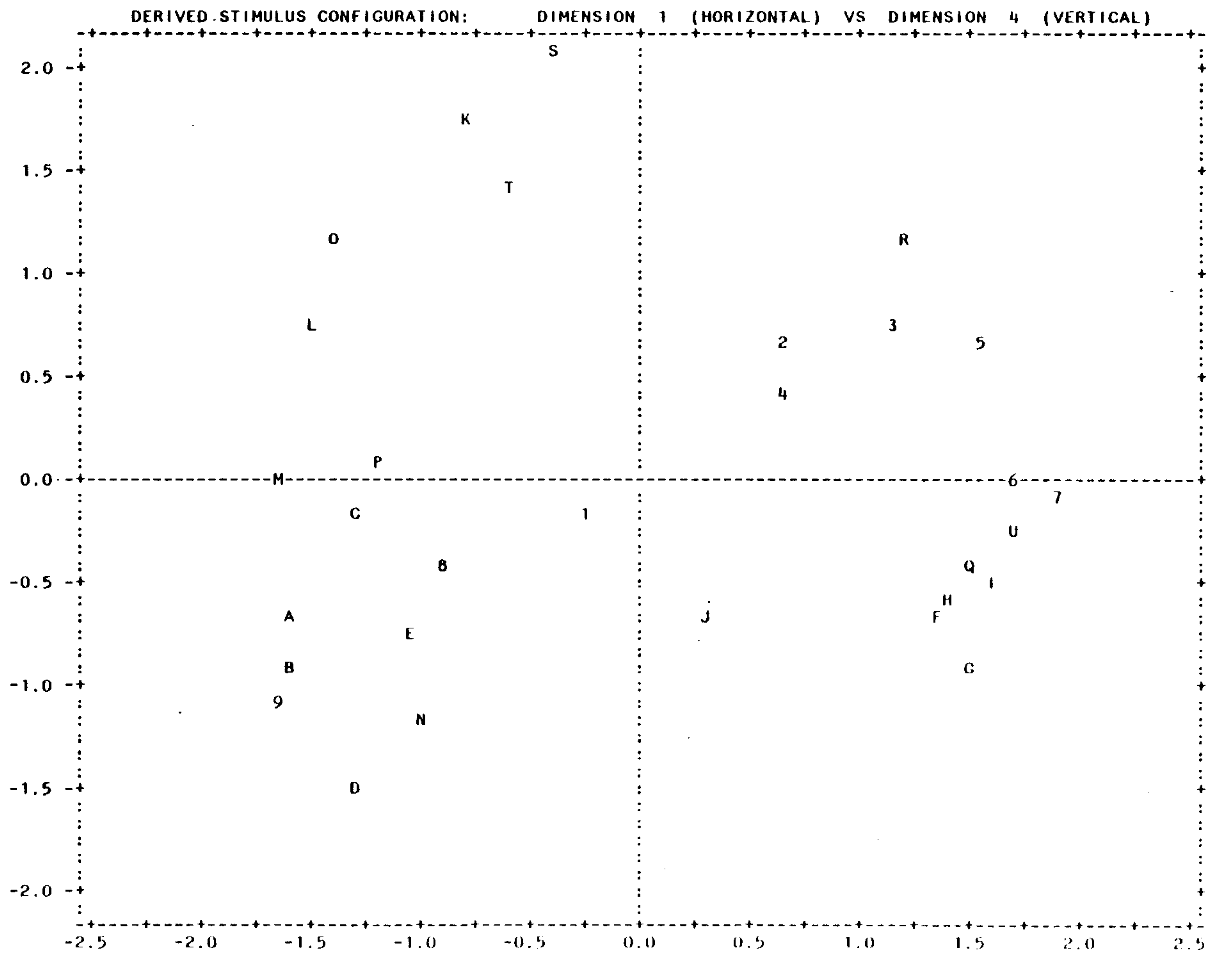


Figure 80: Five-Dimensional MDS Solution for Group B; DIM 2 x DIM 4

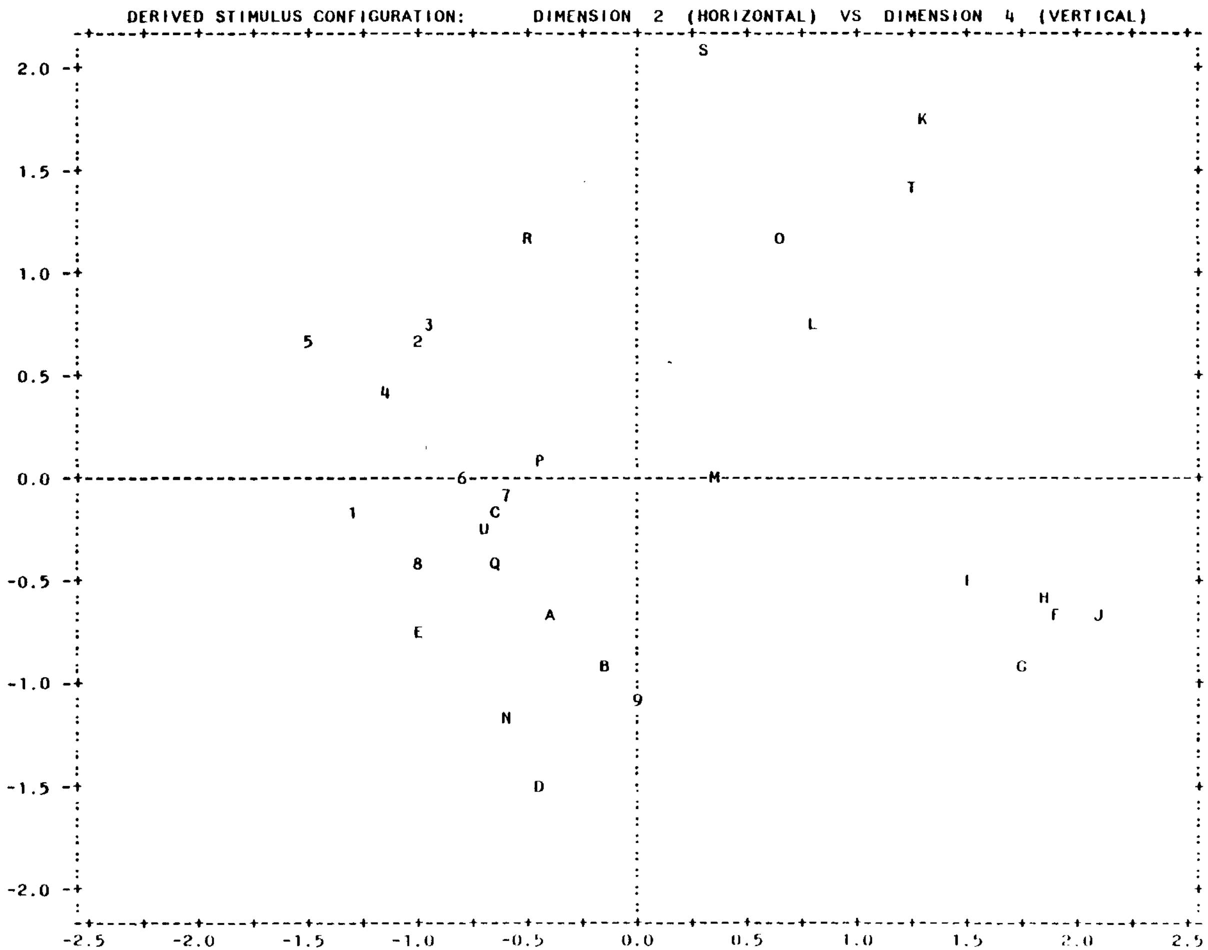


Figure 81: Five-Dimensional MDS Solution for Group B; DIM 3 x DIM 4

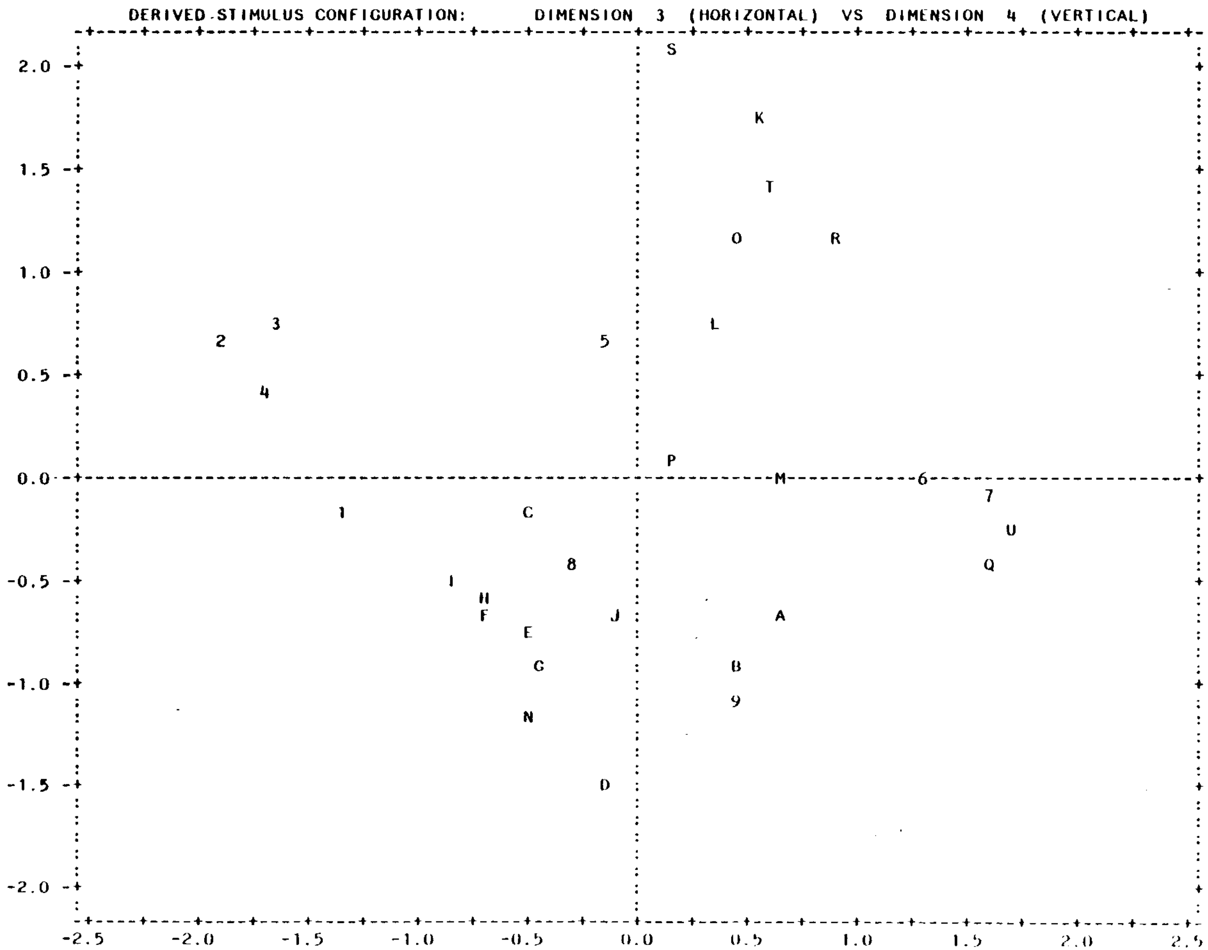


Figure 82: Five-Dimensional MDS Solution for Group B; DIM 1 x DIM 5

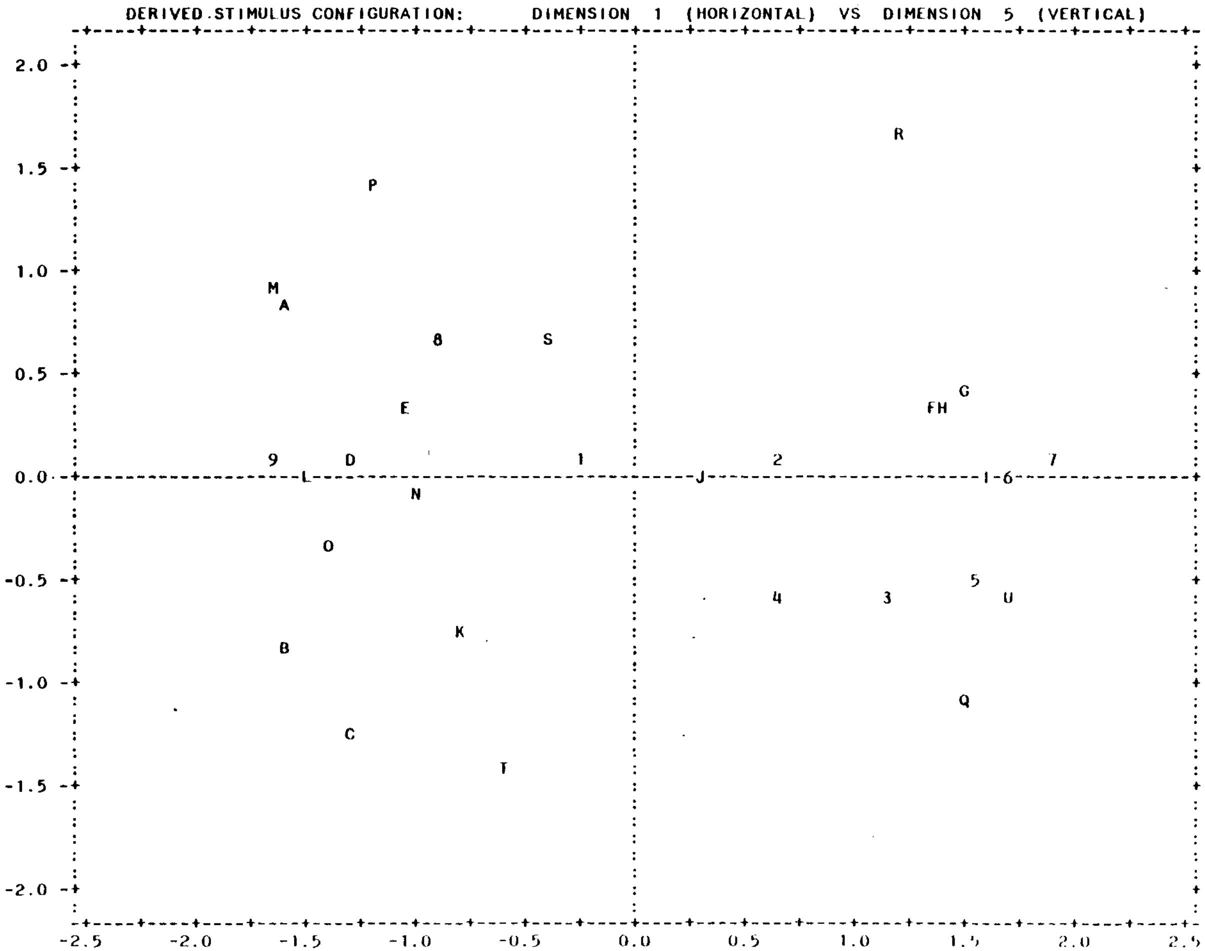


Figure 83: Five-Dimensional MDS Solution for Group B; DIM 2 x DIM 5

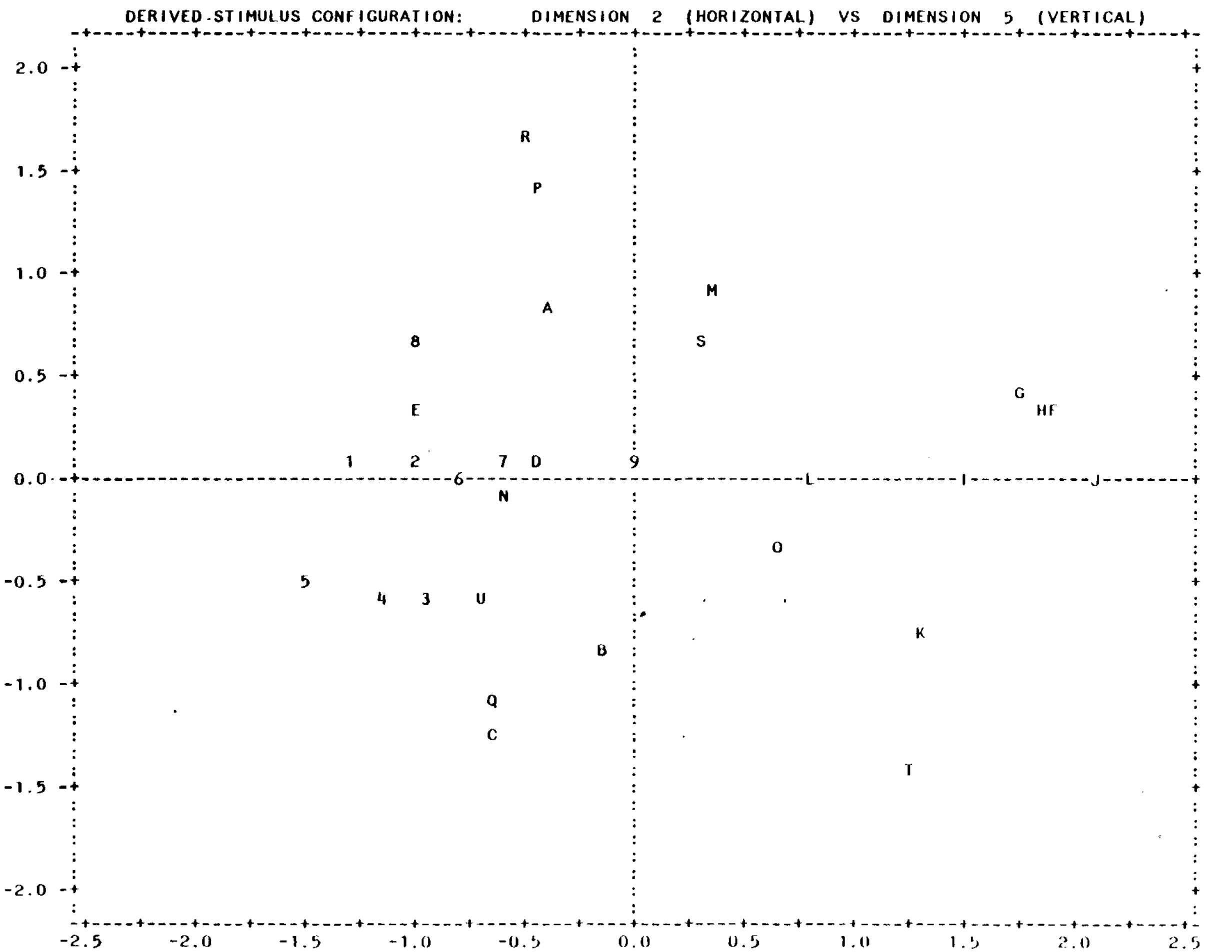


Figure 84: Five-Dimensional MDS Solution for Group B; DIM 3 x DIM 5

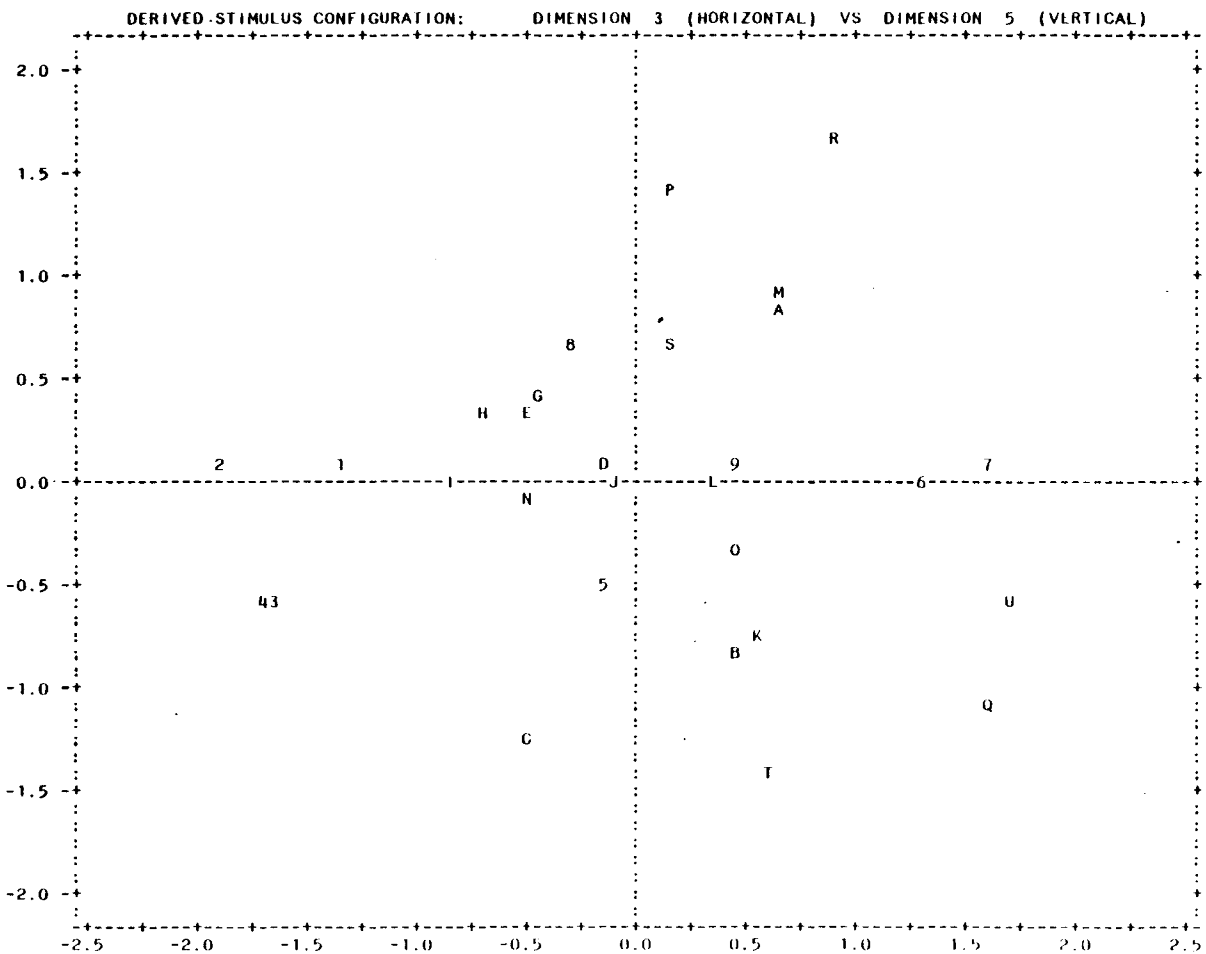


Figure 85: Five-Dimensional MDS Solution for Group B; DIM 4 x DIM 5

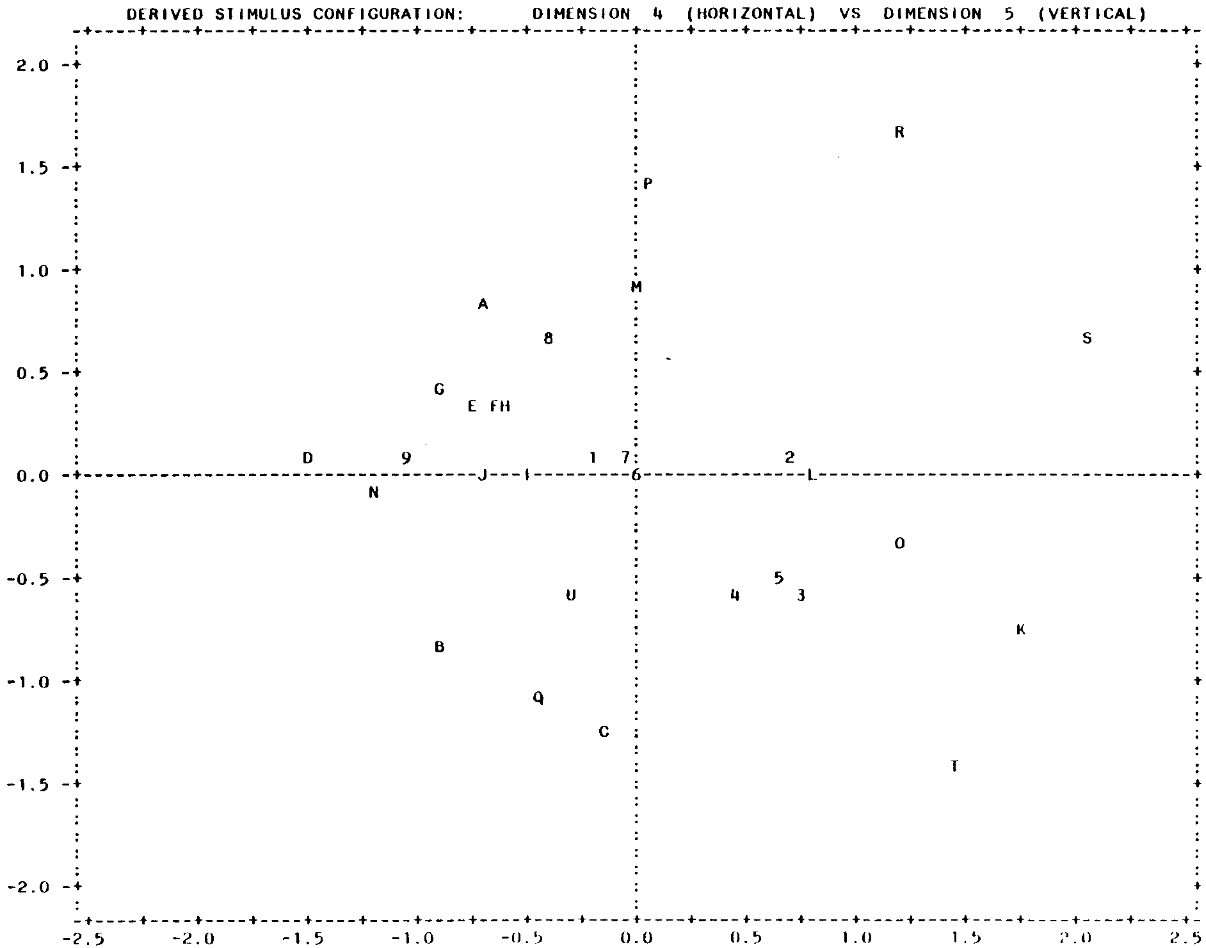


Figure 86: Five-Dimensional MDS Solution for Group B; Linear Fit Plot

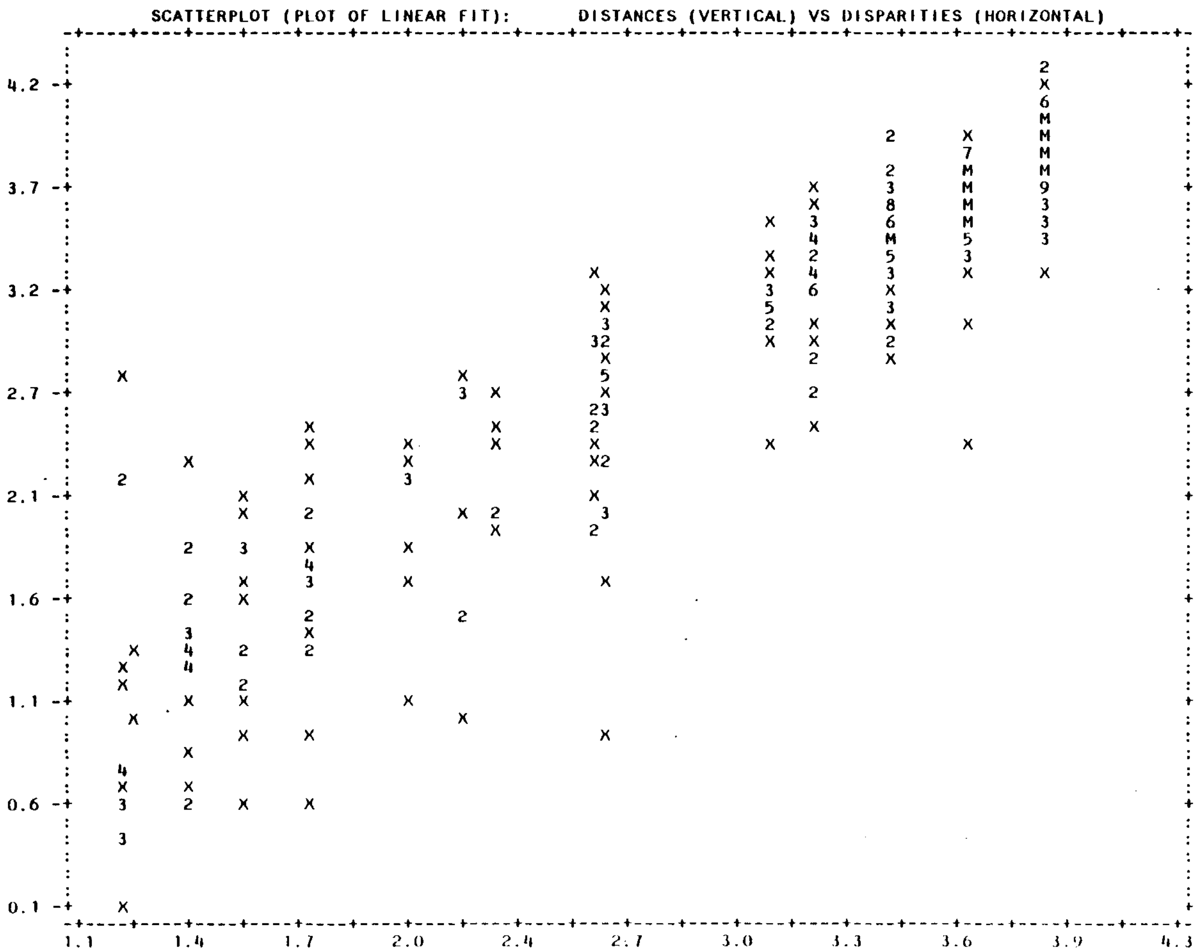


Figure 87: Five-Dimensional MDS Solution for Group B; Nonlinear Fit Plot

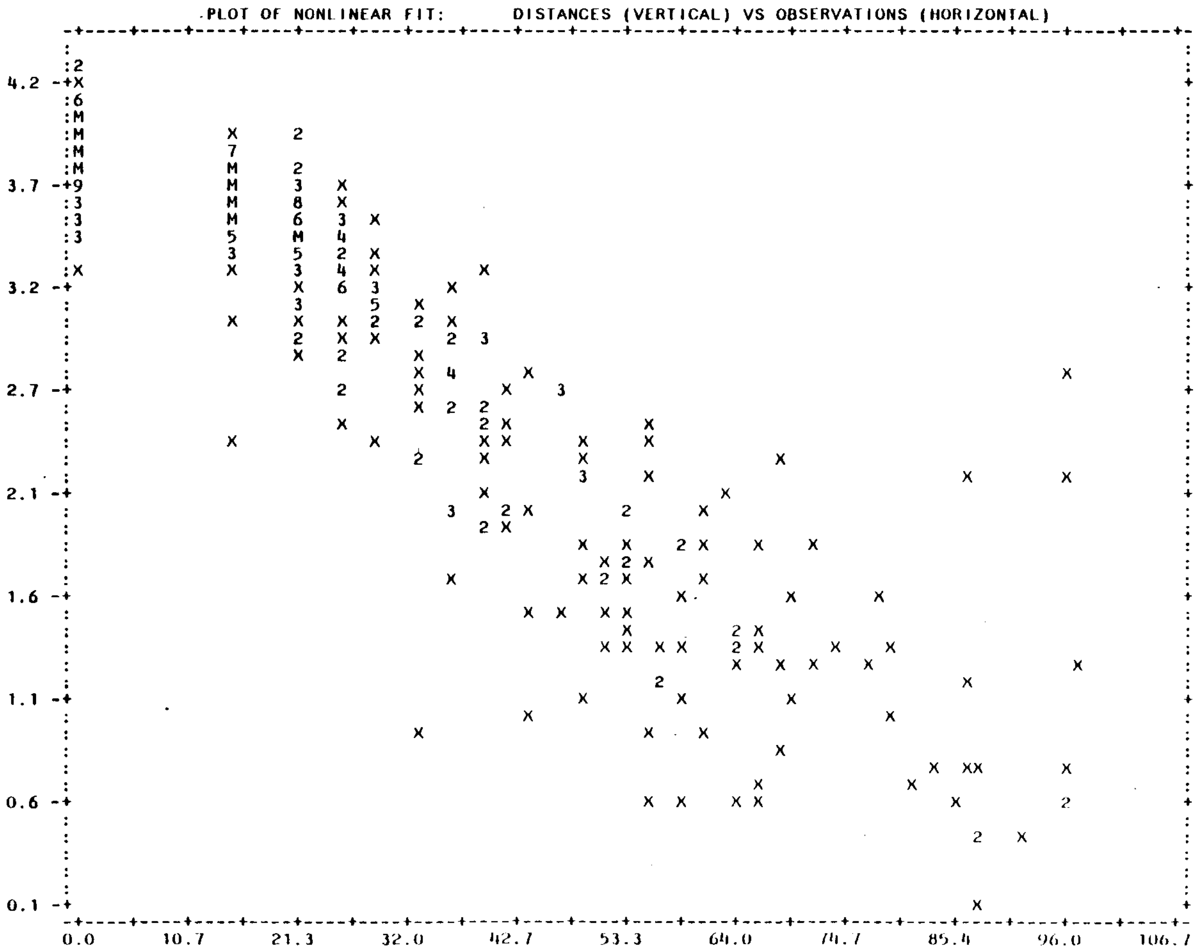


Figure 88: Five-Dimensional MDS Solution for Group B; Transformation Plot

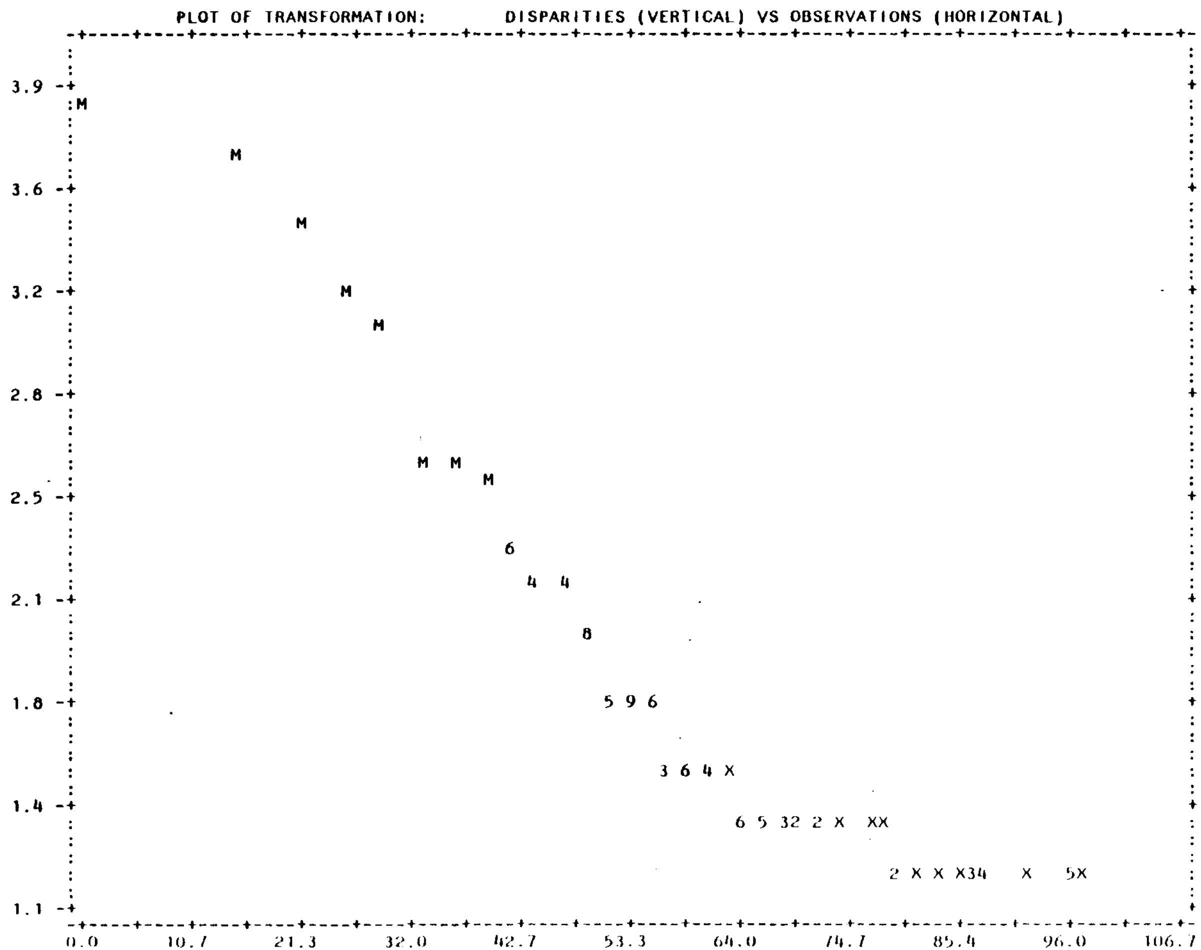


Table 19: Six-Dimensional MDS Solution Coordinates for Group B

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4	5	6
1	Q7	1	-0.2667	-1.3766	-1.5815	0.0794	0.4044	-0.0922
2	Q9	2	0.6404	-1.0637	-1.9581	-0.8306	0.5991	-0.2654
3	Q12	3	1.0346	-0.9708	-1.7653	-0.8541	0.5525	-0.7470
4	Q16	4	0.5970	-1.2316	-1.8916	-0.5926	0.1205	-0.7047
5	Q21	5	1.5149	-1.5767	-0.4085	-0.7341	0.3861	-0.5926
6	Q24	6	1.7703	-0.9200	1.5087	-0.1246	0.1564	-0.0110
7	Q28	7	1.8727	-0.7668	1.7830	-0.0778	-0.0343	0.1186
8	Q36	8	-1.0929	-0.8654	-0.2312	0.5373	1.0258	0.5318
9	Q39	9	-1.5567	0.1159	0.4459	1.0482	1.1656	0.1905
10	Q42	A	-1.4719	-0.4303	0.3553	0.6625	-1.6046	0.3214
11	Q44	B	-1.5374	-0.1749	0.3148	1.0756	-1.0114	-0.6260
12	Q46	C	-1.1489	-0.6804	-0.3958	0.4870	-1.7049	-0.4974
13	Q48	D	-1.3124	-0.6017	-0.1384	1.5238	-0.7721	0.0994
14	Q49	E	-1.2458	-1.0420	-0.4516	0.9926	-0.1080	0.4602
15	Q51	F	1.4239	1.9744	-0.7433	0.6902	-0.3873	0.4683
16	Q52	G	1.5305	1.8835	-0.5851	0.7986	-0.3595	0.5206
17	Q55	H	1.4459	1.9346	-0.7705	0.6329	-0.3865	0.5072
18	Q57	I	1.5949	1.7251	-0.9281	0.5778	-0.2312	0.1673
19	Q60	J	0.5615	2.2108	-0.2631	0.7556	0.2362	0.0708
20	Q68	K	-0.8087	1.3087	0.5783	-1.9522	-0.0972	-0.8352
21	Q69	L	-1.4839	0.8696	0.5248	-0.7688	1.0014	-0.0043
22	Q71	M	-1.4992	0.4678	0.5987	0.0805	1.5202	0.4462
23	Q77	N	-1.1571	-0.5116	-0.2469	1.3864	0.8758	-0.0883
24	Q80	O	-1.4336	0.7959	0.5791	-1.4254	-0.2616	-0.4879
25	Q83	P	-1.2054	-0.4606	0.3266	-0.0175	0.3261	1.6926
26	Q88	Q	1.5945	-0.6942	1.7579	0.3803	0.0803	-1.0930
27	Q90	R	1.0163	-0.6311	0.9433	-1.1704	-0.3945	1.8902
28	Q103	S	-0.4091	0.1442	0.2371	-1.9575	-1.1379	0.9988
29	Q105	T	-0.6847	1.3040	0.6098	-1.4885	-0.0761	-1.5703
30	Q108	U	1.7168	-0.7360	1.7960	0.2854	0.1164	-0.8687

Figure 89: Six-Dimensional MDS Solution for Group B; DIM 1 x DIM 2

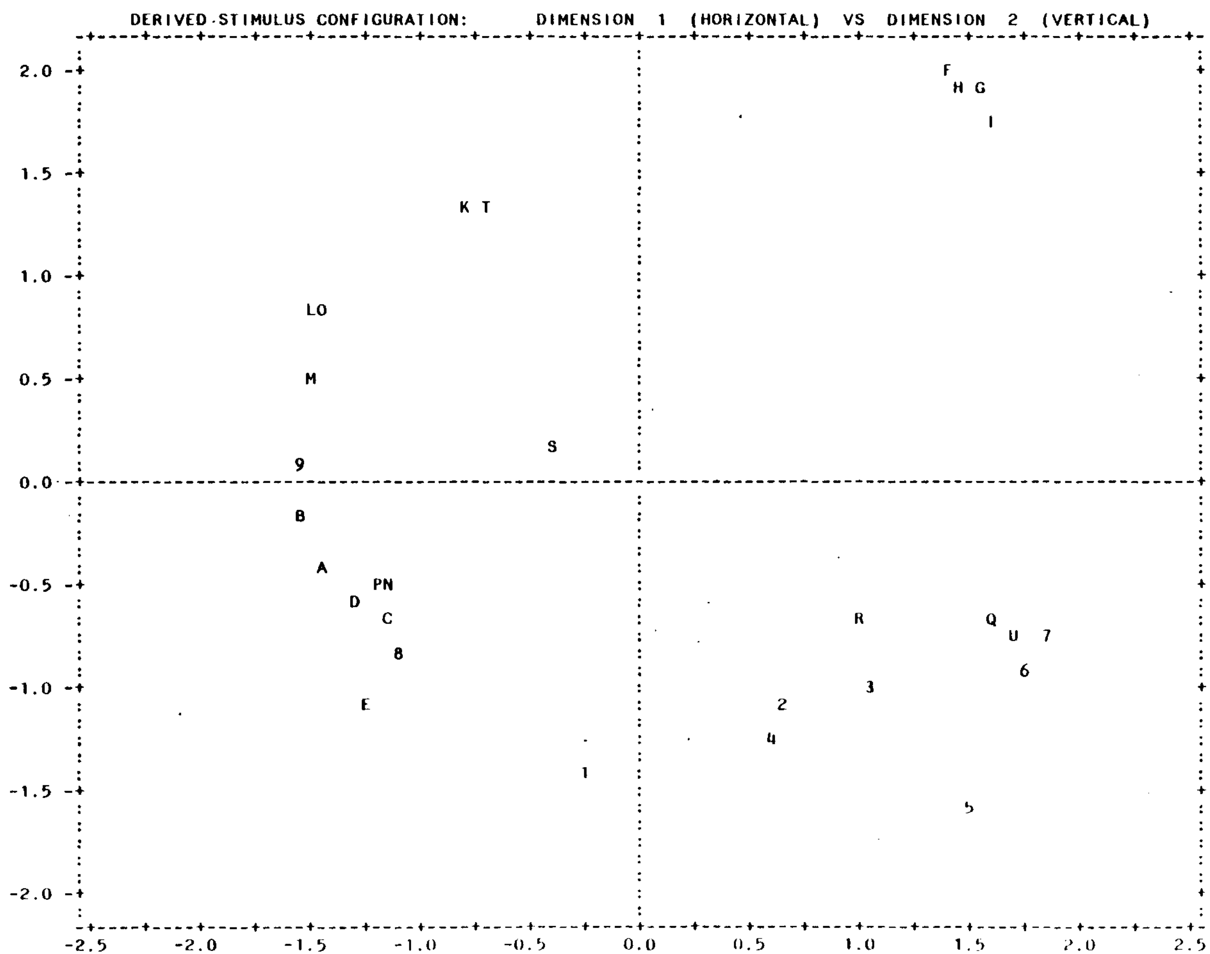


Figure 90: Six-Dimensional MDS Solution for Group B; DIM 1 x DIM 3

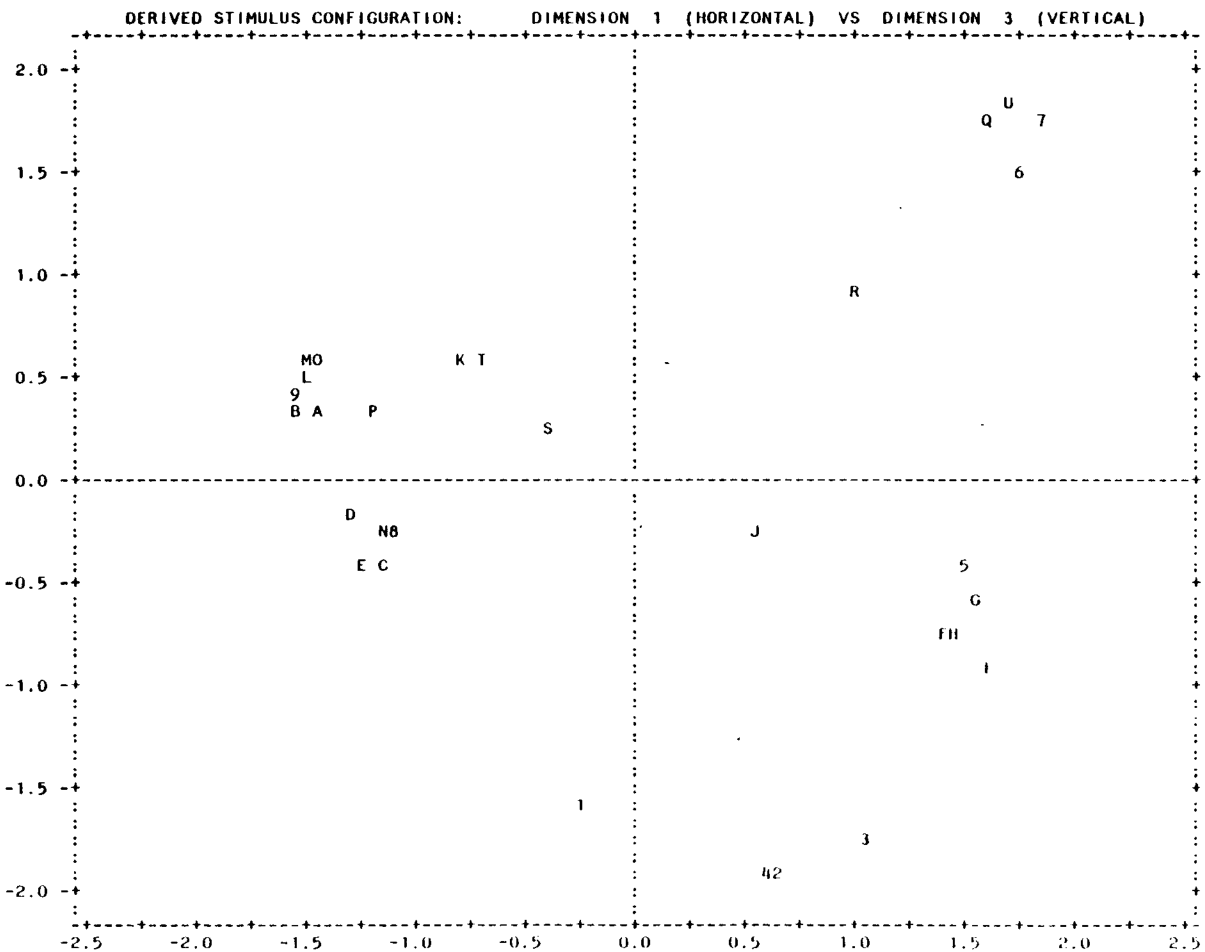


Figure 91: Six-Dimensional MDS Solution for Group B; DIM 2 x DIM 3

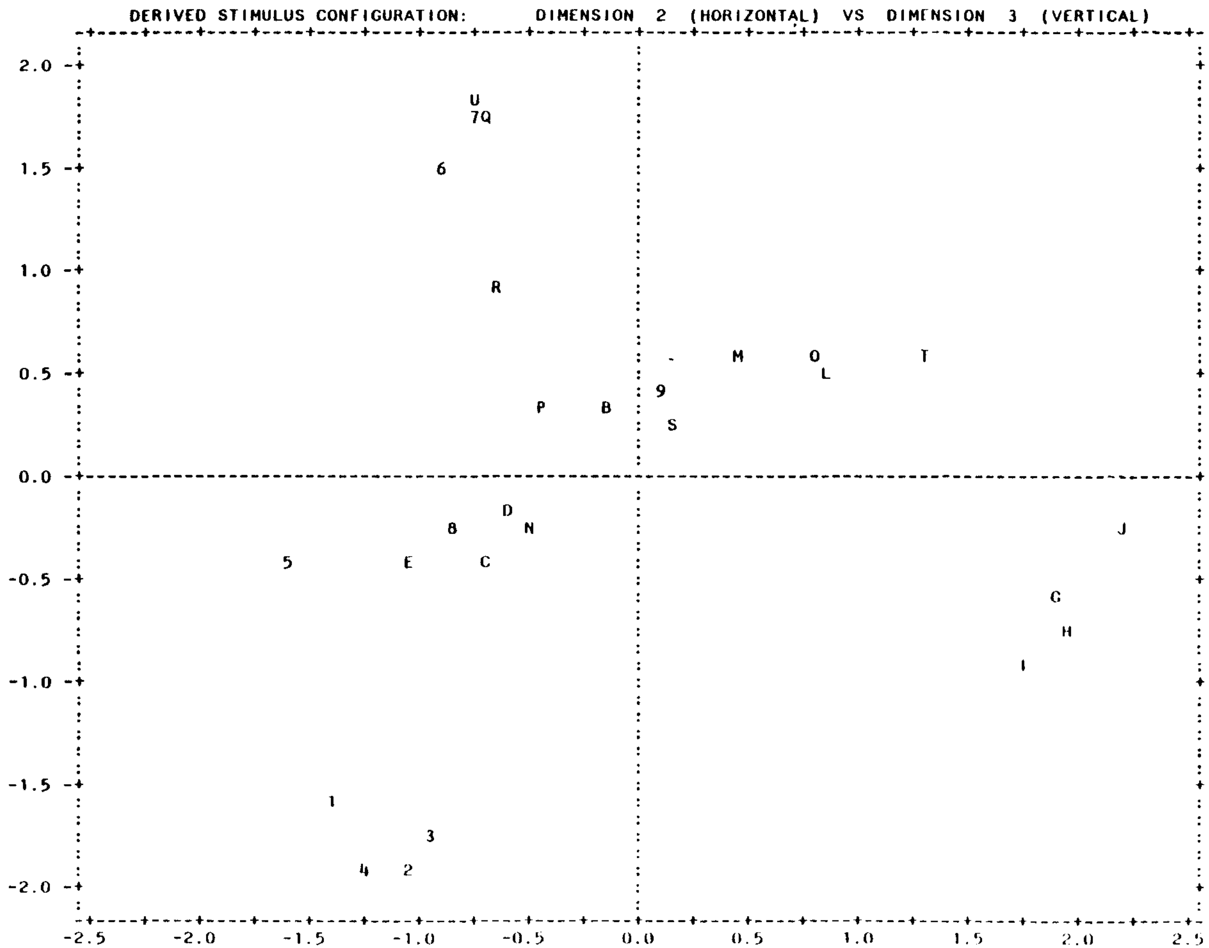


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Figure 92: Six-Dimensional MDS Solution for Group B; DIM 1 x DIM 4

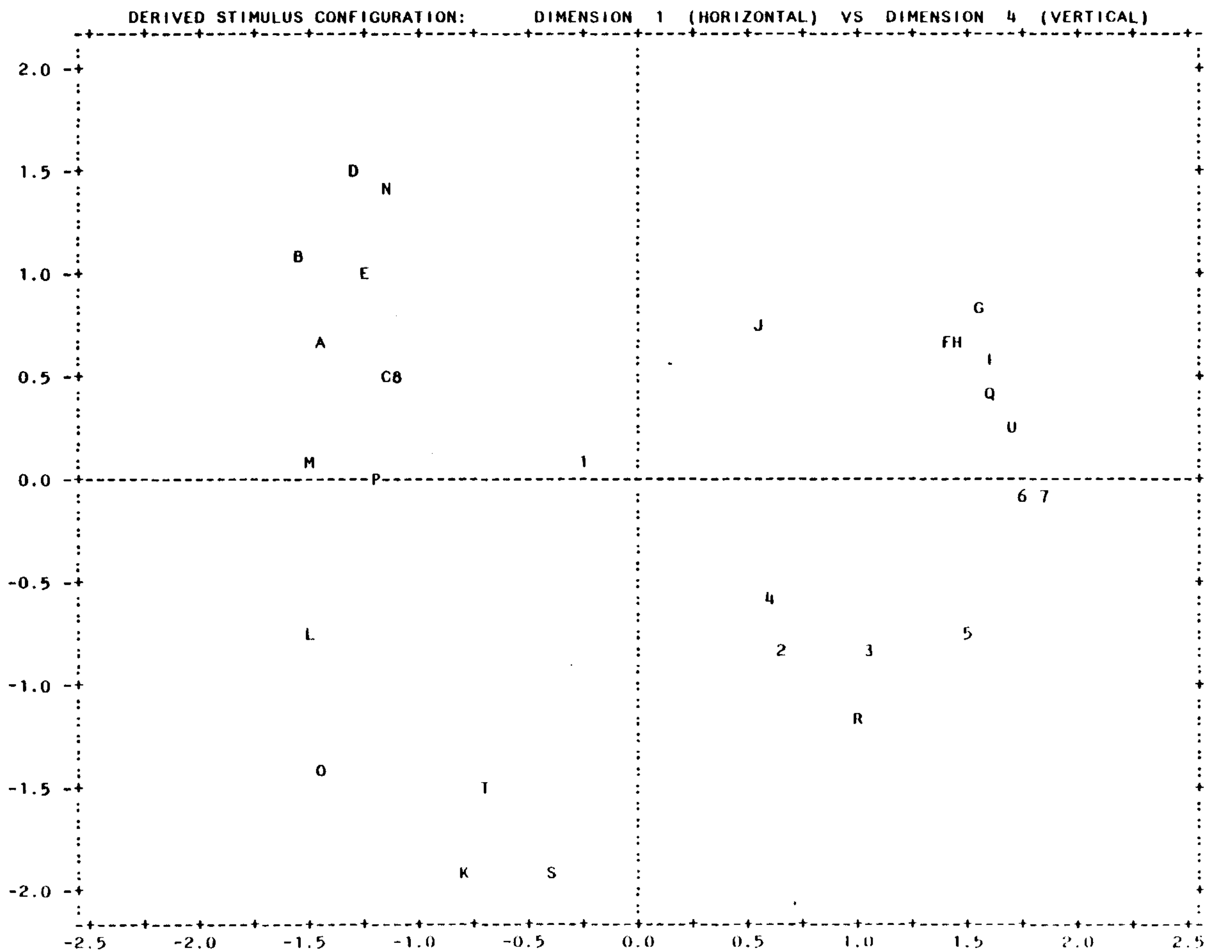


Figure 93: Six-Dimensional MDS Solution for Group B; DIM 2 x DIM 4

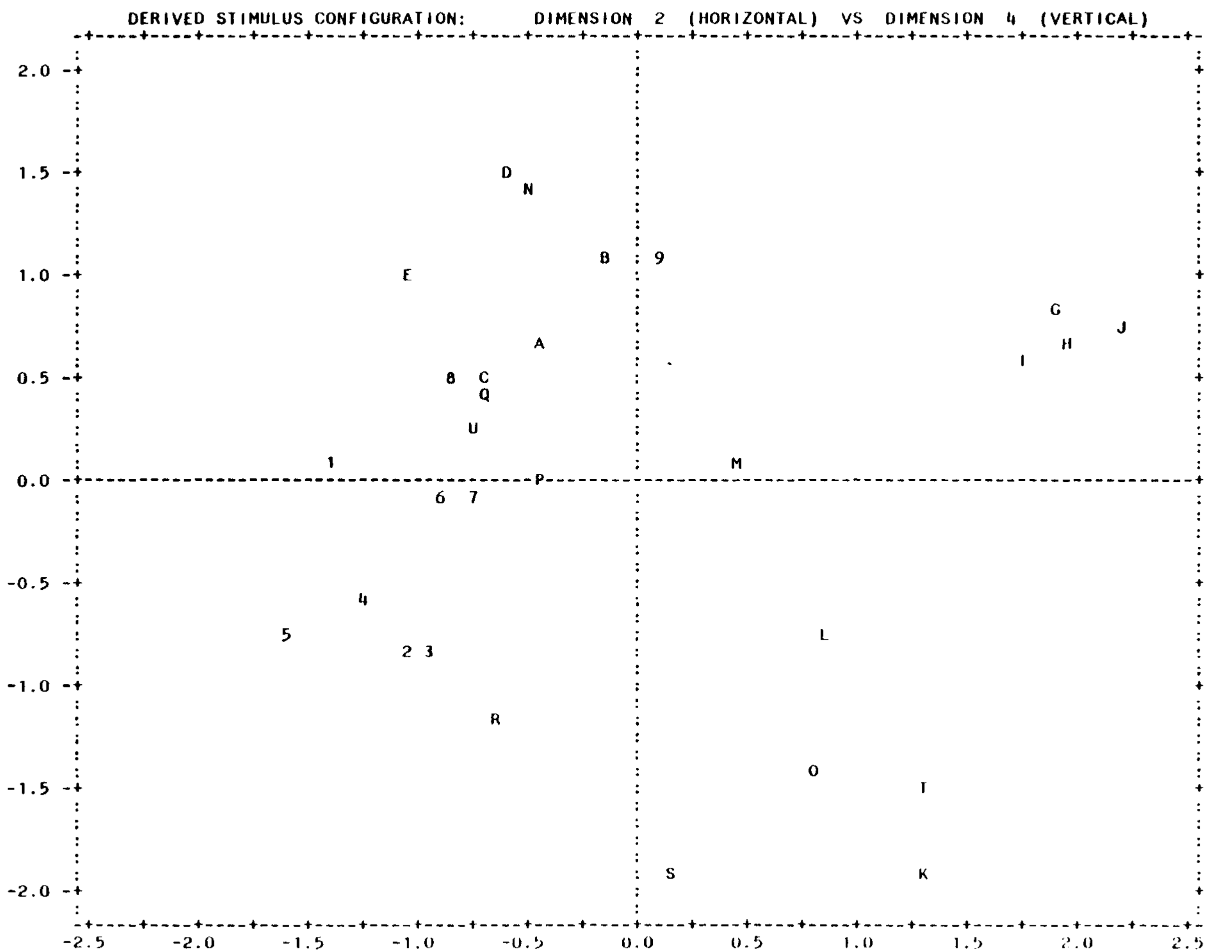


Figure 94: Six-Dimensional MDS Solution for Group B; DIM 3 x DIM 4

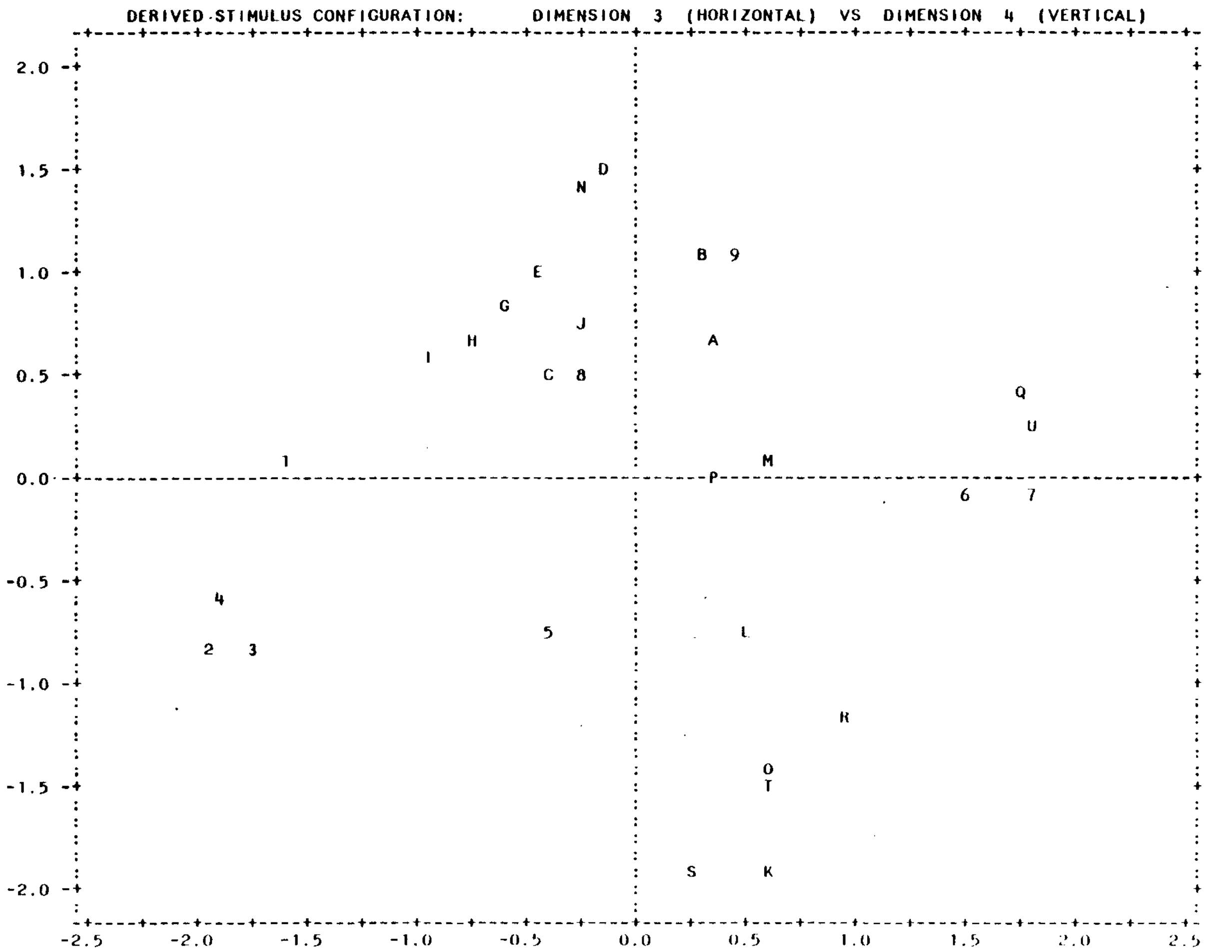


Figure 95: Six-Dimensional MDS Solution for Group B; DIM 1 x DIM 5

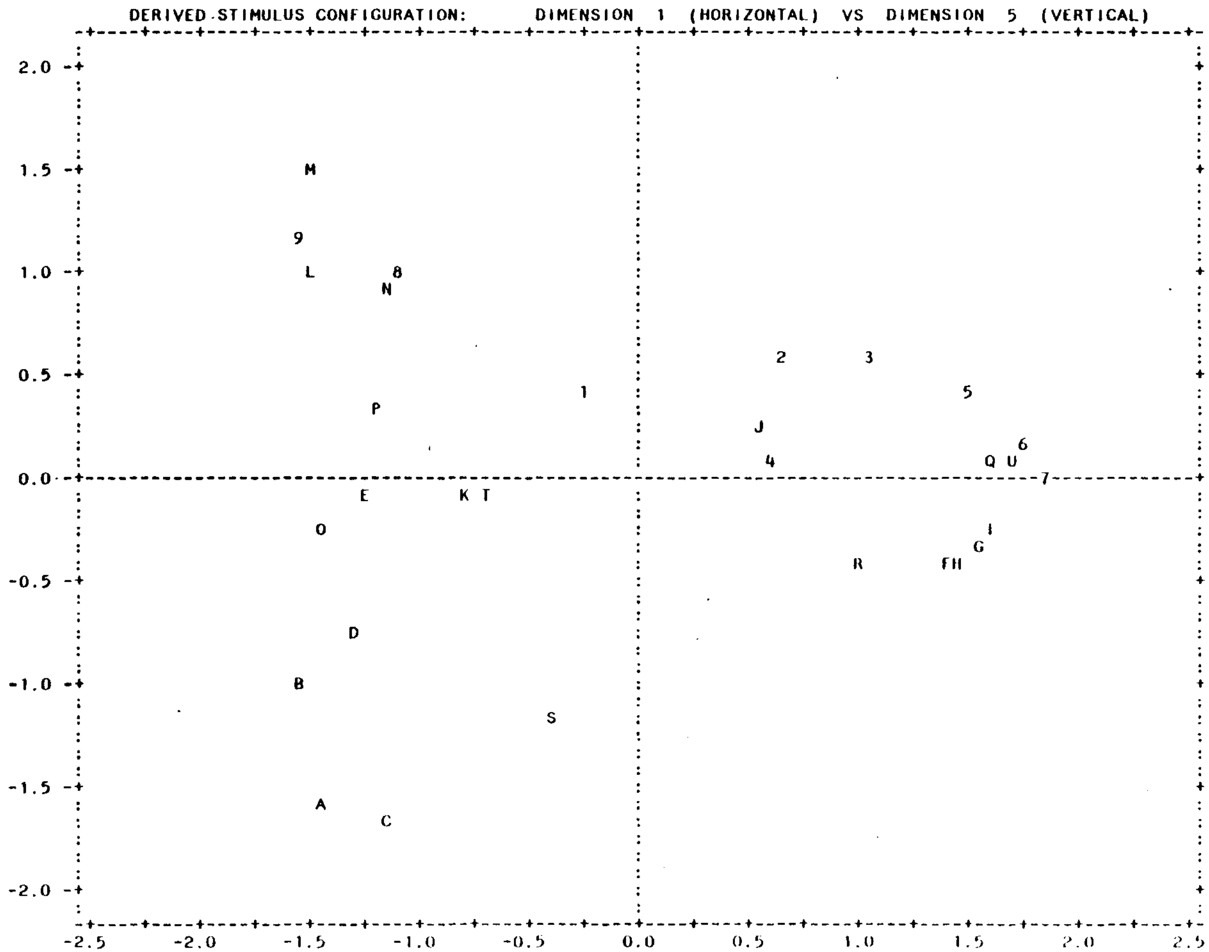


Figure 96: Six-Dimensional MDS Solution for Group B; DIM 2 x DIM 5

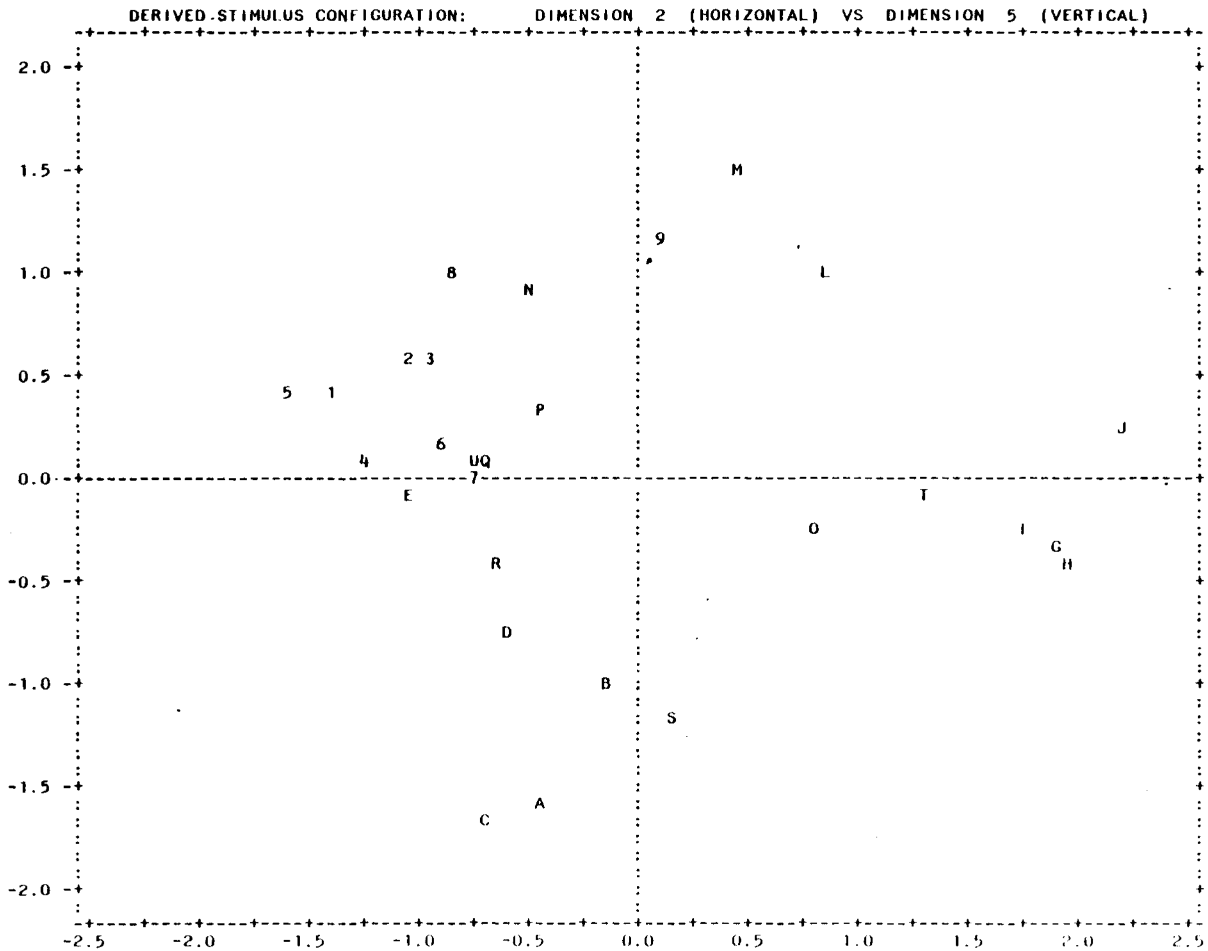


Figure 97: Six-Dimensional MDS Solution for Group B; DIM 3 x DIM 5

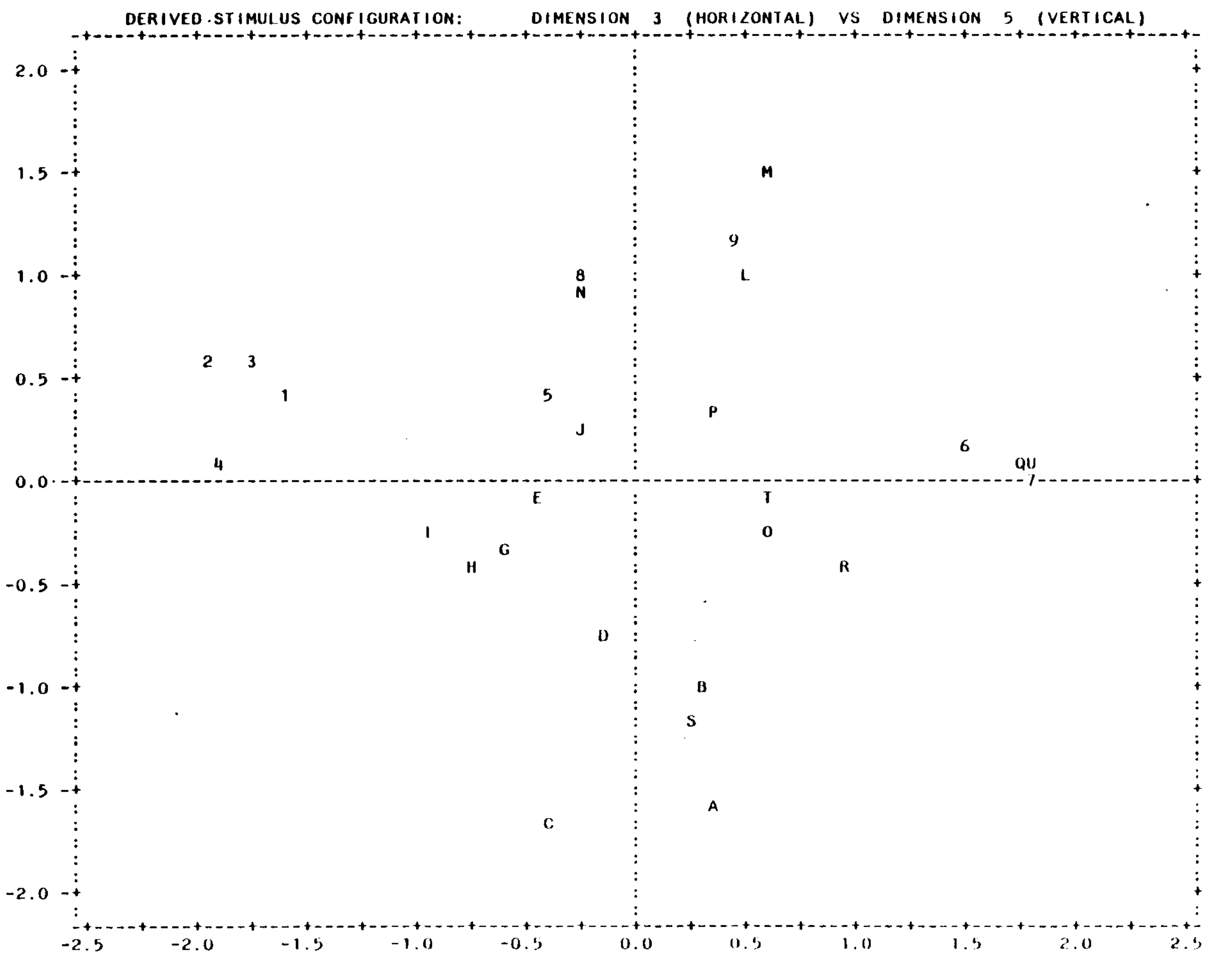


Figure 98: Six-Dimensional MDS Solution for Group B; DIM 4 x DIM 5

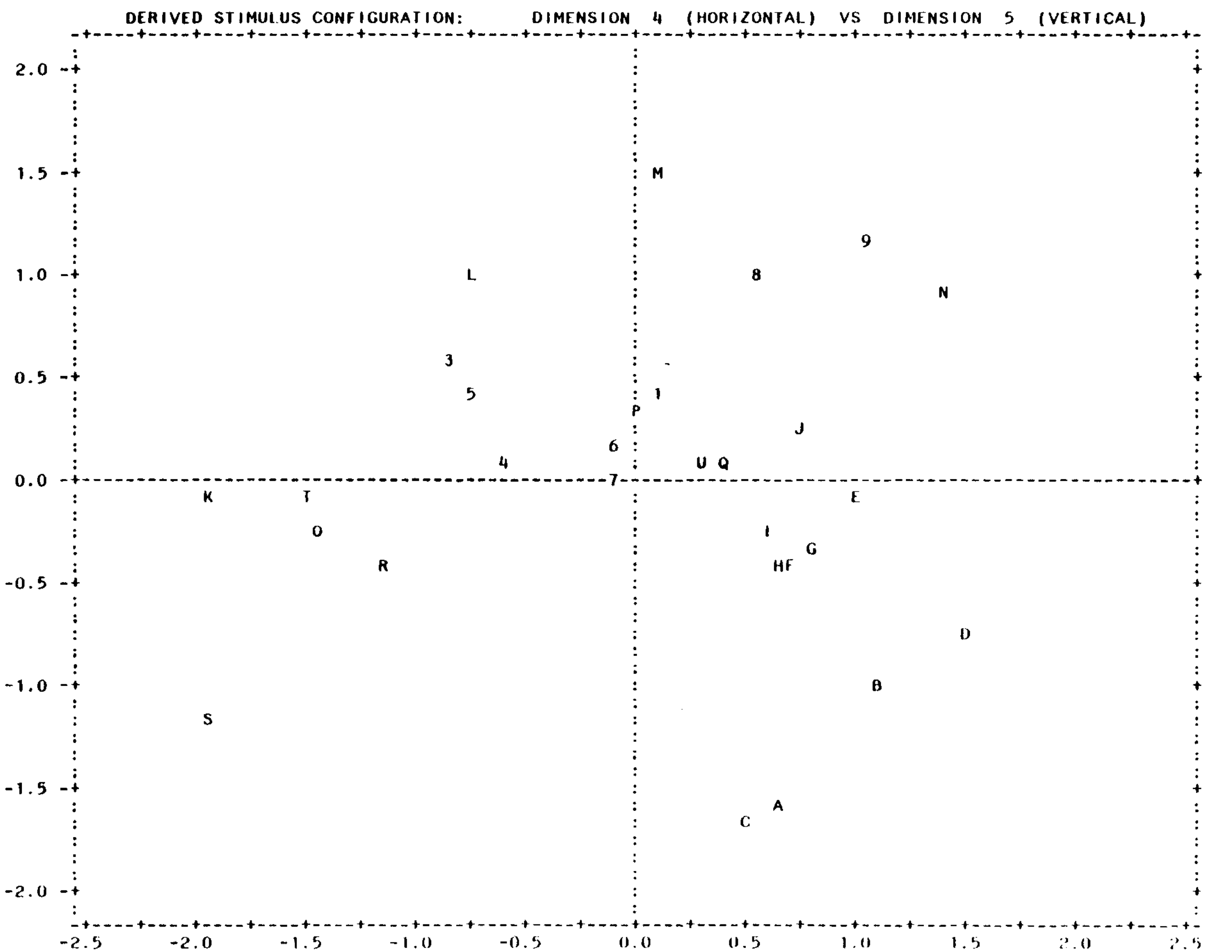


Figure 99: Six-Dimensional MDS Solution for Group B; DIM 1 x DIM 6

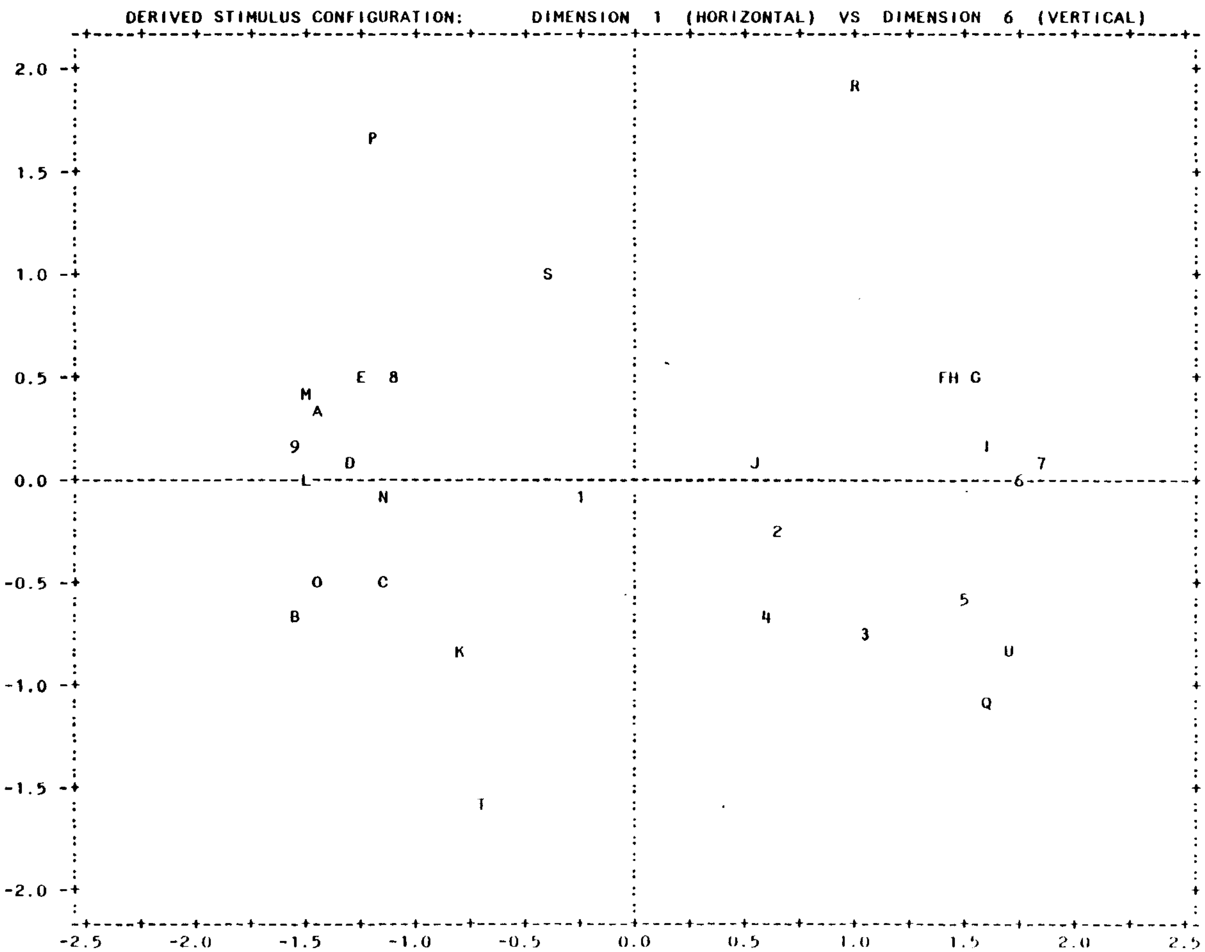


Figure 100: Six-Dimensional MDS Solution for Group B; DIM 2 x DIM 6

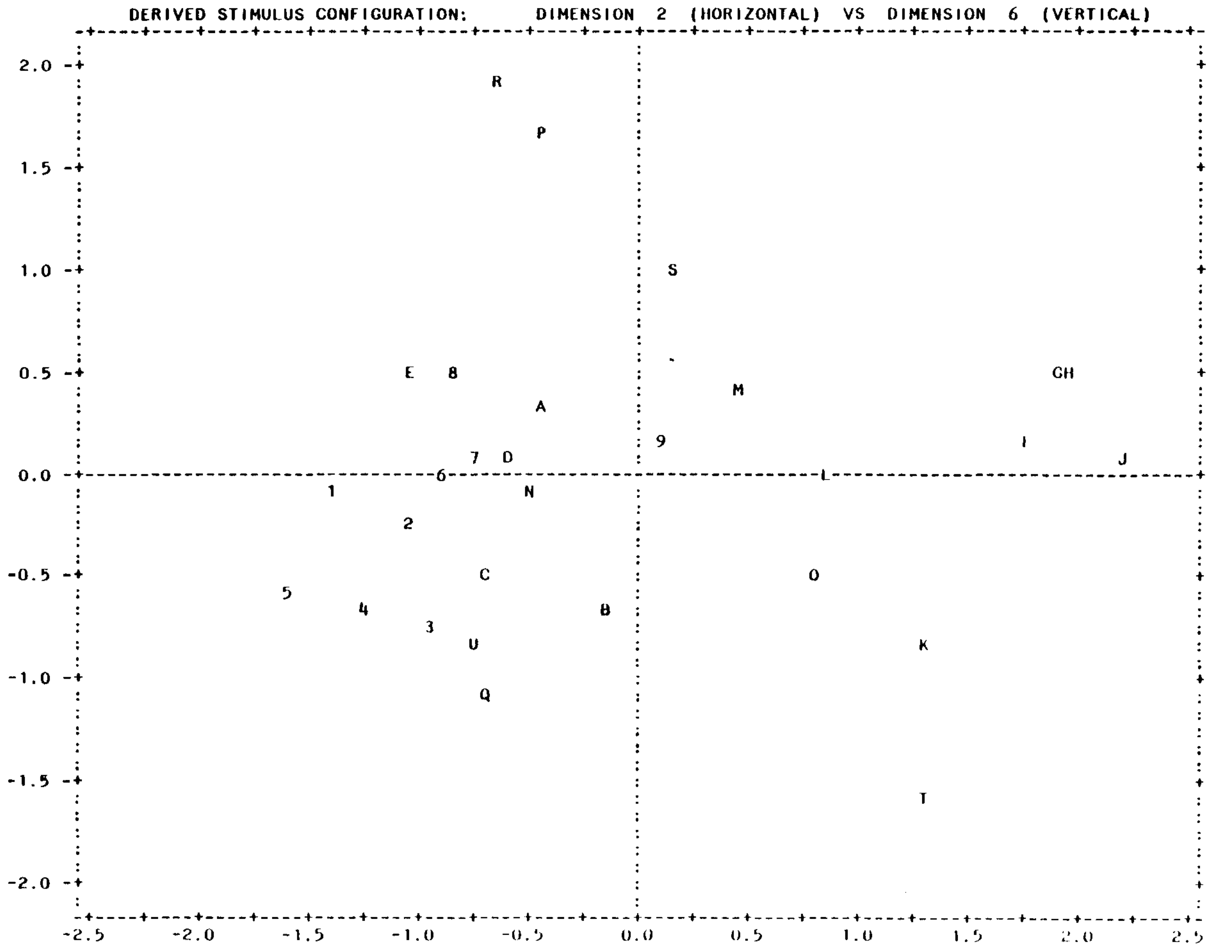


Figure 101: Six-Dimensional MDS Solution for Group B; DIM 3 x DIM 6

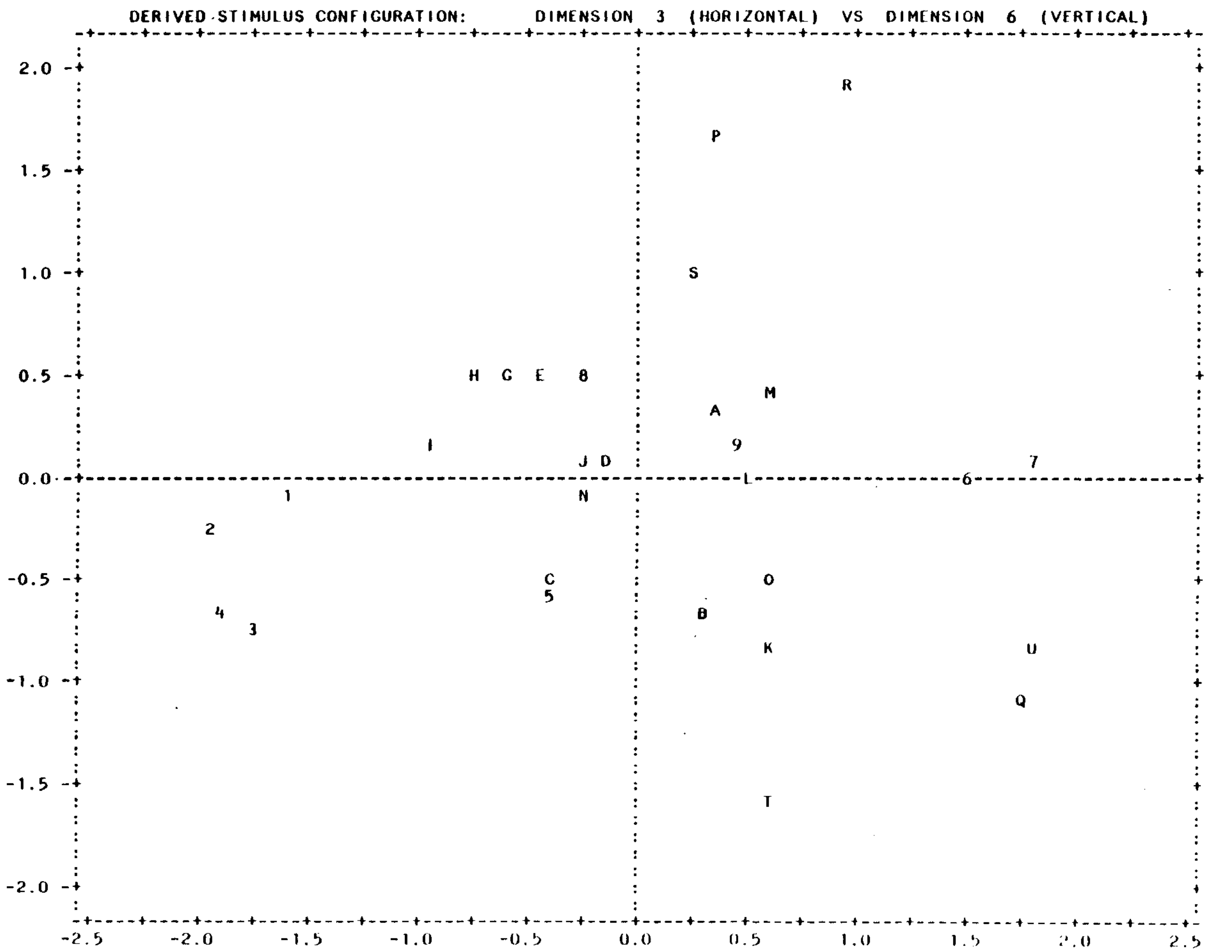


Figure 102: Six-Dimensional MDS Solution for Group B; DIM 4 x DIM 6

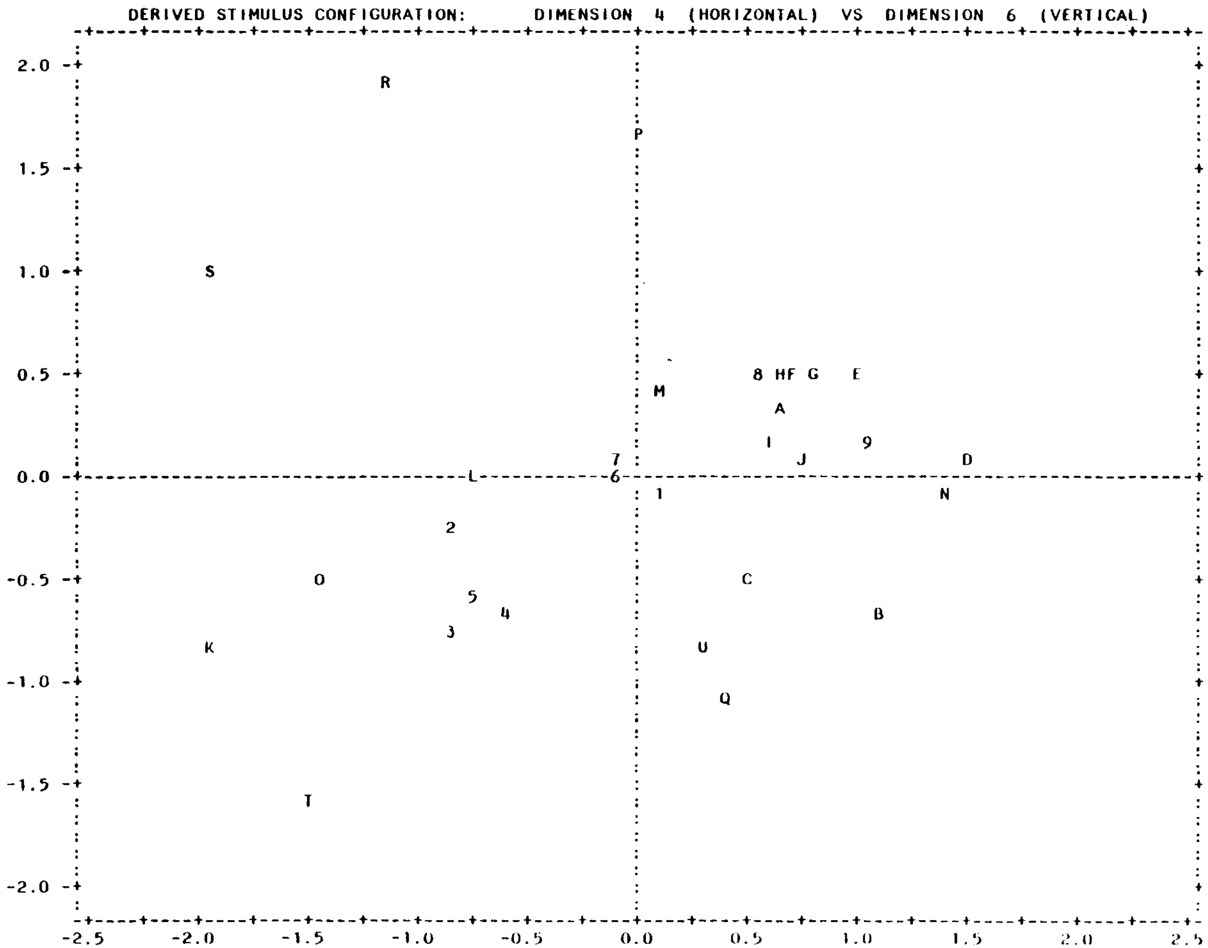


Figure 103: Six-Dimensional MDS Solution for Group B; DIM 5 x DIM 6

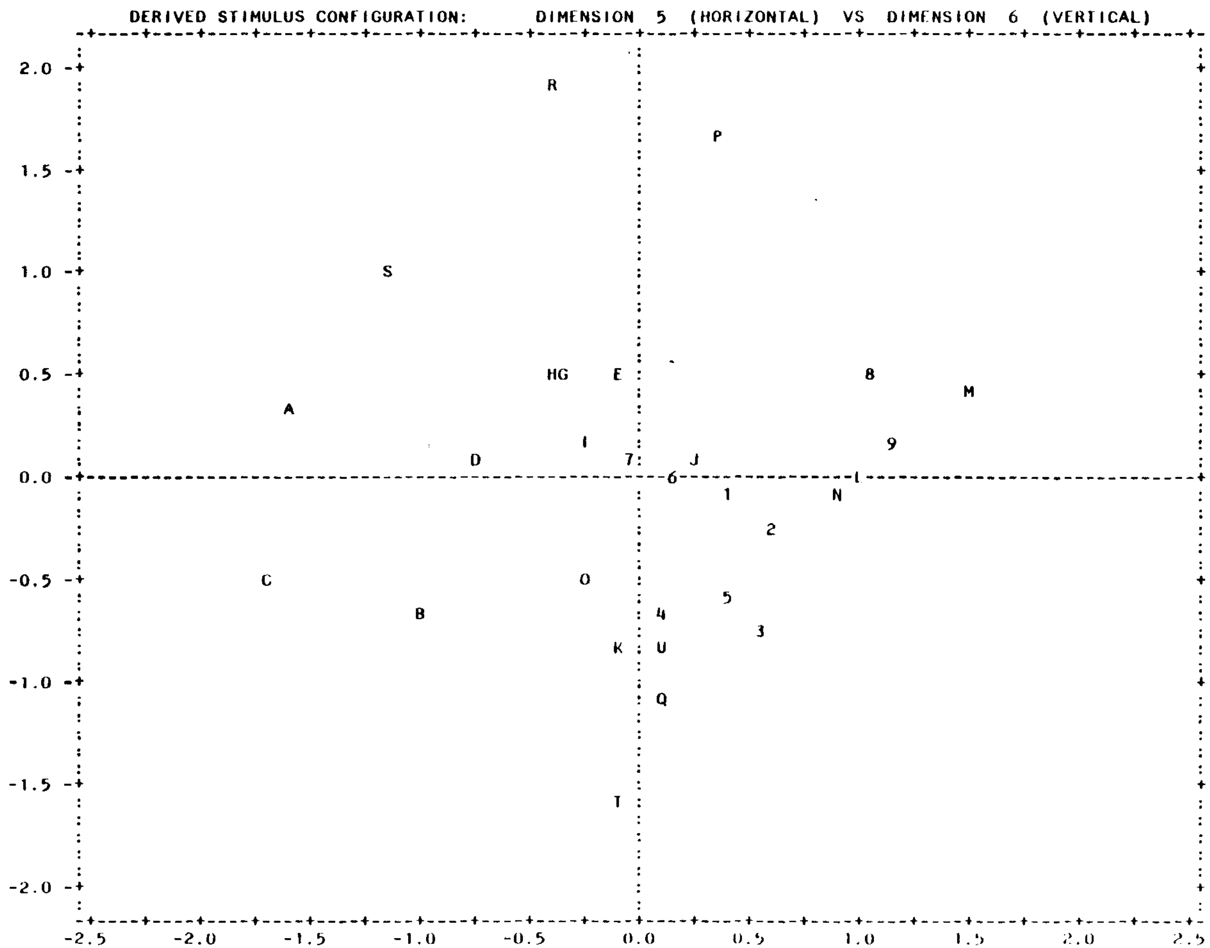


Figure 104: Six-Dimensional MDS Solution for Group B; Linear Fit Plot

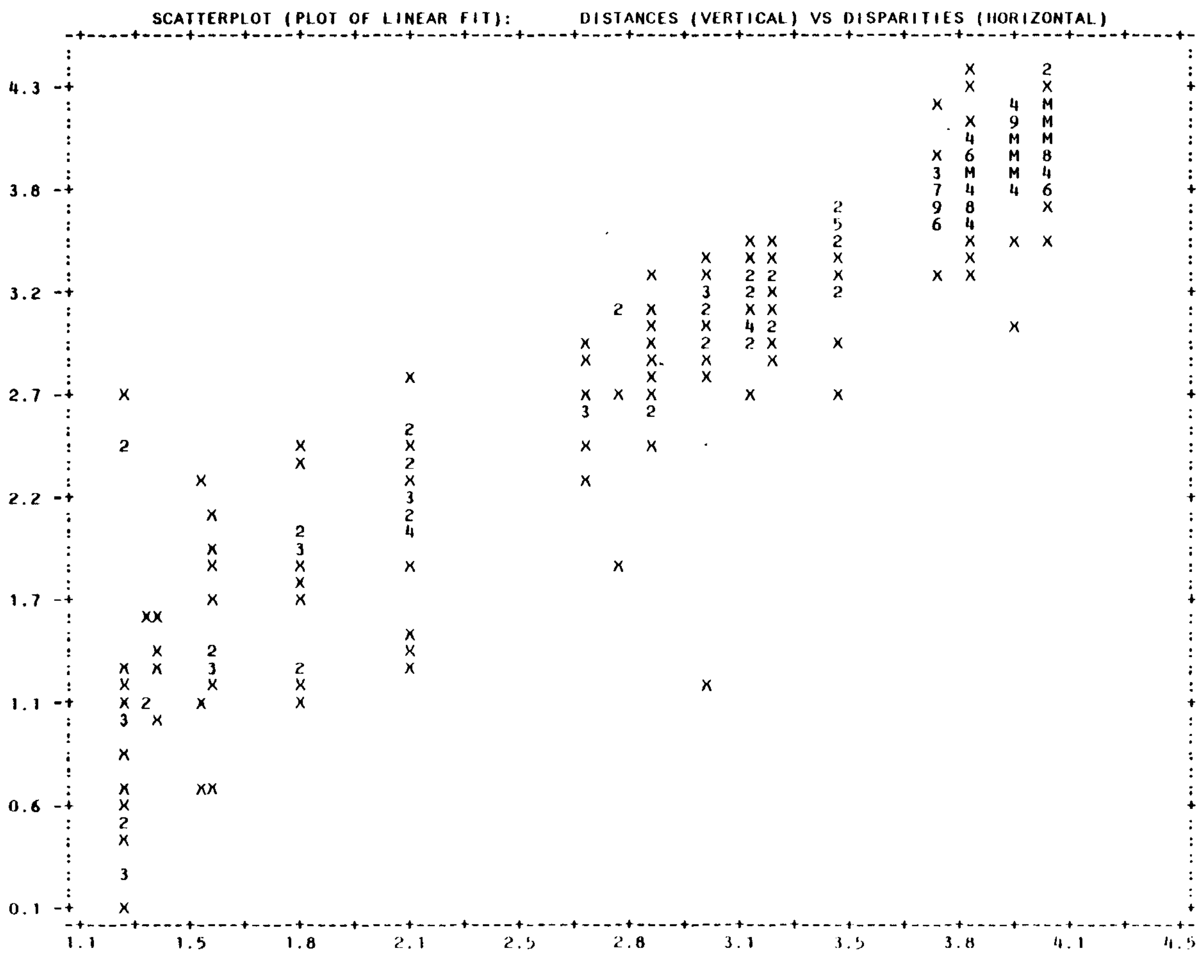


Figure 105: Six-Dimensional MDS Solution for Group B; Nonlinear Fit Plot

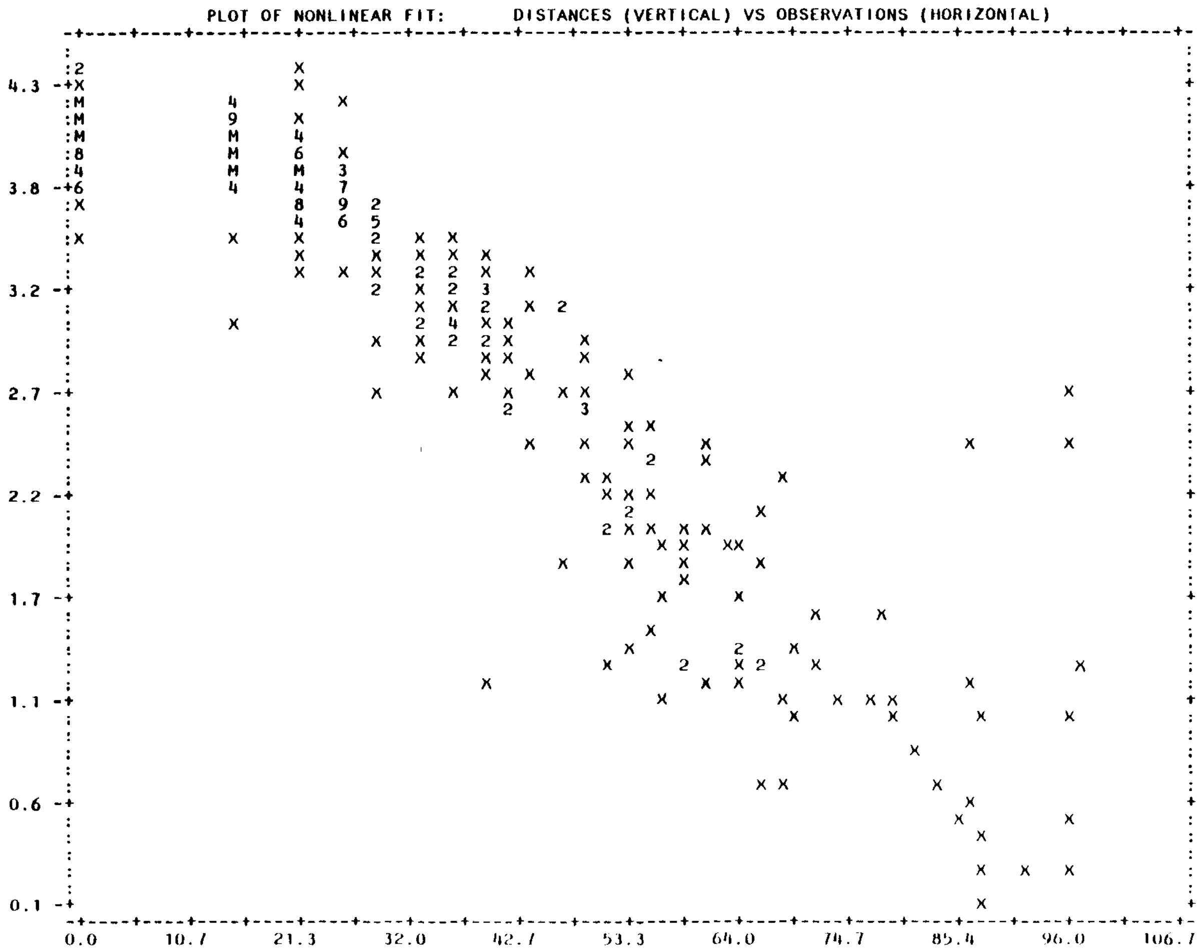
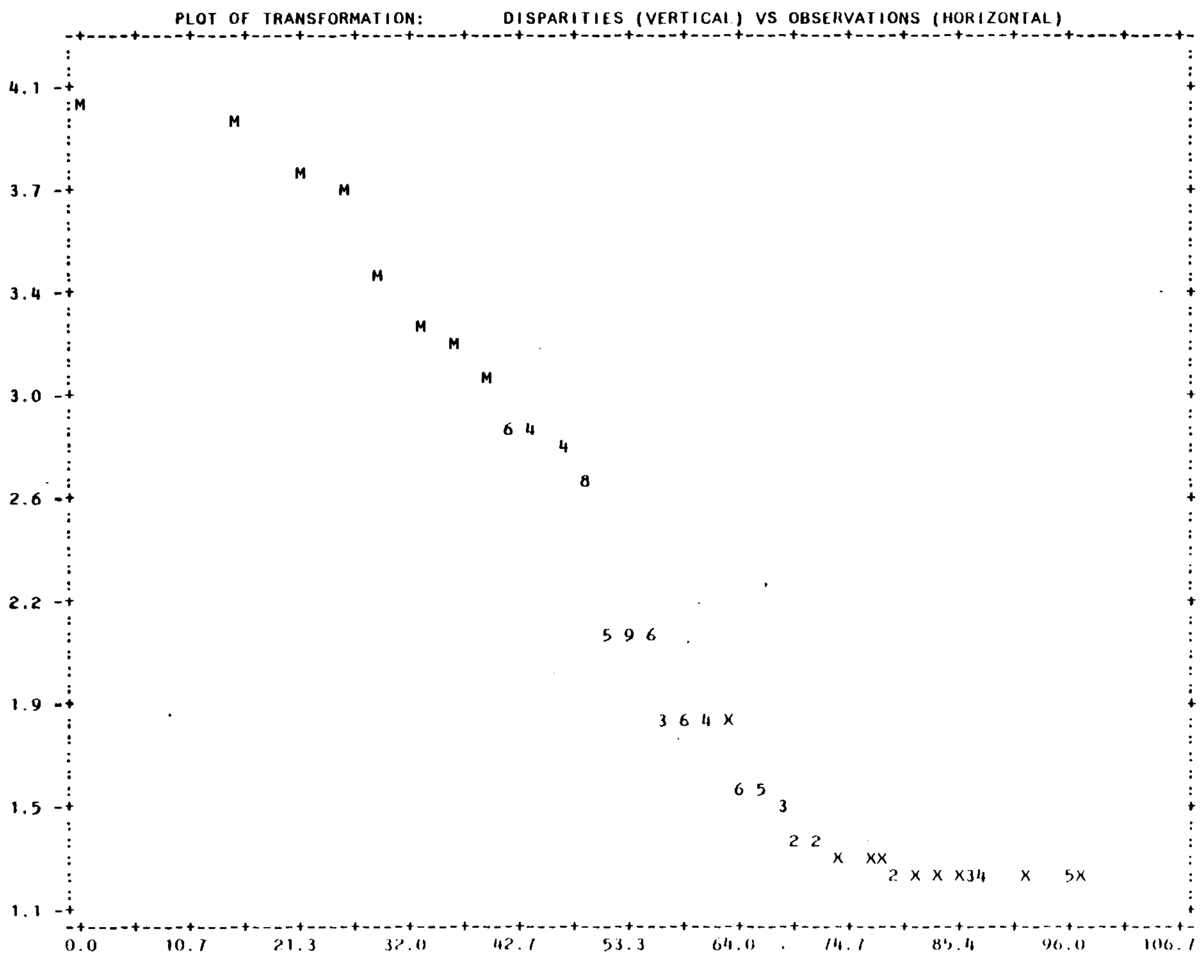


Figure 106: Six-Dimensional MDS Solution for Group B; Transformation Plot



Appendix C

Table 20: Two-Dimensional MDS Solution Coordinates for Attribution Group

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	DIMENSION 2
1	Q2	1	1.2918	-0.1820
2	Q3	2	1.3423	0.0519
3	Q4	3	1.4109	0.2076
4	Q5	4	1.2898	-0.7630
5	Q6	5	1.3263	0.1708
6	Q35	6	1.5373	-0.1472
7	Q36	7	1.4745	-0.1396
8	Q39	8	1.0157	1.2077
9	Q62	9	-1.5746	-0.1004
10	Q63	A	-1.3039	0.3862
11	Q64	B	-1.4599	0.1492
12	Q65	C	-1.6758	-0.0644
13	Q66	D	-1.4266	0.3089
14	Q68	E	-1.6307	-0.3707
15	Q69	F	0.2141	0.5417
16	Q70	G	-0.4641	-0.3634
17	Q71	H	1.0719	0.1196
18	Q72	I	0.8475	0.7494
19	Q73	J	-0.8321	-0.7751
20	Q79	K	-1.1628	1.3337
21	Q80	L	-1.0815	-0.2883
22	Q81	M	-1.7209	0.1287
23	Q82	N	-1.6507	0.2560
24	Q83	O	1.2635	-0.9489
25	Q84	P	1.1929	-0.5118
26	Q85	Q	1.0890	-0.8075
27	Q86	R	1.3608	0.0597
28	Q87	S	1.0267	-0.6350
29	Q96	T	-0.7219	1.0016
30	Q104	U	1.3405	-0.3151
31	Q105	V	-1.7225	-0.0437
32	Q106	W	-1.6676	-0.2168

Figure 107: Two-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 2

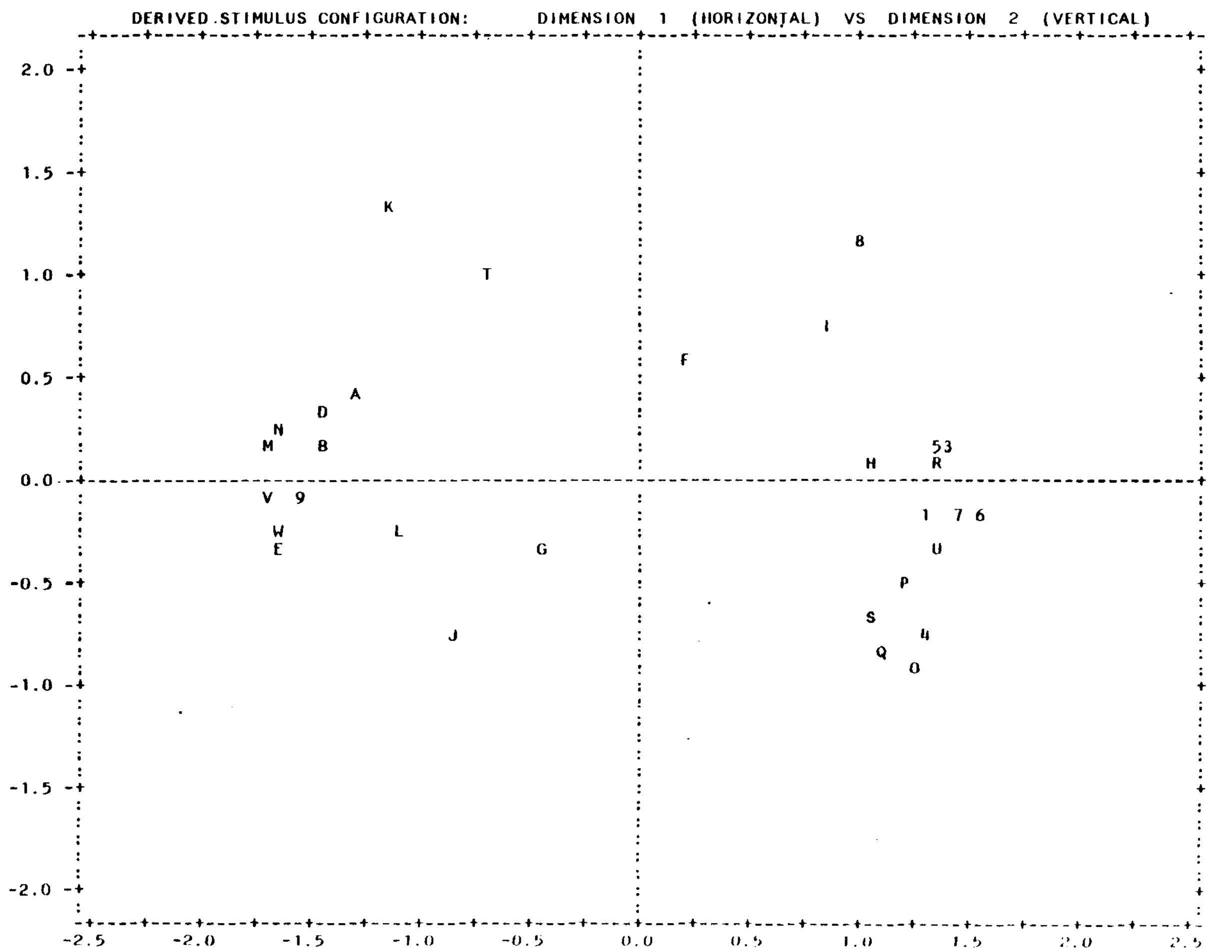


Figure 108: Two-Dimensional MDS Solution for Attribution Group; Linear Fit Plot

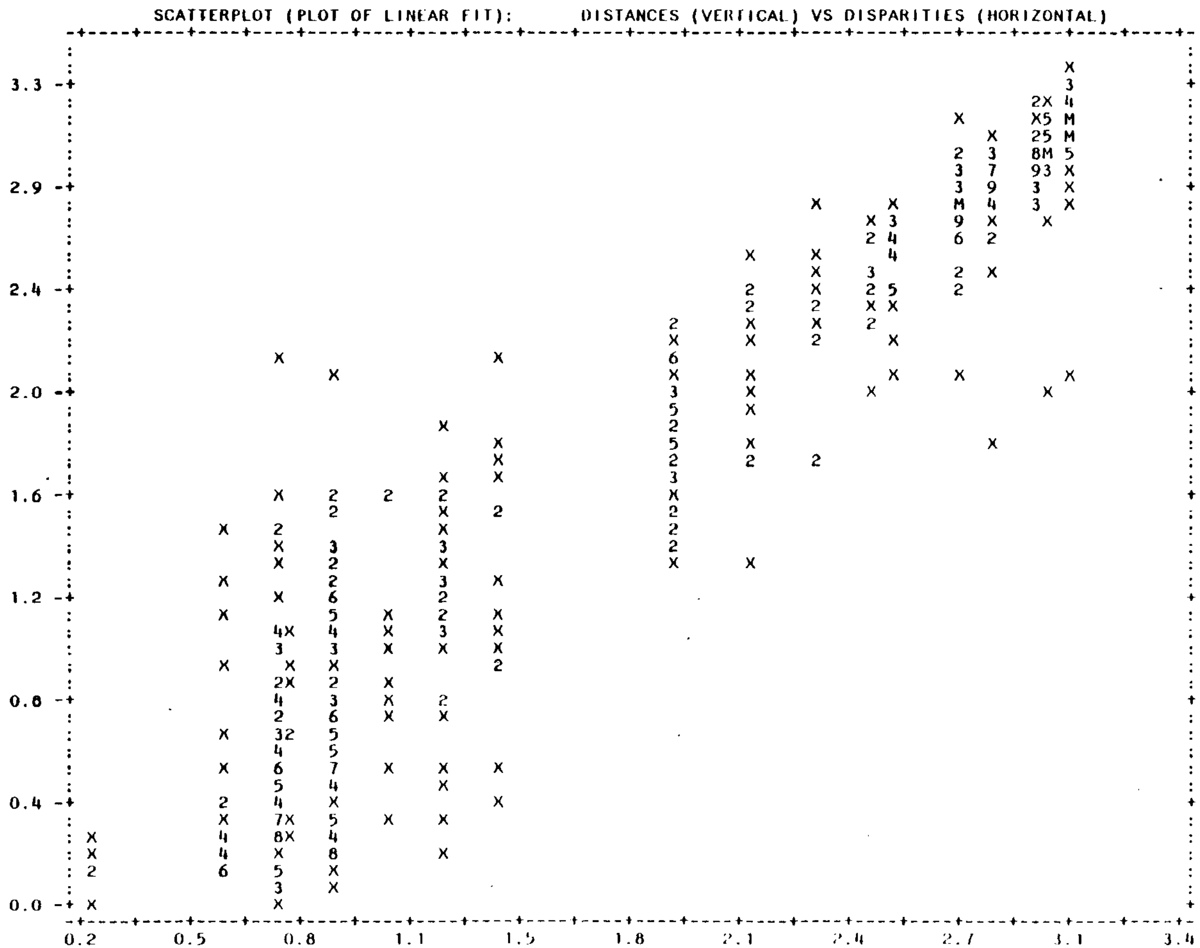


Figure 109: Two-Dimensional MDS Solution for Attribution Group; Nonlinear Fit Plot

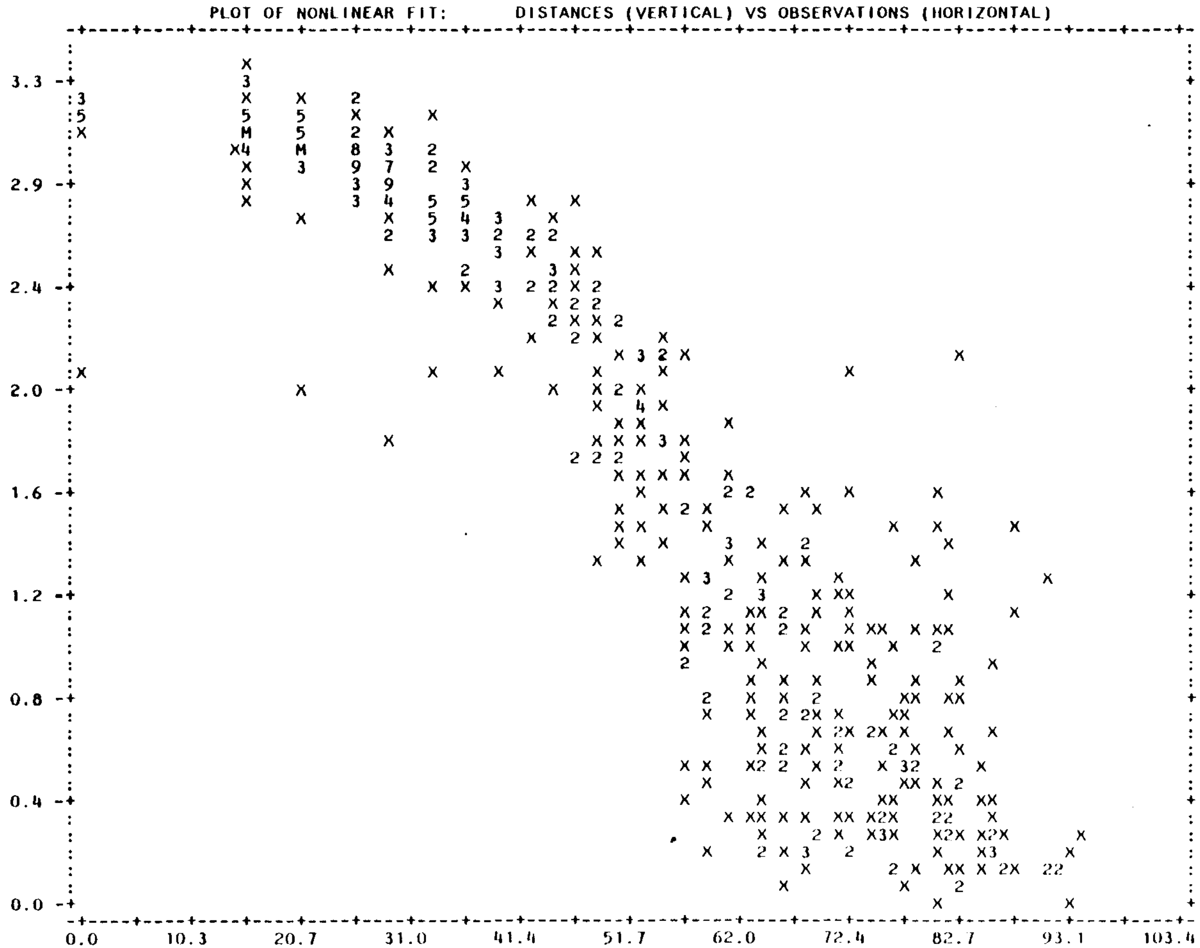


Figure 110: Two-Dimensional MDS Solution for Attribution Group; Transformation Plot

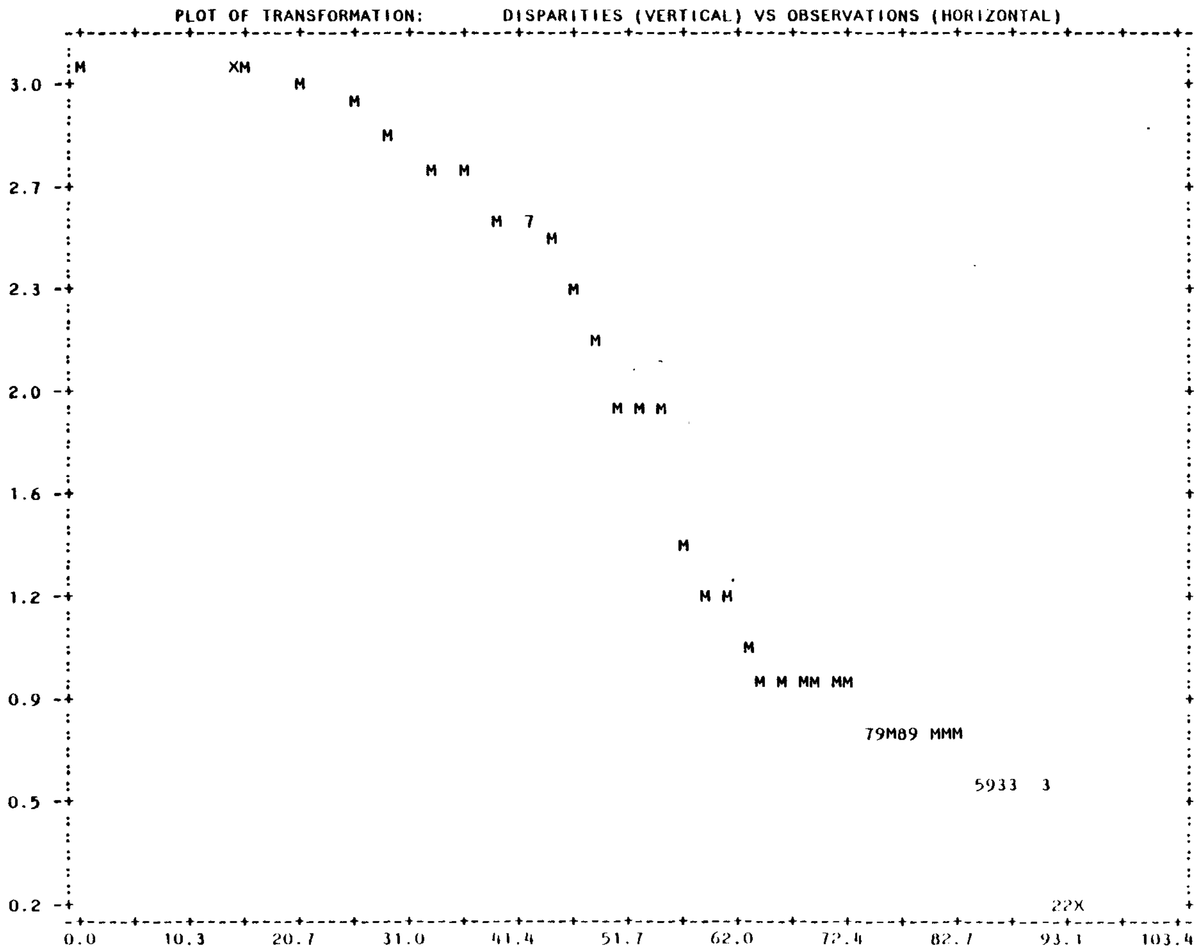


Table 21: Four-Dimensional MDS Solution Coordinates for Attribution Group

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4
1	Q2	1	1.6244	-1.0351	-0.0079	0.1885
2	Q3	2	1.7212	-0.7352	-0.0435	0.0683
3	Q4	3	1.7515	-0.8938	-0.2958	-0.2570
4	Q5	4	1.6402	1.1705	0.5497	0.5927
5	Q6	5	1.6908	-0.7792	-0.0686	-0.3388
6	Q35	6	1.8170	1.2523	0.0874	-0.6071
7	Q36	7	1.7269	1.1833	-0.2272	0.6042
8	Q39	8	1.2761	0.3554	-1.6957	-0.2596
9	Q62	9	-2.0551	0.3379	-0.0319	0.3784
10	Q63	A	-1.6716	-0.4361	-0.5036	0.4709
11	Q64	B	-1.8804	-0.2989	-0.2325	0.4130
12	Q65	C	-2.1998	0.1979	0.2412	-0.3169
13	Q66	D	-1.8739	-0.1415	-0.5105	0.3683
14	Q68	E	-2.0963	-0.2197	0.6296	-0.3991
15	Q69	F	0.1515	0.1825	-0.2916	-1.0044
16	Q70	G	-0.3778	-0.4316	1.0215	-0.4077
17	Q71	H	1.3577	-0.7342	-0.4650	0.1004
18	Q72	I	1.0709	-0.5985	-1.1233	0.1120
19	Q73	J	-0.7788	-1.0881	0.7695	0.7948
20	Q79	K	-1.5796	0.6687	-1.6208	-0.1602
21	Q80	L	-1.0264	-0.1284	-0.2125	1.3444
22	Q81	M	-2.2569	0.2383	-0.0270	-0.1281
23	Q82	N	-2.1670	0.2735	-0.1039	-0.4500
24	Q83	O	1.5246	1.0906	0.6308	-1.2229
25	Q84	P	1.5072	0.4313	0.6616	1.0025
26	Q85	Q	1.4769	-0.4738	1.2522	-0.1859
27	Q86	R	1.7320	-0.8671	0.0460	-0.3813
28	Q87	S	1.3297	0.6344	0.7471	0.7541
29	Q96	T	-0.7245	-0.6268	-0.1019	-1.5673
30	Q104	U	1.6917	0.4434	0.7185	0.6152
31	Q105	V	-2.2456	0.4147	-0.0485	-0.0580
32	Q106	W	-2.1566	0.6131	0.2565	-0.0634

Figure 111: Four-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 2

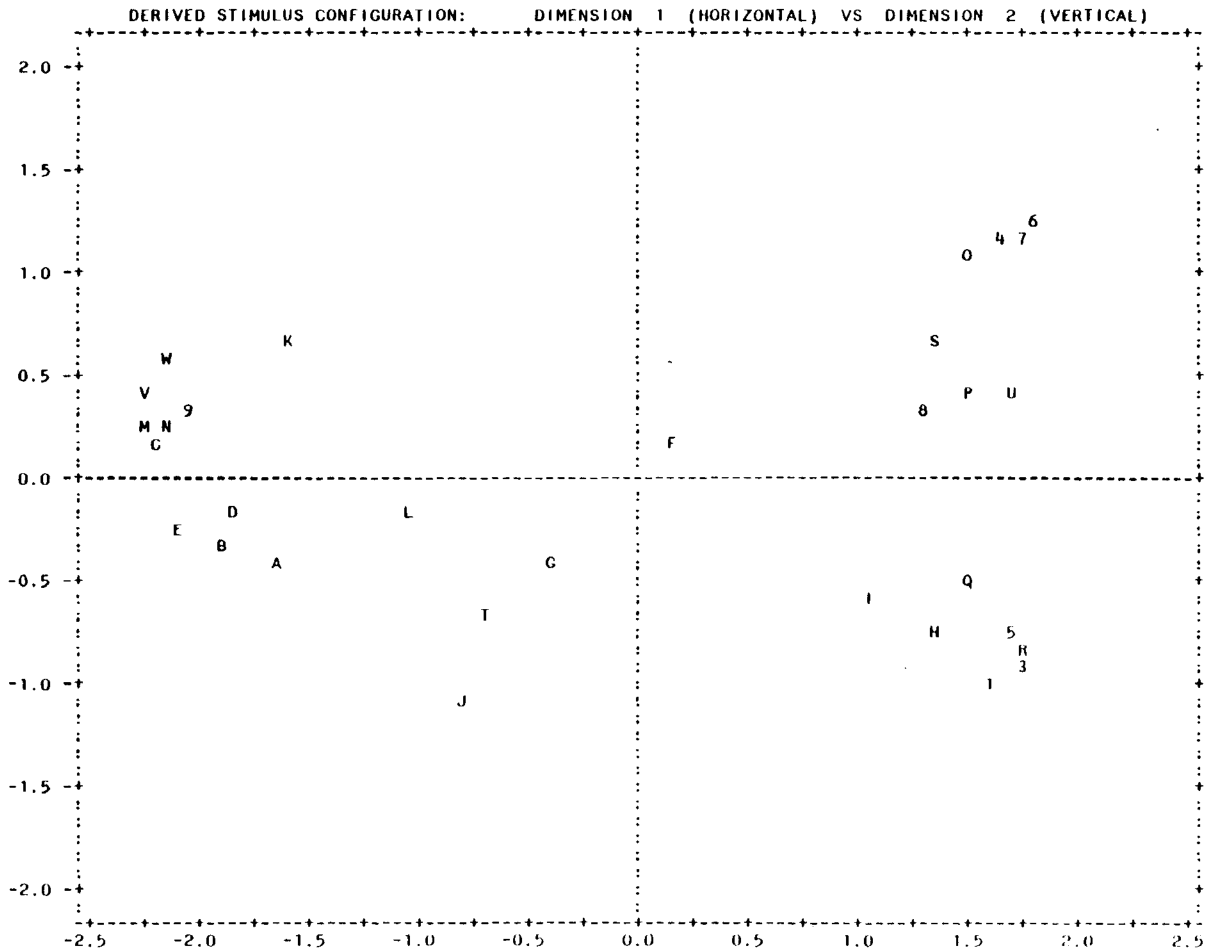


Figure 112: Four-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 3

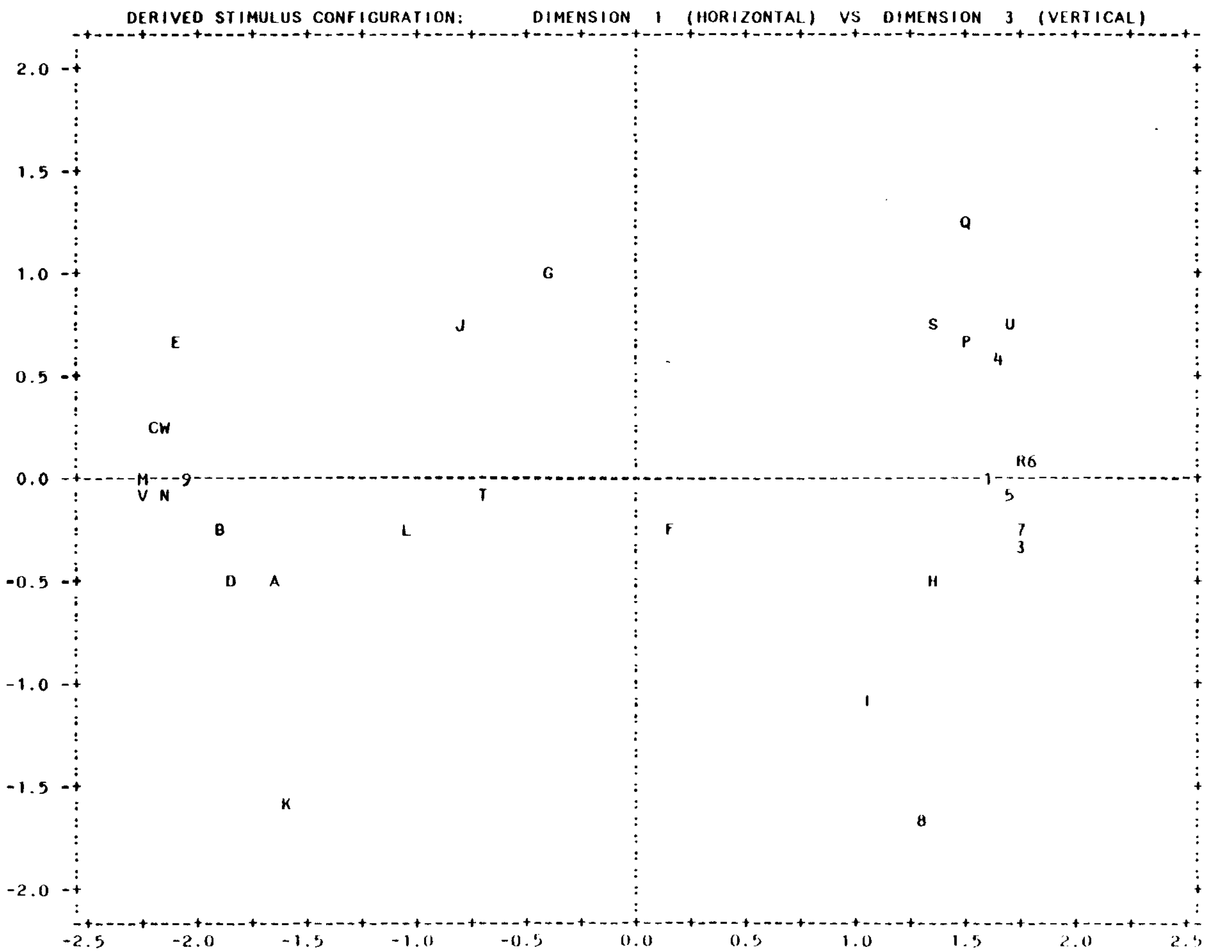


Figure 113: Four-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 3

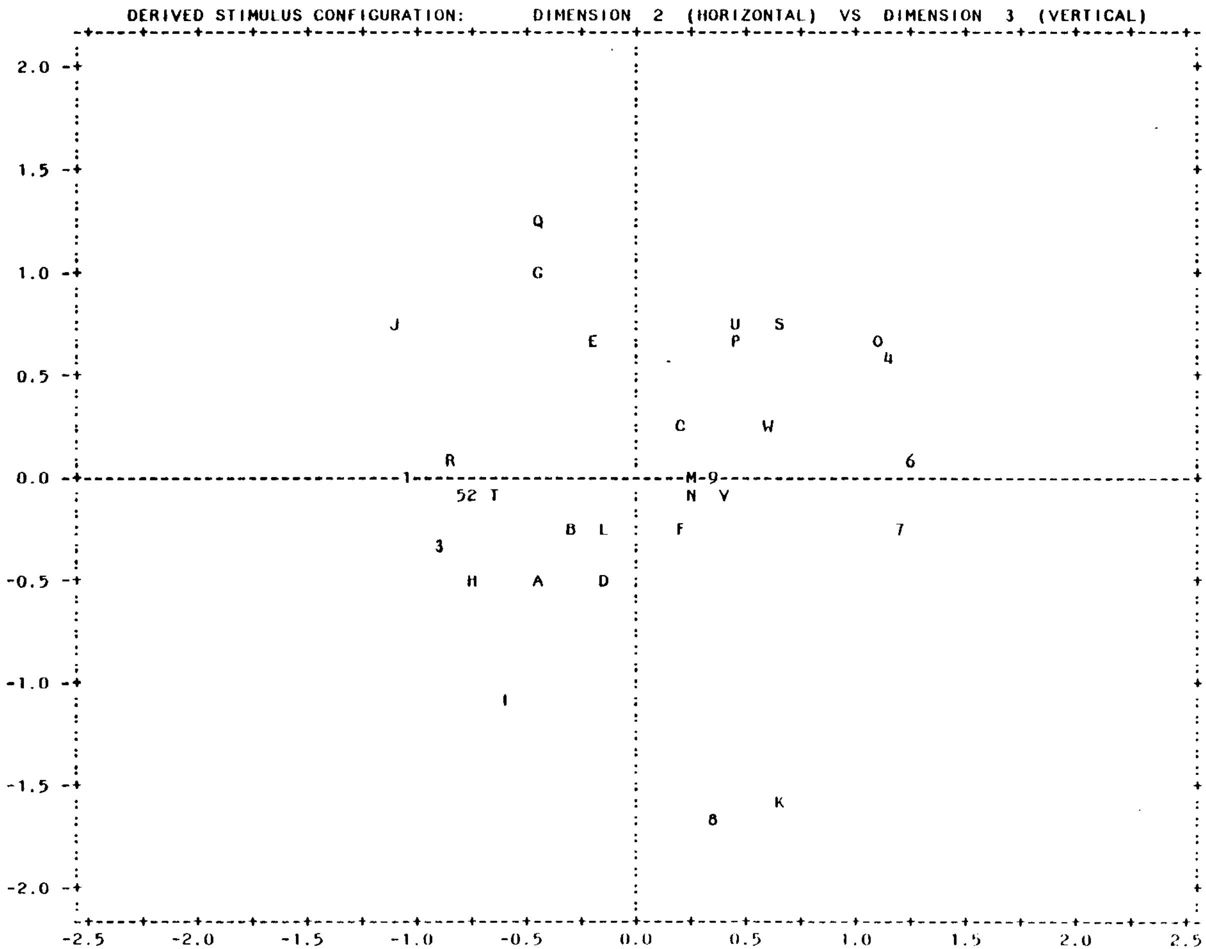


Figure 114: Four-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 4

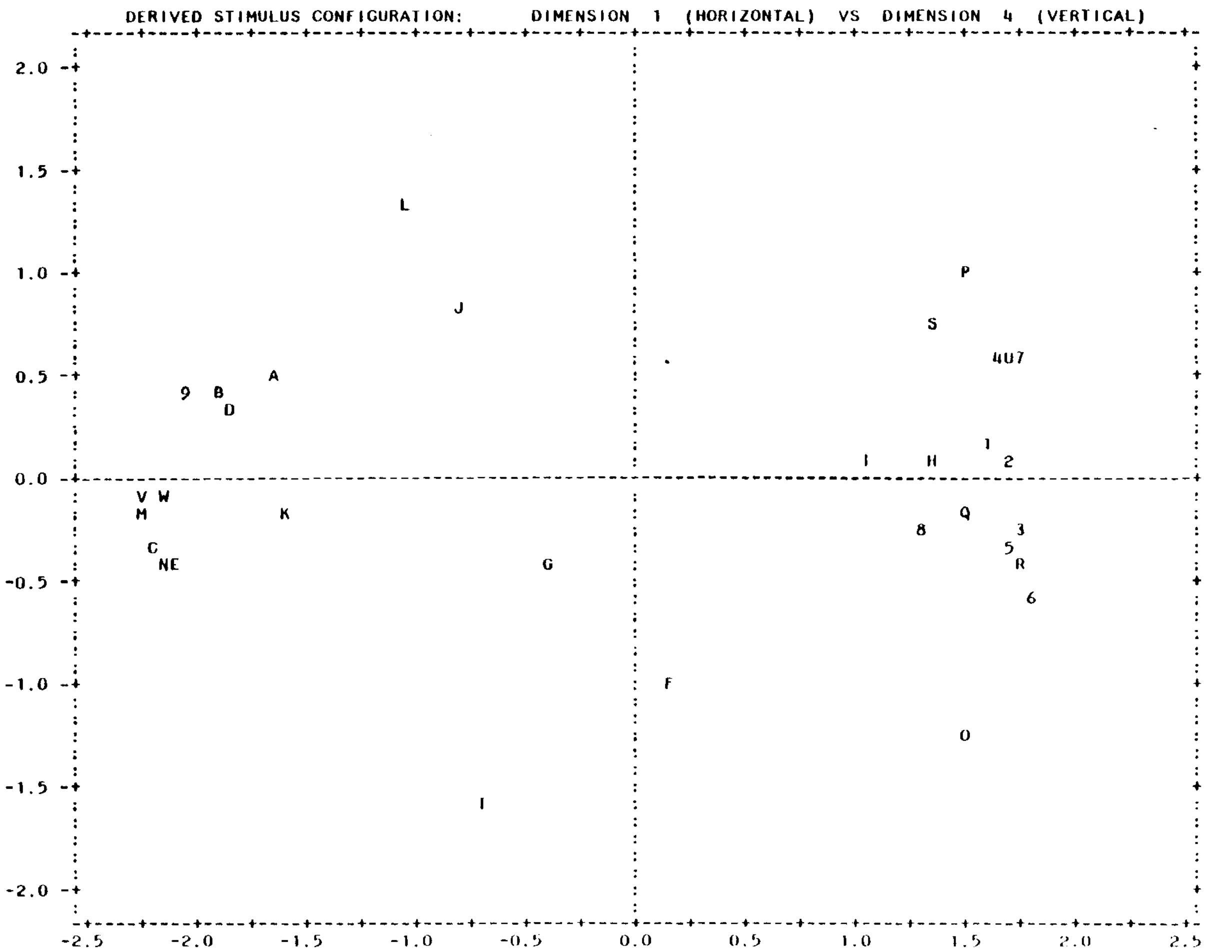


Figure 115: Four-Dimensional MDS Solution for Attribution Group: DIM 2 x DIM 4

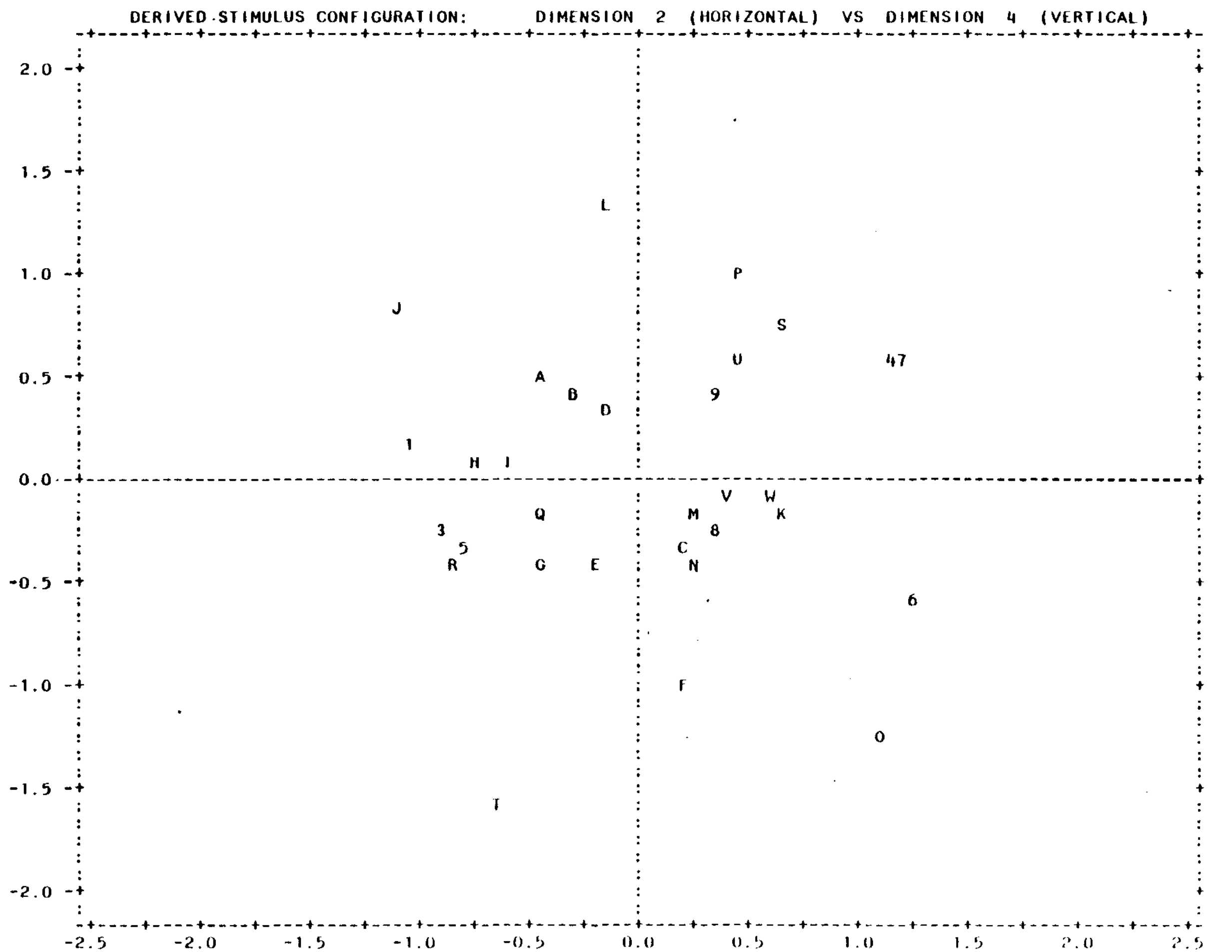


Figure 116: Four-Dimensional MDS Solution for Attribution Group; DIM 3 x DIM 4

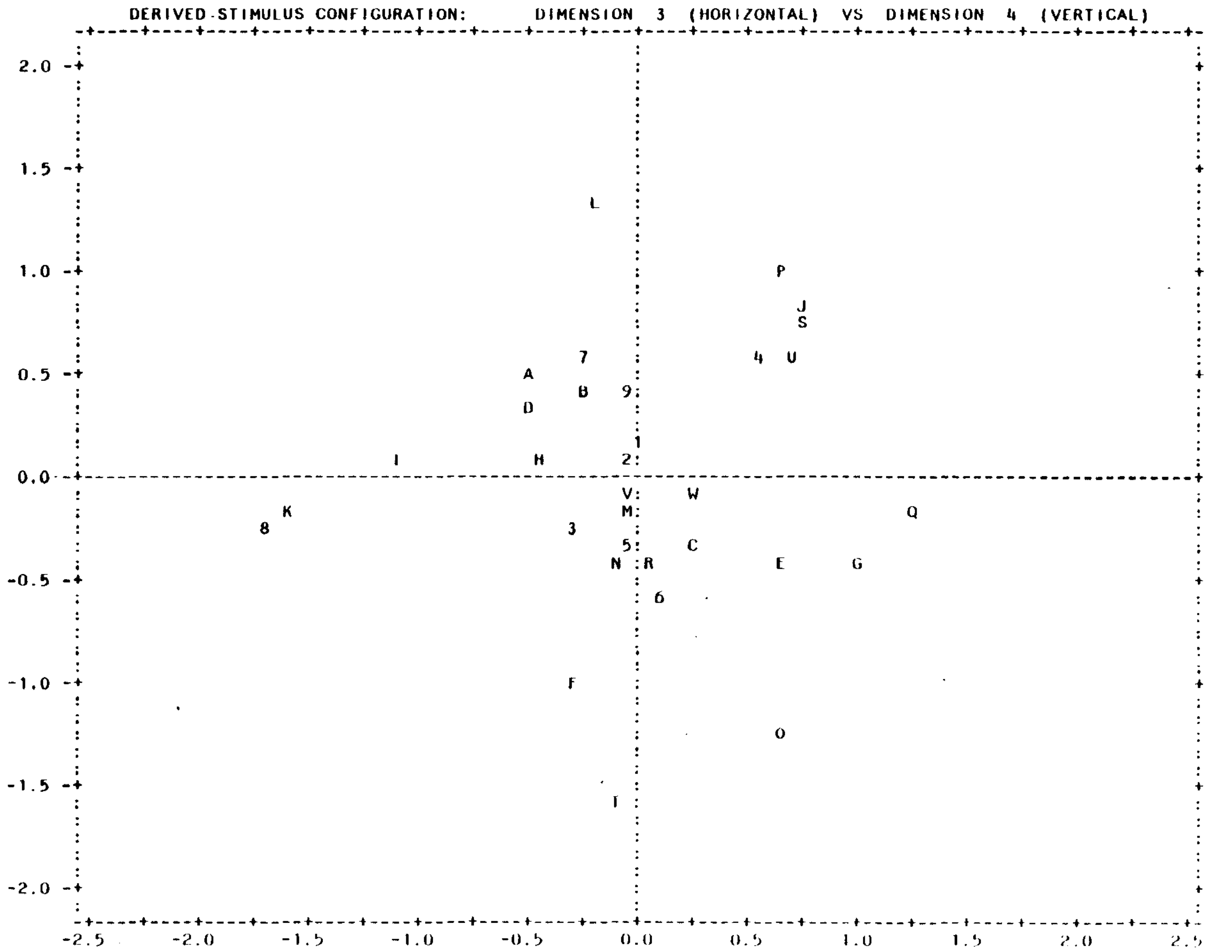


Figure 117: Four-Dimensional MDS Solution for Attribution Group; Linear Fit Plot

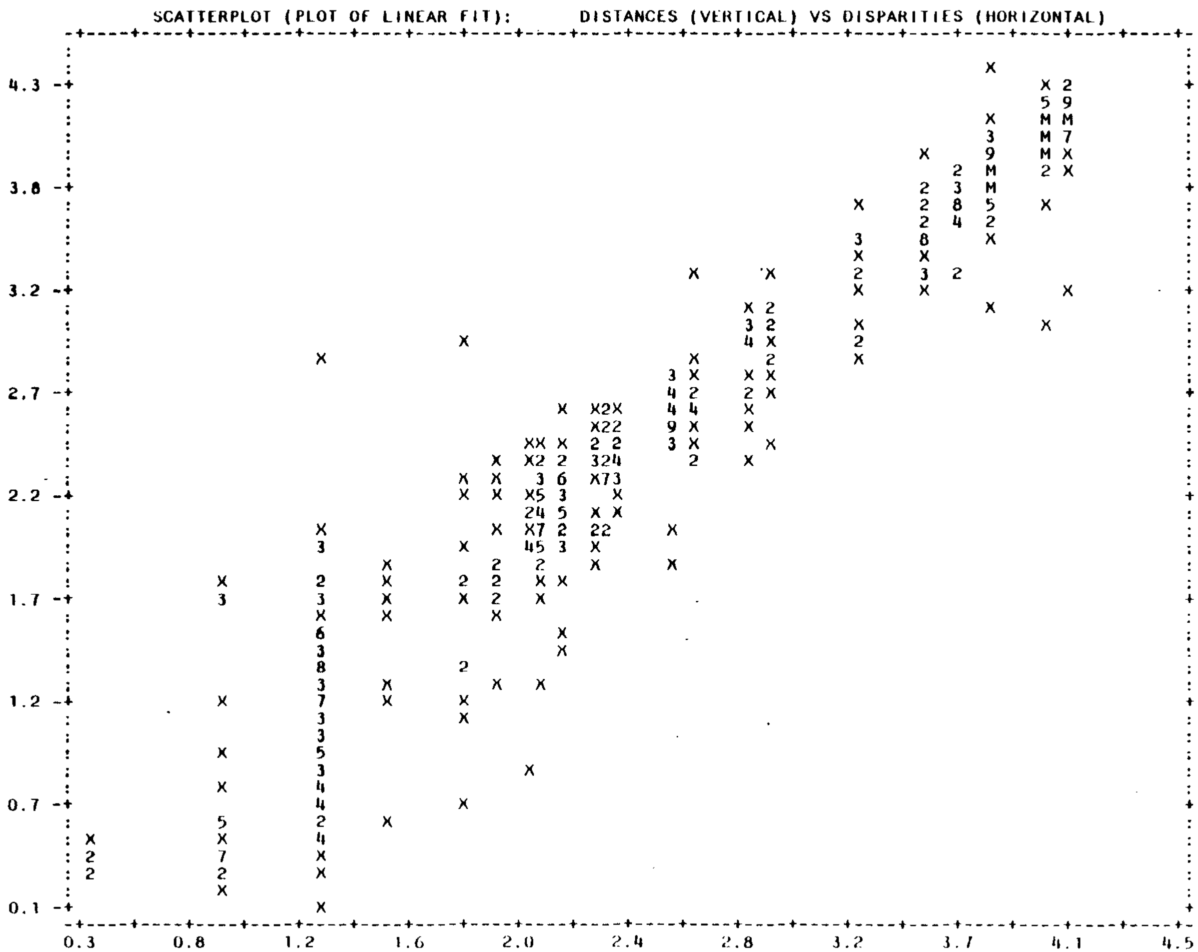


Figure 118: Four-Dimensional MDS Solution for Attribution Group; Nonlinear Fit Plot

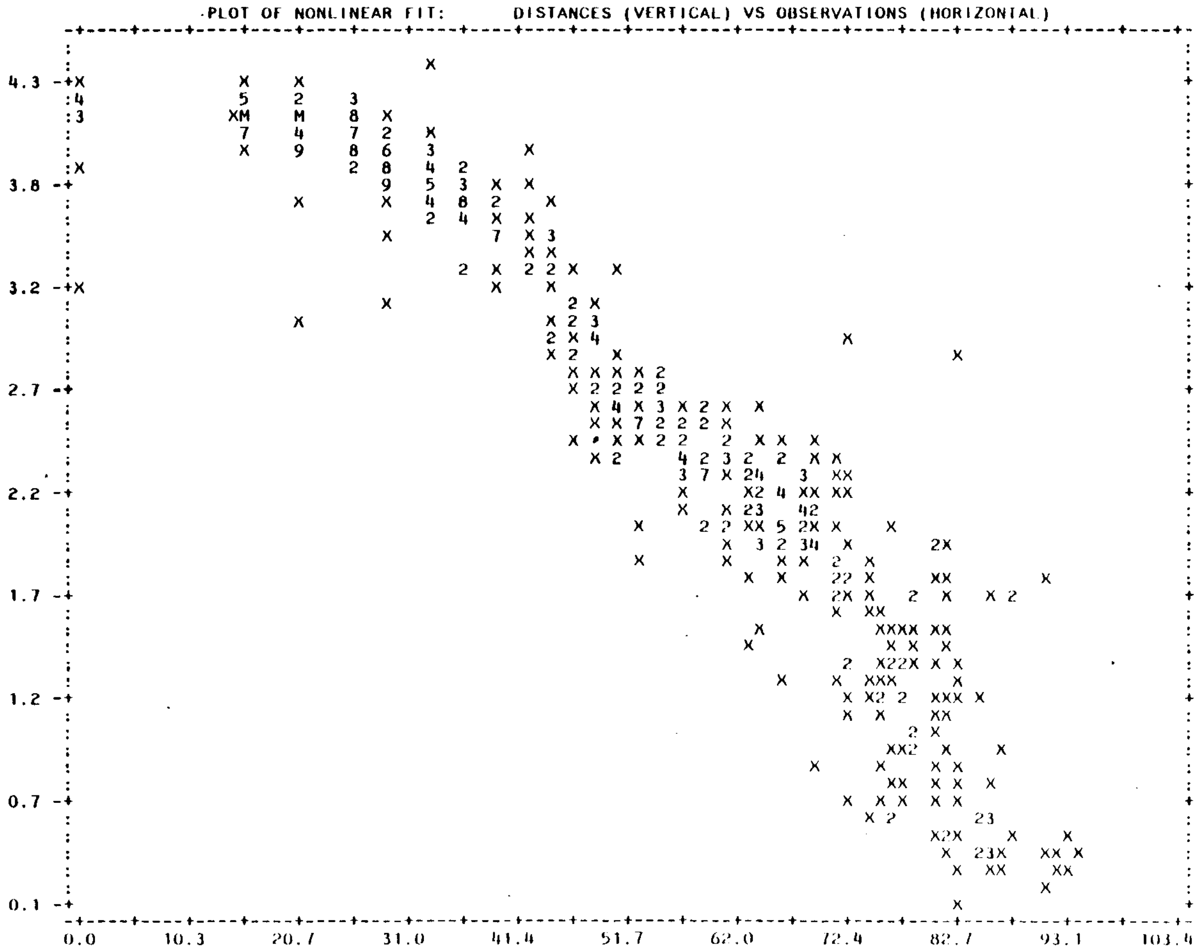


Figure 119: Four-Dimensional MDS Solution for Attribution Group; Transformation Plot

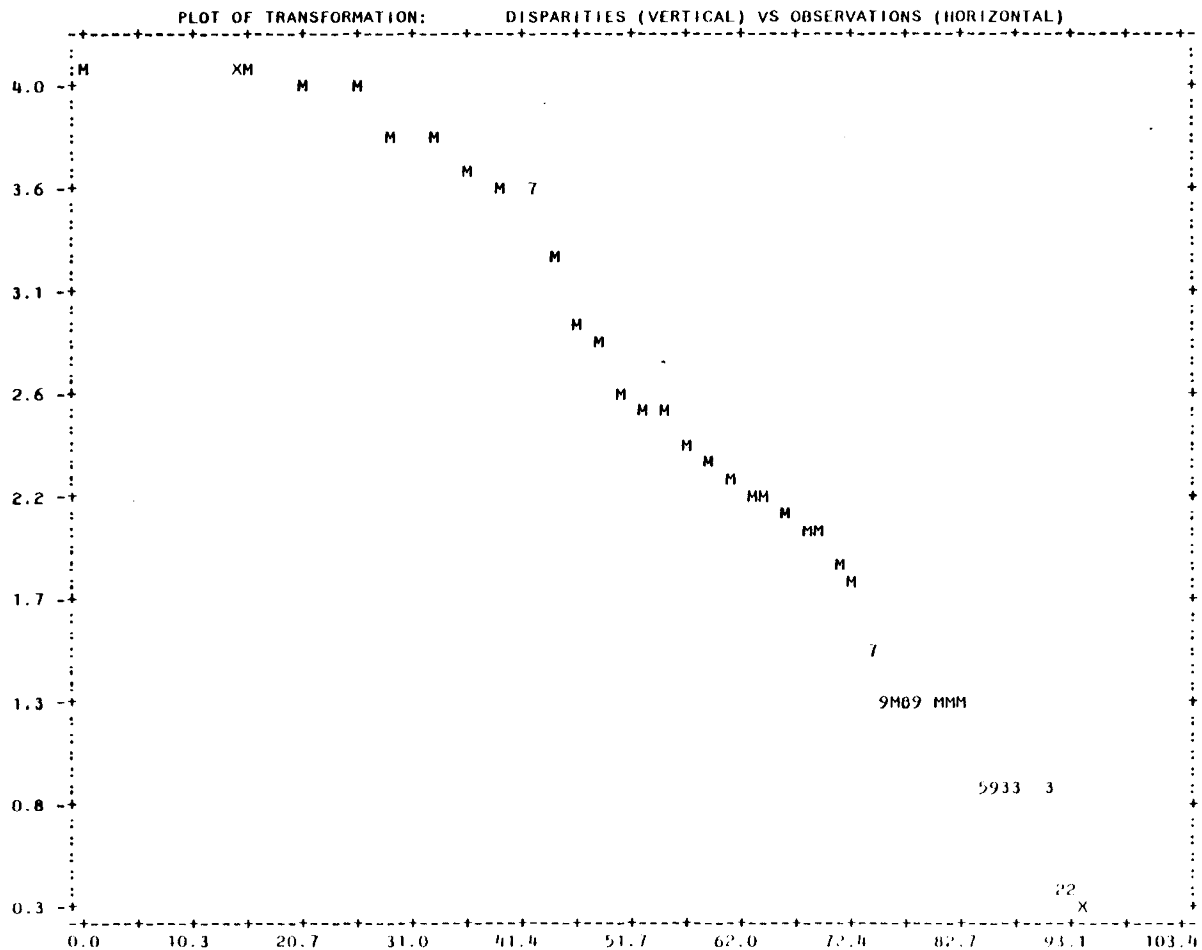


Table 22: Five-Dimensional MDS Solution Coordinates for Attribution Group

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4	5
1	Q2	1	1.8838	1.1078	-0.3993	-0.0546	0.1482
2	Q3	2	1.9233	0.7172	0.1982	-0.0872	-0.0593
3	Q4	3	1.9069	0.9837	-0.0928	-0.4392	-0.4202
4	Q5	4	1.5539	-1.4531	0.7666	0.5986	0.5588
5	Q6	5	1.8109	0.7957	0.4008	-0.0110	-0.5150
6	Q35	6	2.0034	-1.1566	-0.7144	0.2913	-0.4312
7	Q36	7	1.6465	-1.4927	0.6243	-0.3834	0.6434
8	Q39	8	1.2963	-0.3860	0.1476	-1.9699	-0.4756
9	Q62	9	-1.9350	-0.3160	-1.1188	-0.0624	0.4097
10	Q63	A	-1.8750	0.3147	-0.4191	-0.4553	0.6030
11	Q64	B	-2.0160	0.2474	-0.3925	-0.2394	0.5272
12	Q65	C	-2.1067	-0.1262	-0.9444	0.2446	-0.1132
13	Q66	D	-1.9901	0.0617	-0.6569	-0.3134	0.5062
14	Q68	E	-2.1050	0.3310	-0.6074	0.8071	-0.1971
15	Q69	F	-0.0761	0.0252	1.3338	-0.3612	-1.1104
16	Q70	G	-0.8436	0.4630	1.2254	0.7292	-0.5705
17	Q71	H	1.3421	0.6458	1.0900	-0.5307	-0.1987
18	Q72	I	1.2060	0.7821	0.4257	-1.3411	-0.1012
19	Q73	J	-0.8600	1.2816	-0.3717	0.8265	1.1241
20	Q79	K	-1.5228	-0.6855	-0.5599	-1.7293	-0.1925
21	Q80	L	-1.2646	0.2712	0.2179	-0.2592	1.6327
22	Q81	M	-2.2235	-0.2013	-0.6919	-0.0341	0.0682
23	Q82	N	-2.2299	-0.3024	-0.4321	-0.0860	-0.4172
24	Q83	O	1.5677	-1.2175	-0.6392	0.9954	-1.1890
25	Q84	P	1.3788	-0.5644	1.3109	0.7562	0.7409
26	Q85	Q	1.6582	0.5664	0.3432	1.2263	-0.1970
27	Q86	R	1.9570	0.9103	-0.1909	-0.1363	-0.2871
28	Q87	S	1.4184	-0.7290	0.8152	0.9721	0.6380
29	Q96	T	-1.0749	0.4518	0.6388	0.0320	-1.9440
30	Q104	U	1.6913	-0.6191	0.8367	0.8608	0.4026
31	Q105	V	-2.0450	-0.2984	-1.1486	-0.0615	0.3130
32	Q106	W	-2.0763	-0.4083	-0.9953	0.2150	0.1033

Figure 120: Five-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 2

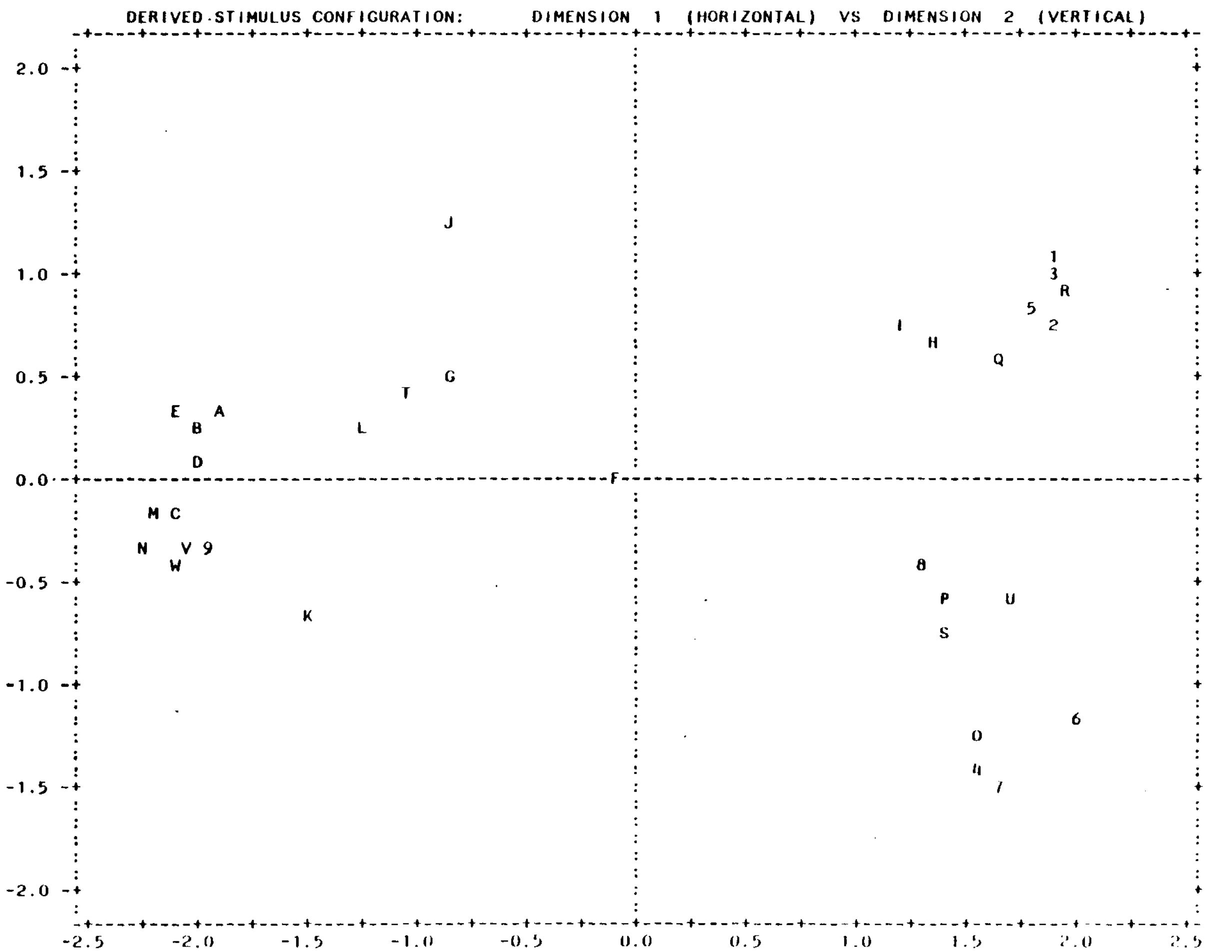


Figure 121: Five-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 3

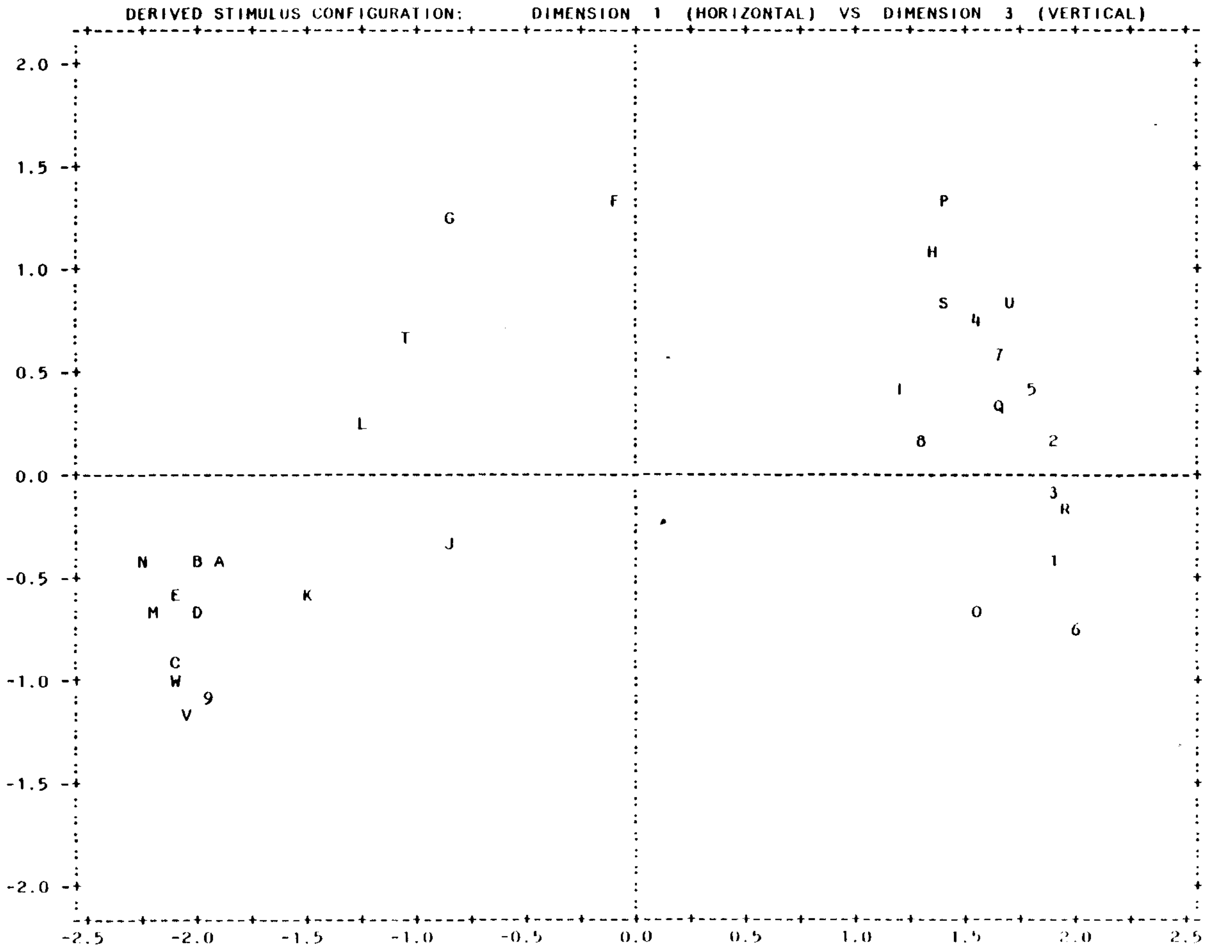


Figure 122: Five-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 3

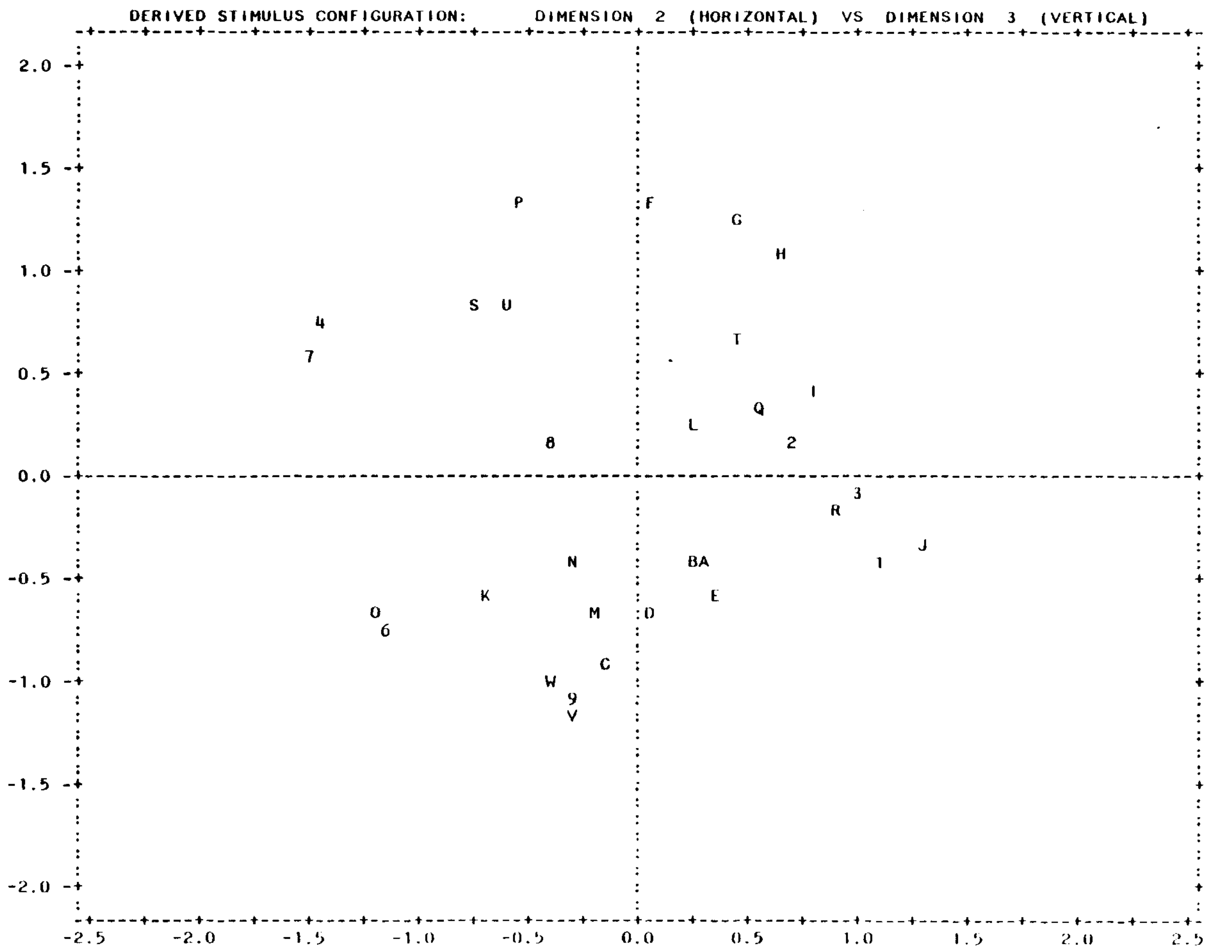


Figure 123: Five-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 4

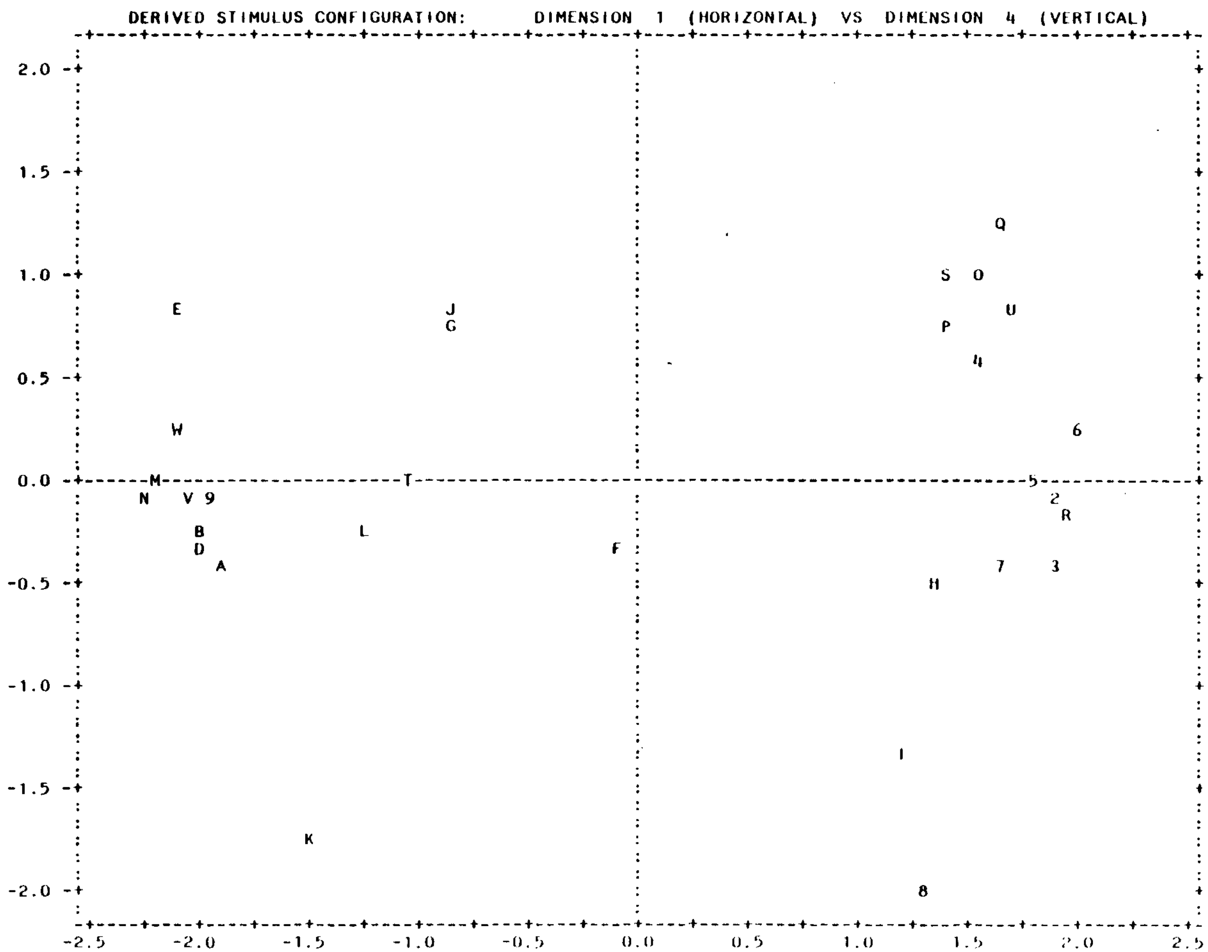


Figure 124: Five-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 4

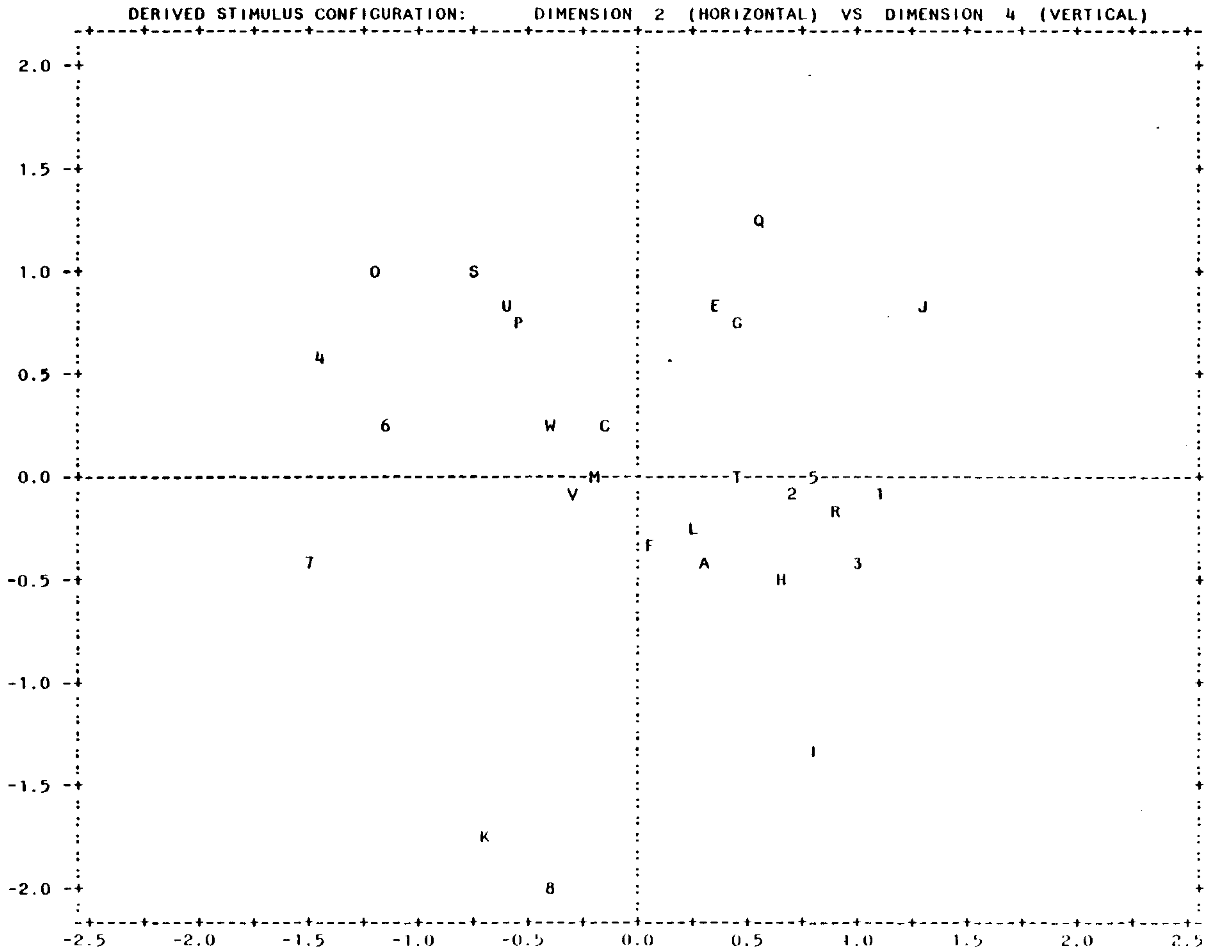


Figure 125: Five-Dimensional MDS Solution for Attribution Group; DIM 3 x DIM 4

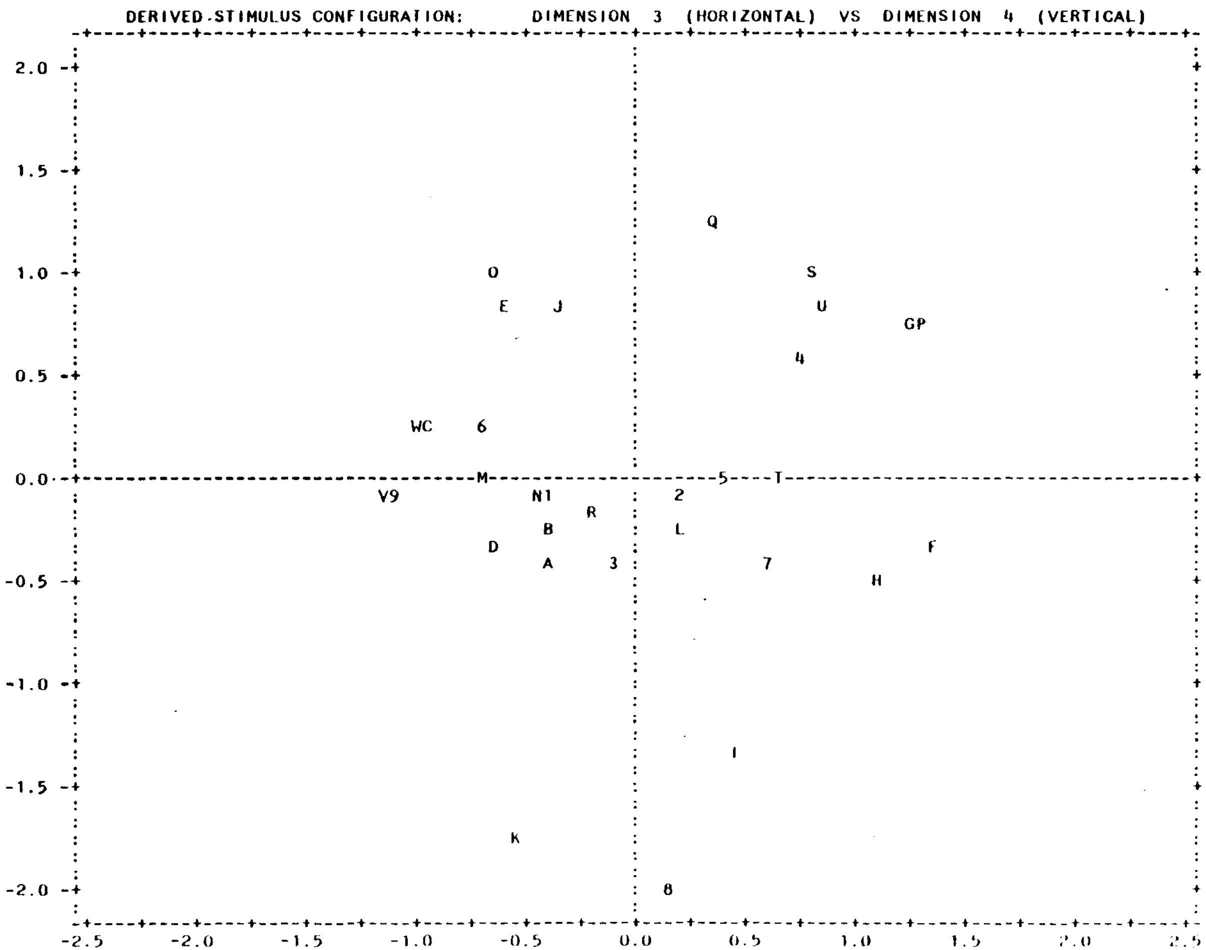


Figure 126: Five-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 5

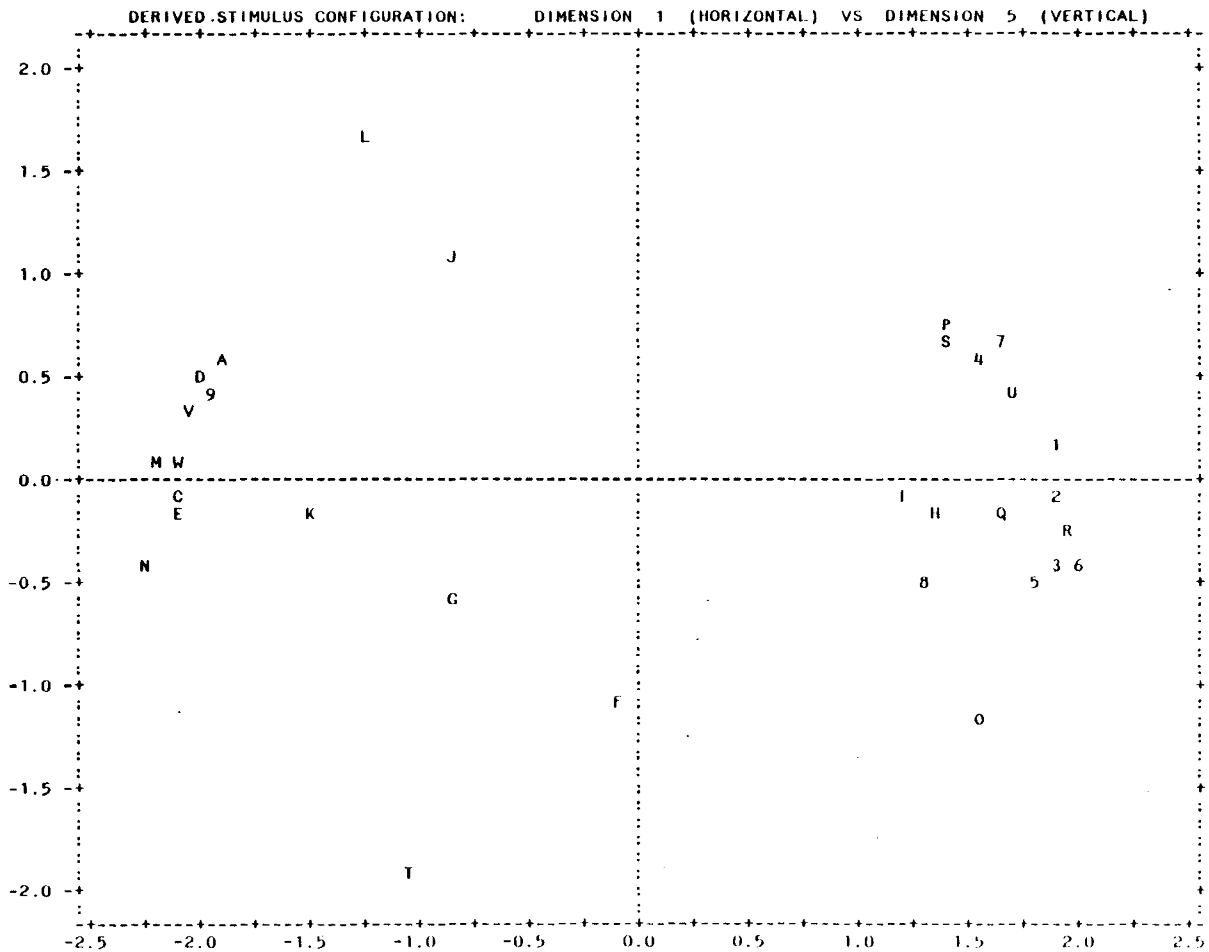


Figure 127: Five-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 5

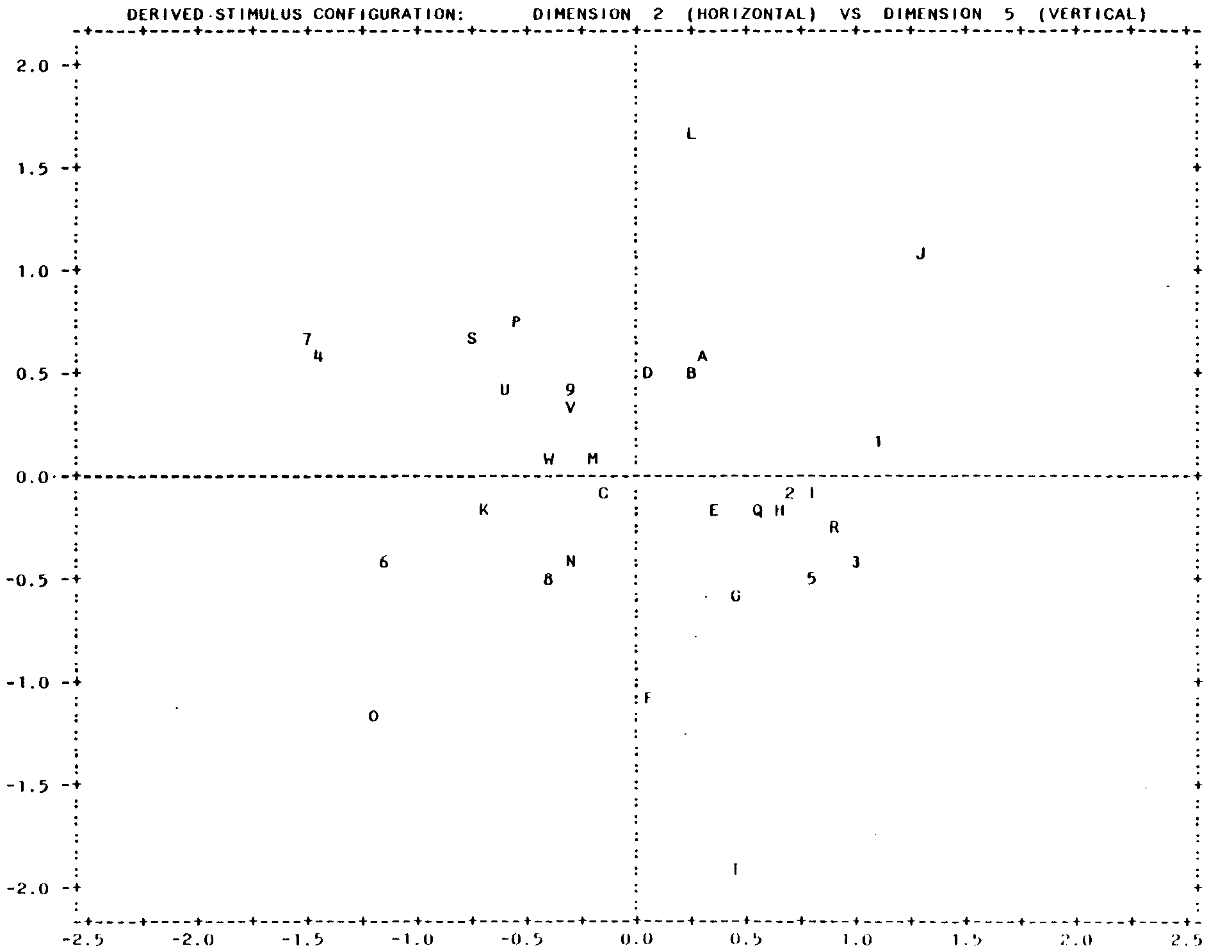


Figure 128: Five-Dimensional MDS Solution for Attribution Group; DIM 3 x DIM 5

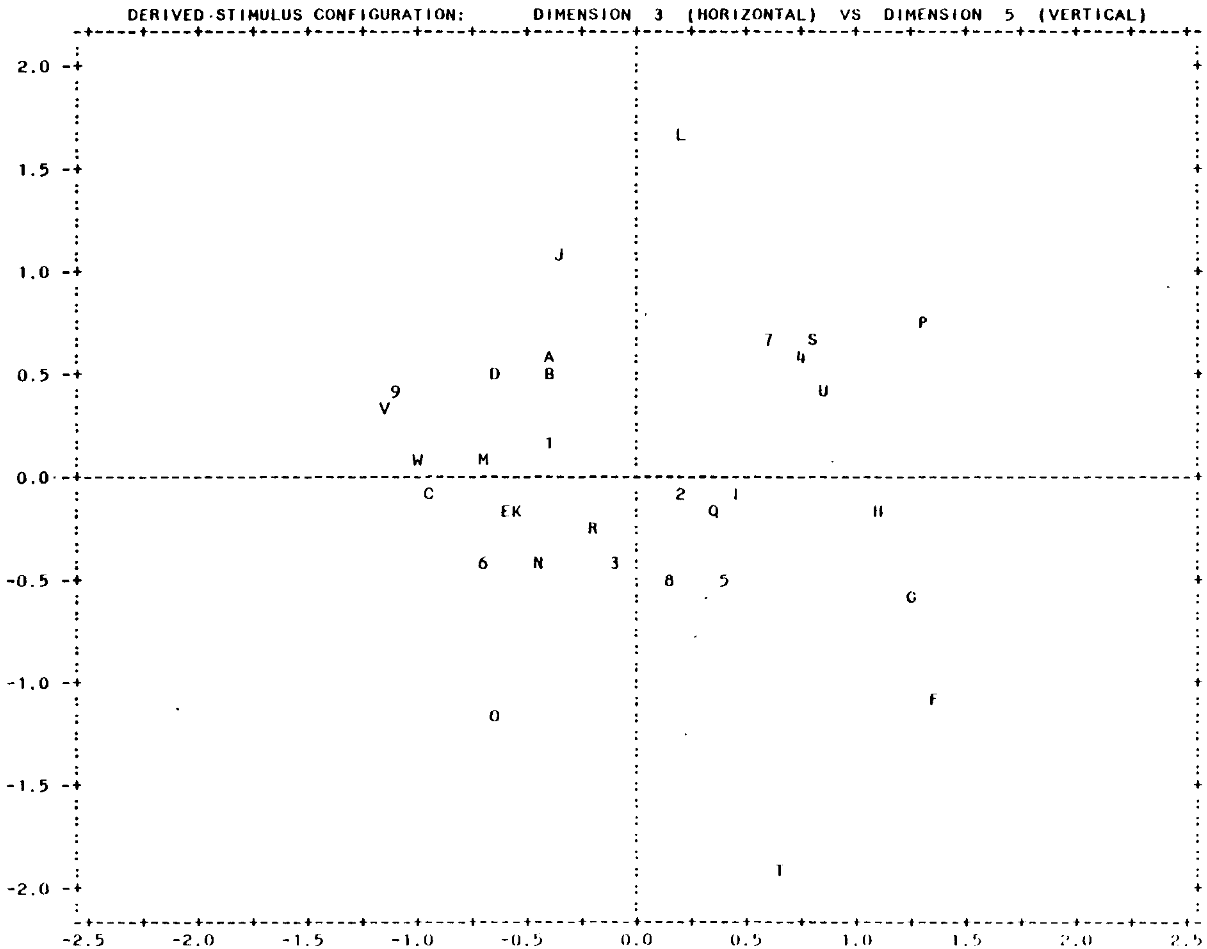


Figure 129: Five-Dimensional MDS Solution for Attribution Group; DIM 4 x DIM 5

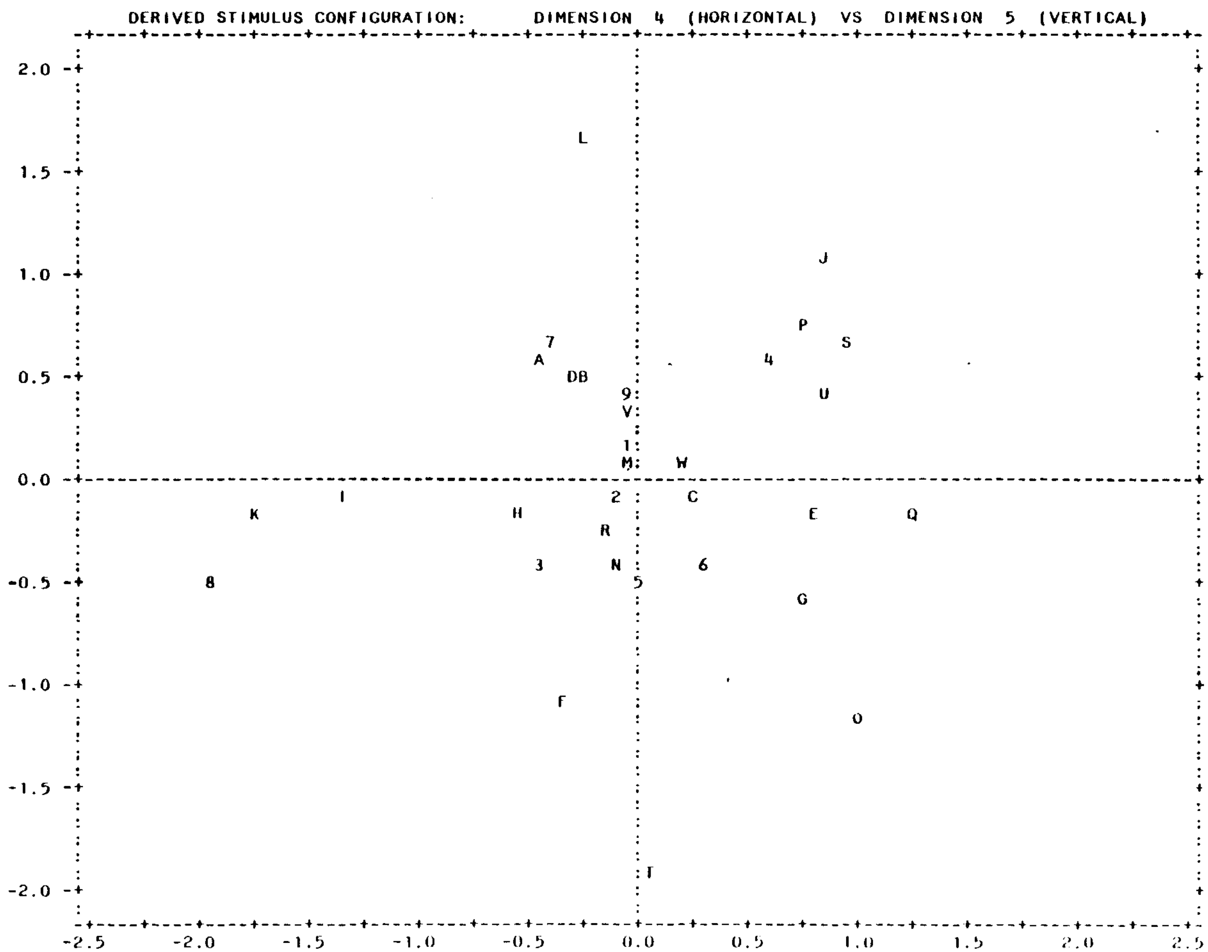


Figure 130: Five-Dimensional MDS Solution for Attribution Group; Linear Fit Plot

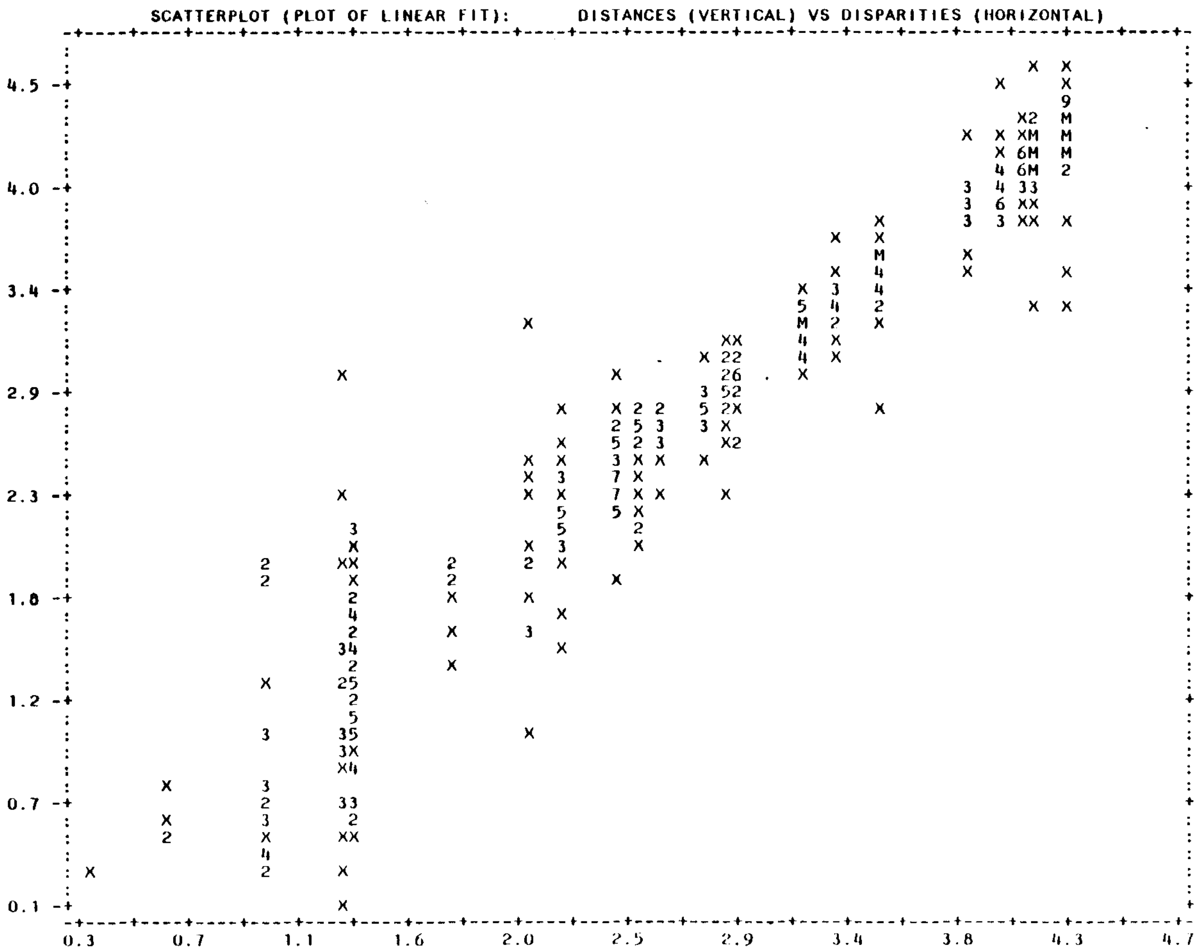


Figure 131: Five-Dimensional MDS Solution for Attribution Group; Nonlinear Fit Plot

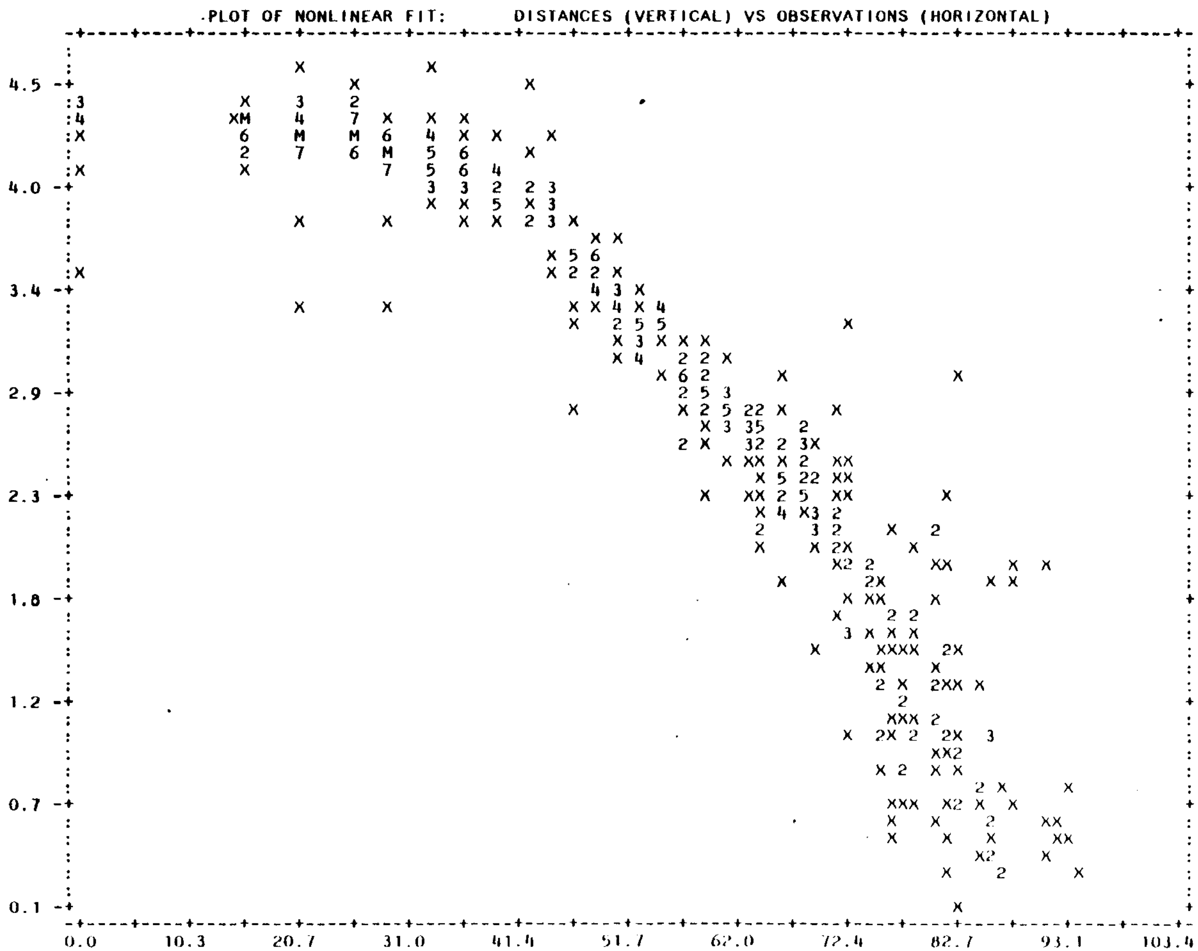


Figure 132: Five-Dimensional MDS Solution for Attribution Group; Transformation Plot

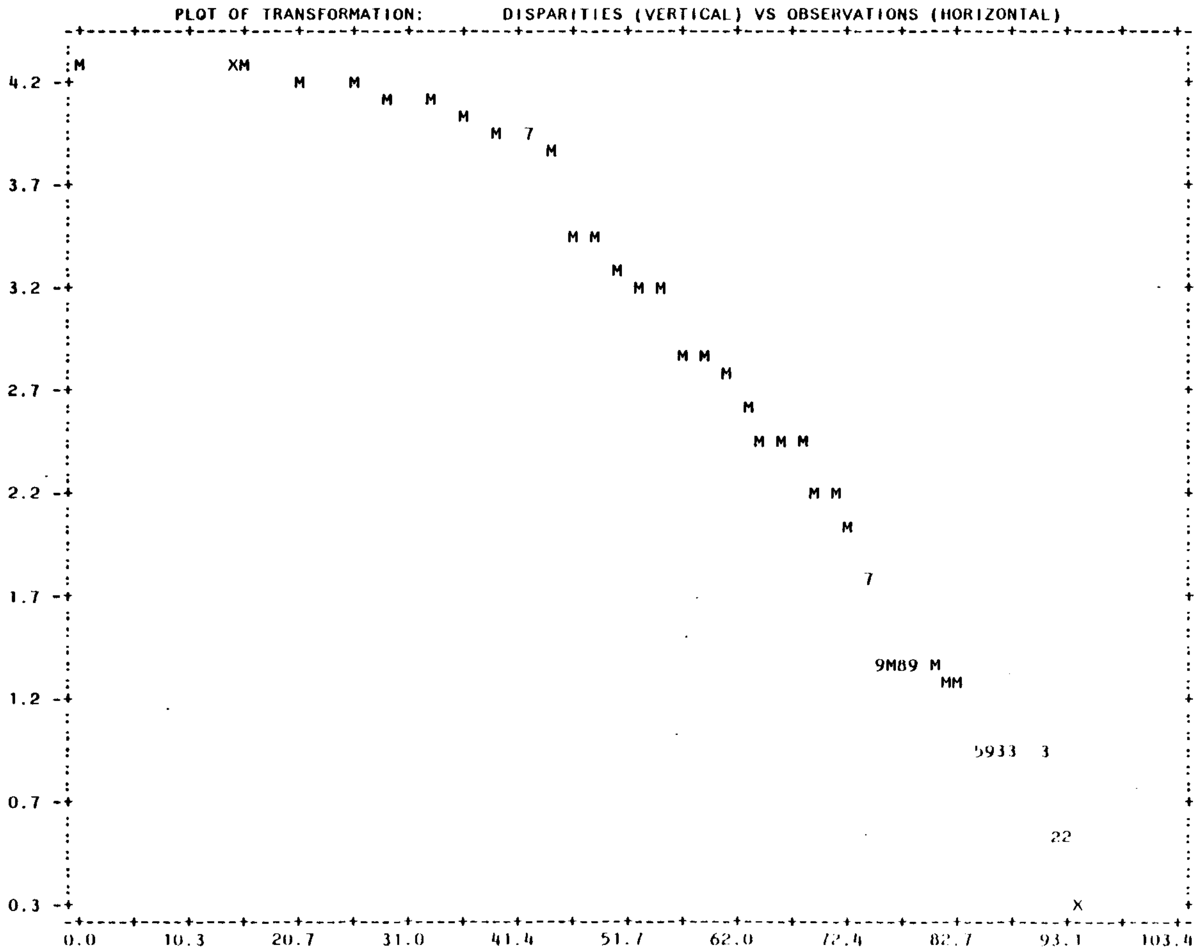


Table 23: Six-Dimensional MDS Solution Coordinates for Attribution Group

STIMULUS NUMBER	STIMULUS NAME	PLOT SYMBOL	DIMENSION 1	2	3	4	5	6
1	Q2	1	1.7833	1.4223	-0.4021	-0.2717	0.0266	0.7229
2	Q3	2	1.9560	0.9127	-0.2548	-0.5896	0.0088	0.2660
3	Q4	3	1.8610	1.2263	-0.8471	-0.4688	-0.3417	0.1364
4	Q5	4	1.7316	-1.6643	0.8586	-0.2326	0.7077	-0.1198
5	Q6	5	1.7781	1.0278	-0.0580	-0.9626	-0.3111	0.2670
6	Q35	6	2.0639	-1.1558	0.1268	0.4908	-0.6212	1.0913
7	Q36	7	1.8741	-1.6104	-0.3058	0.1949	0.7598	-0.6374
8	Q39	8	1.2692	-0.5091	-2.1059	-0.1624	-0.4604	-0.6843
9	Q62	9	-2.2663	-0.3502	-0.2182	-0.1592	0.2861	0.8365
10	Q63	A	-1.9702	0.2244	-0.4489	0.5608	0.6830	-0.0627
11	Q64	B	-2.0353	0.1959	-0.1892	0.7704	0.5729	-0.0471
12	Q65	C	-2.2198	-0.0675	0.1701	0.8408	-0.2188	0.6846
13	Q66	D	-2.0283	0.0308	-0.4380	0.6860	0.7757	0.1997
14	Q68	E	-1.9449	0.4123	0.7319	1.3577	-0.1690	0.0235
15	Q69	F	-0.0555	-0.0977	0.1506	-1.0370	-1.2627	-1.3837
16	Q70	G	-0.5460	0.2974	1.2002	-0.0970	-0.8075	-1.4964
17	Q71	H	1.5633	0.4771	-0.6171	-0.4530	-0.2669	-1.0881
18	Q72	I	1.1359	0.7890	-1.4408	-0.7835	-0.2886	-0.4596
19	Q73	J	-0.7147	1.2906	0.8212	1.0946	1.2236	-0.1276
20	Q79	K	-1.8531	-0.8149	-1.6488	-0.2847	-0.2372	0.1423
21	Q80	L	-0.8133	0.2865	-0.0345	1.4527	1.4781	-0.8531
22	Q81	M	-2.4173	-0.1884	-0.0673	0.5259	0.0751	0.3098
23	Q82	N	-2.4116	-0.3602	-0.0443	0.0587	-0.5259	0.2924
24	Q83	O	1.7637	-1.0308	0.6512	1.1084	-1.3028	0.9164
25	Q84	P	1.3822	-0.6523	1.0866	-1.2504	0.9709	-0.3863
26	Q85	Q	1.5534	0.6826	1.0862	-1.1026	-0.0739	0.6113
27	Q86	R	1.8264	1.2761	-0.3655	-0.6576	-0.1944	0.4187
28	Q87	S	1.3933	-0.8969	1.1540	-0.9747	0.7605	0.0907
29	Q96	T	-0.7271	0.3265	0.5662	0.4181	-2.0055	-1.2696
30	Q104	U	1.6974	-0.7027	0.9763	-1.1063	0.5869	0.1101
31	Q105	V	-2.3865	-0.2962	-0.1721	0.3405	0.0857	0.7611
32	Q106	W	-2.2428	-0.4809	0.0788	0.6934	0.0864	0.7352

Figure 133: Six-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 2

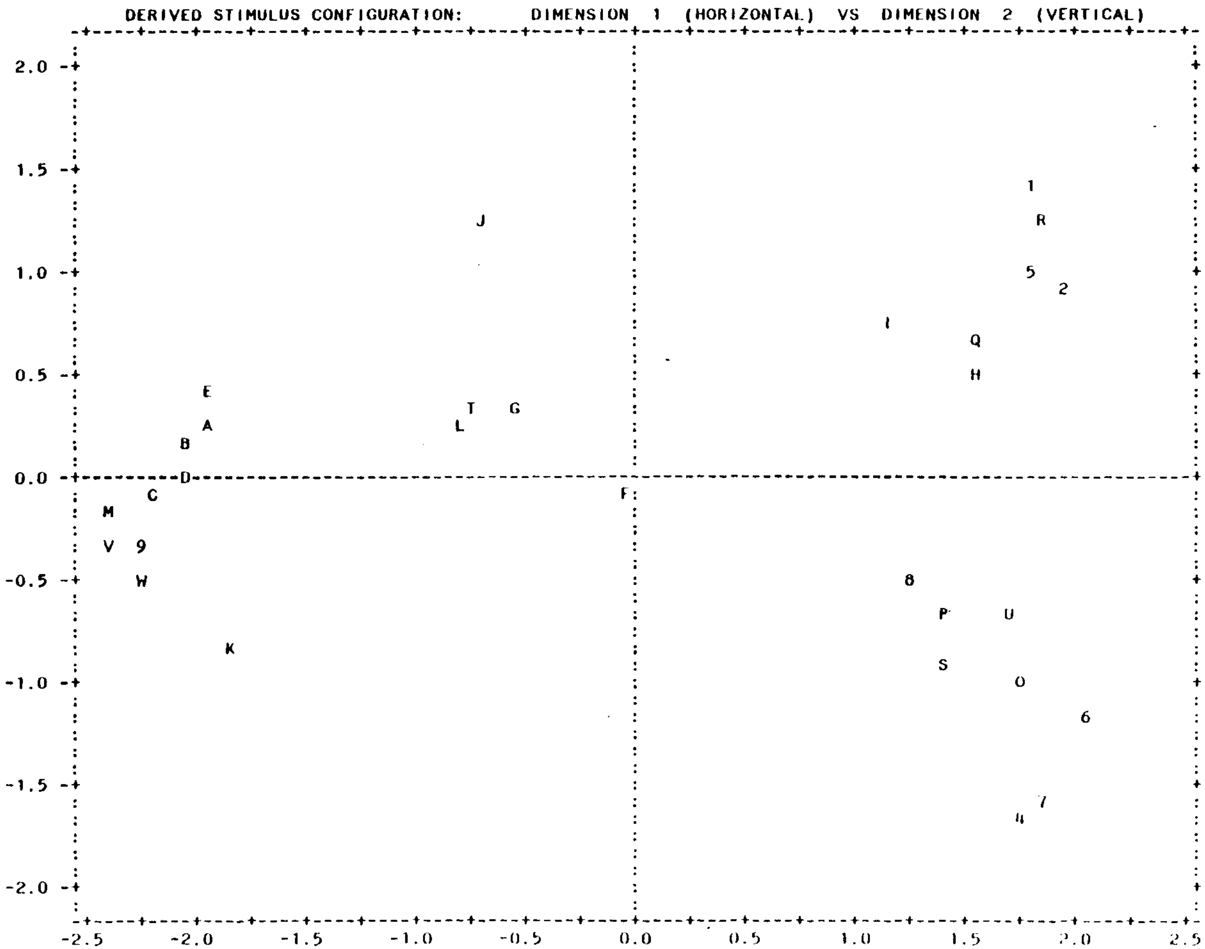


Figure 134: Six-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 3

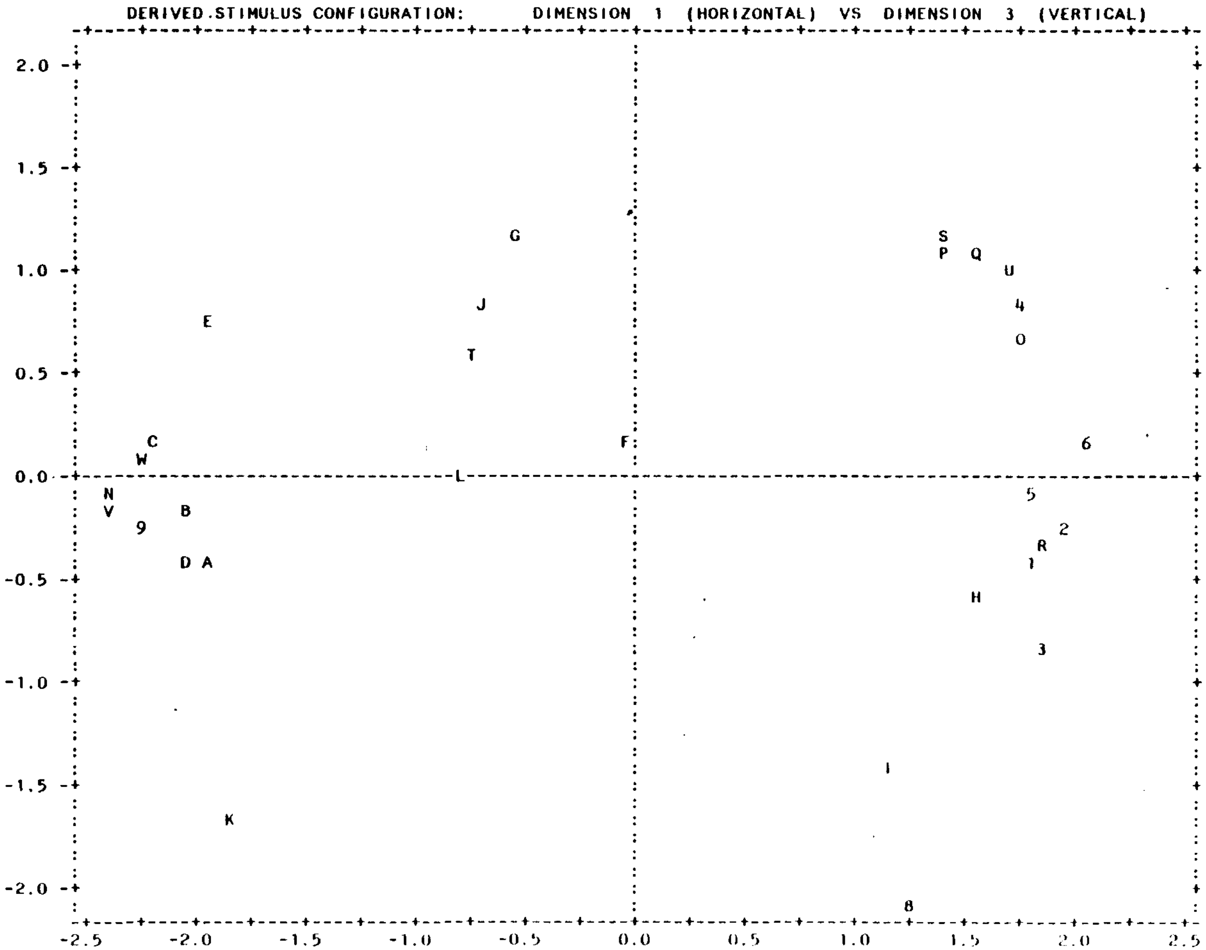


Figure 135: Six-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 3

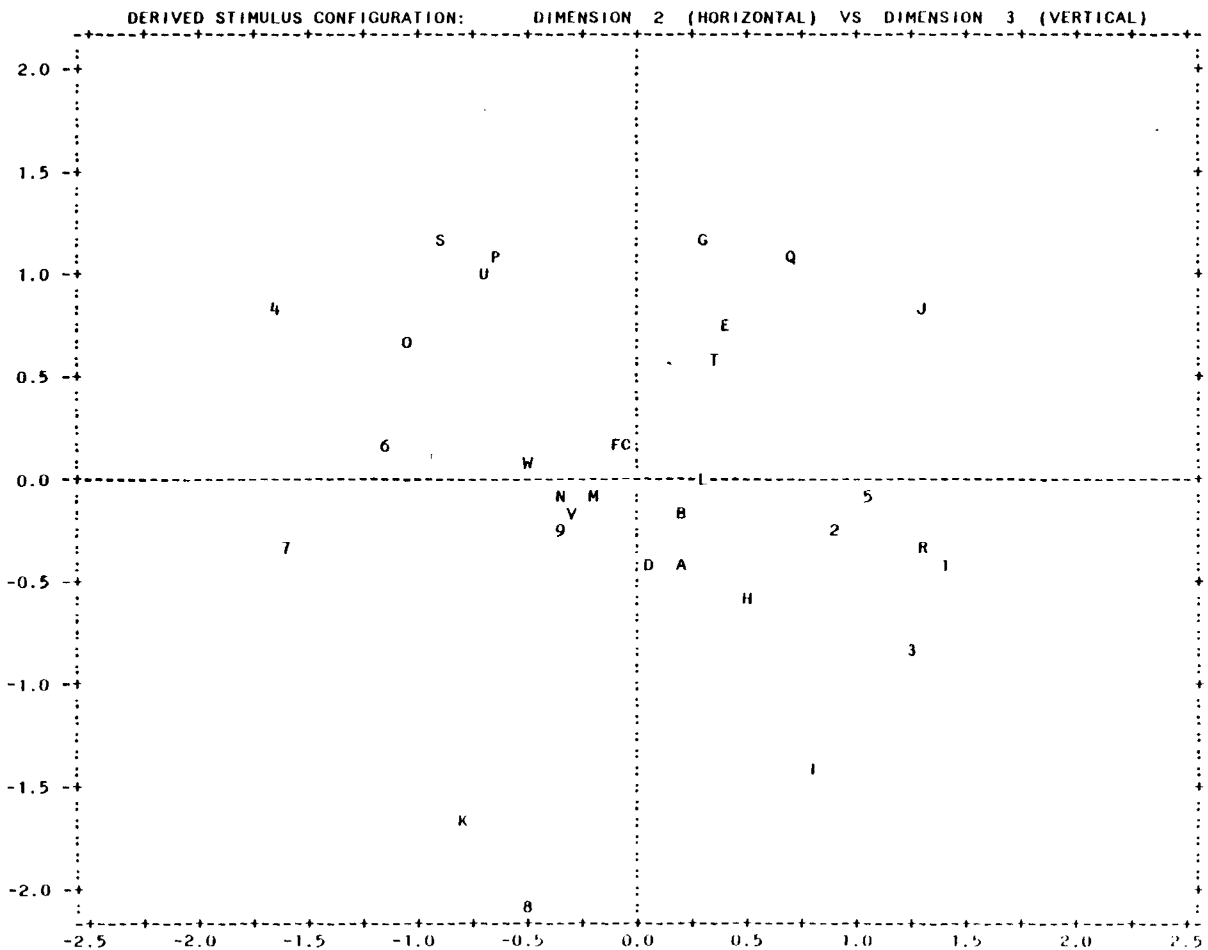


Figure 136: Six-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 4

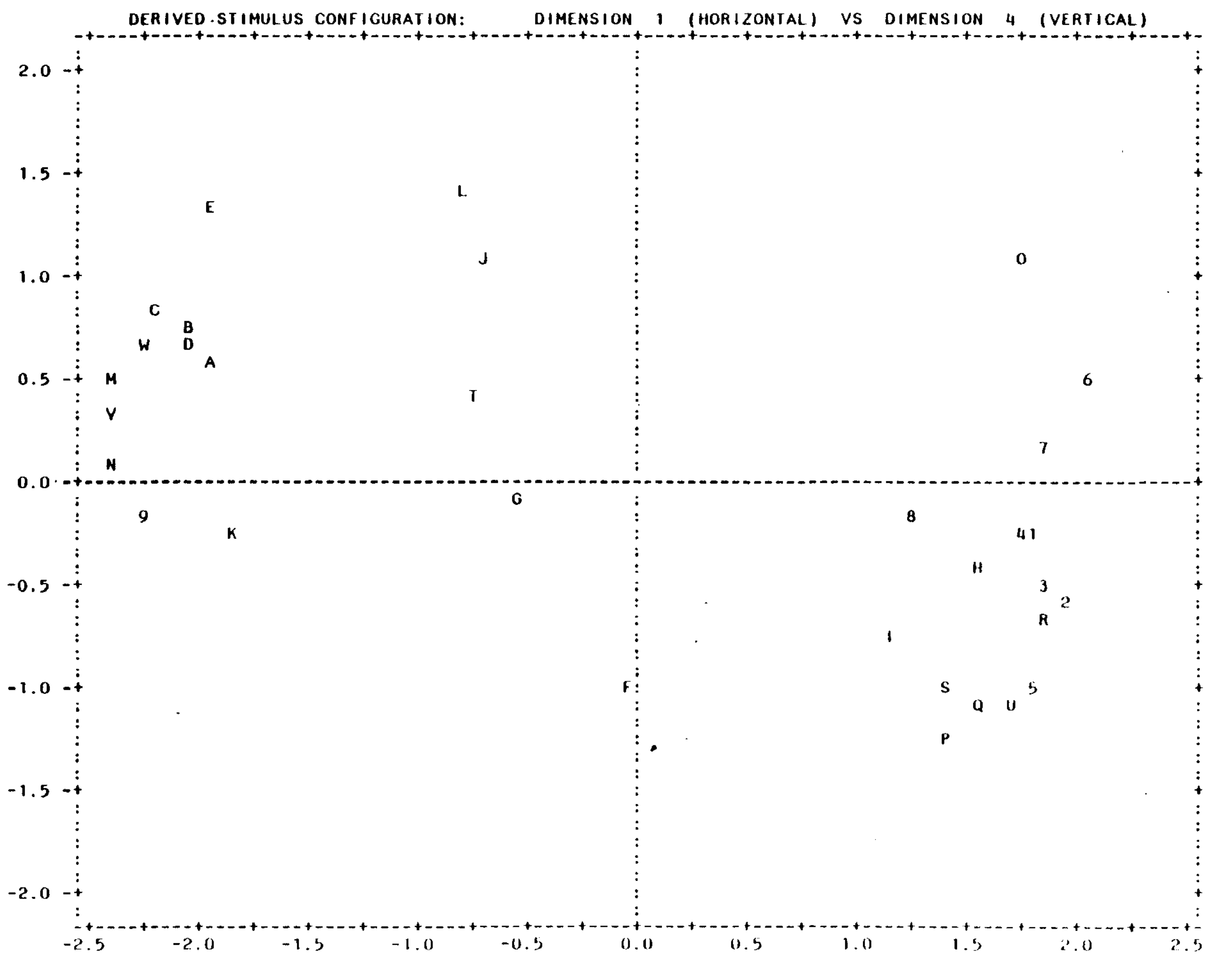


Figure 137: Six-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 4

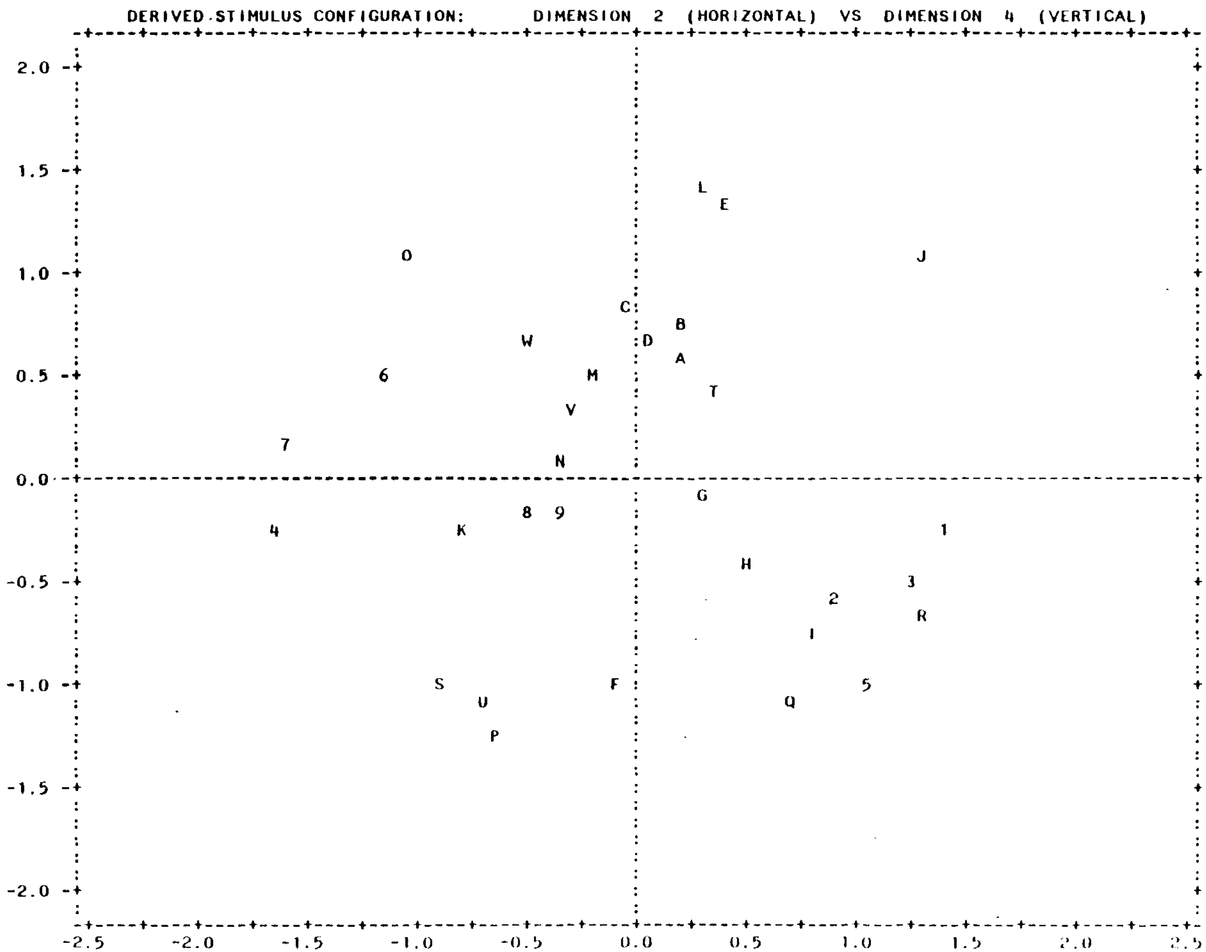


Figure 138: Six-Dimensional MDS Solution for Attribution Group; DIM 3 x DIM 4

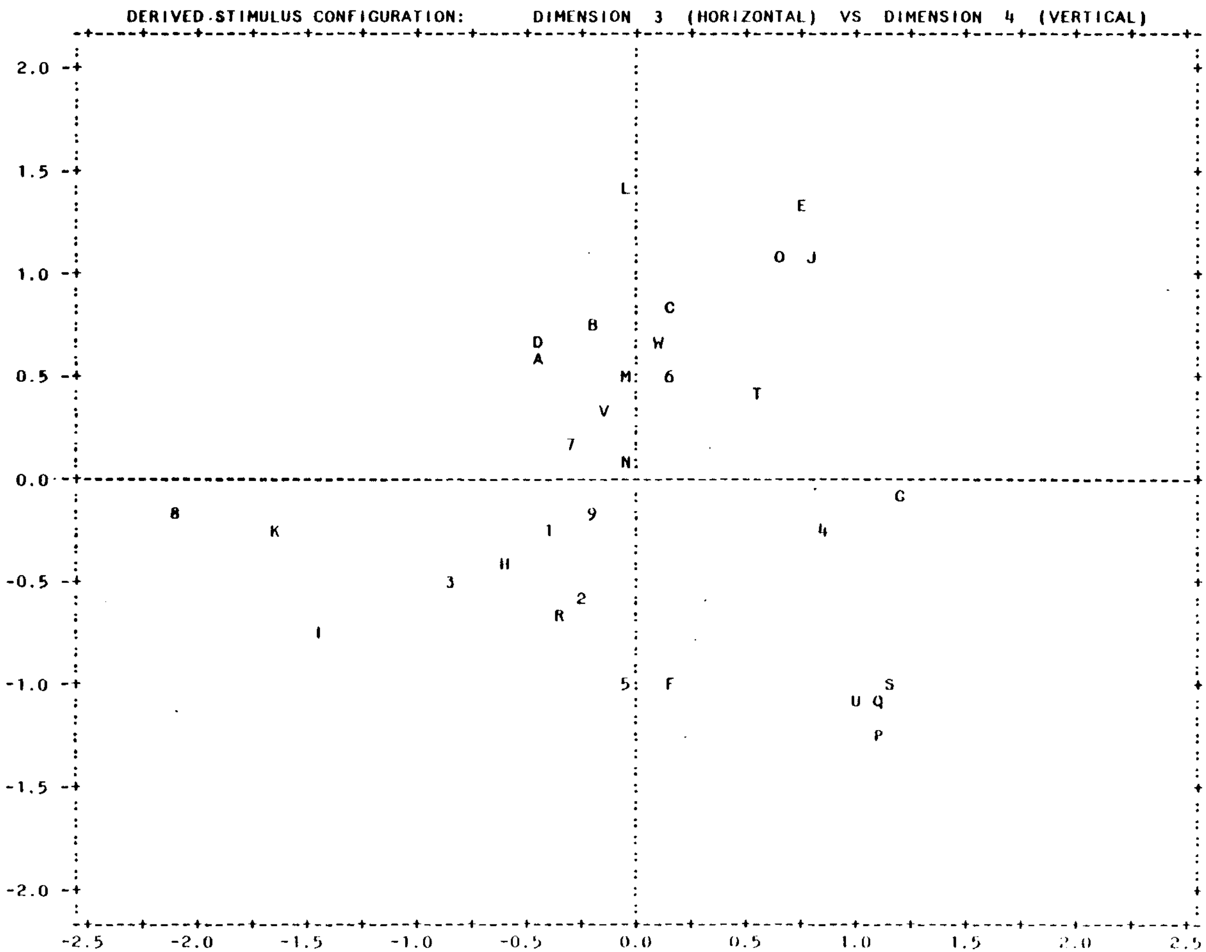


Figure 139: Six-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 5

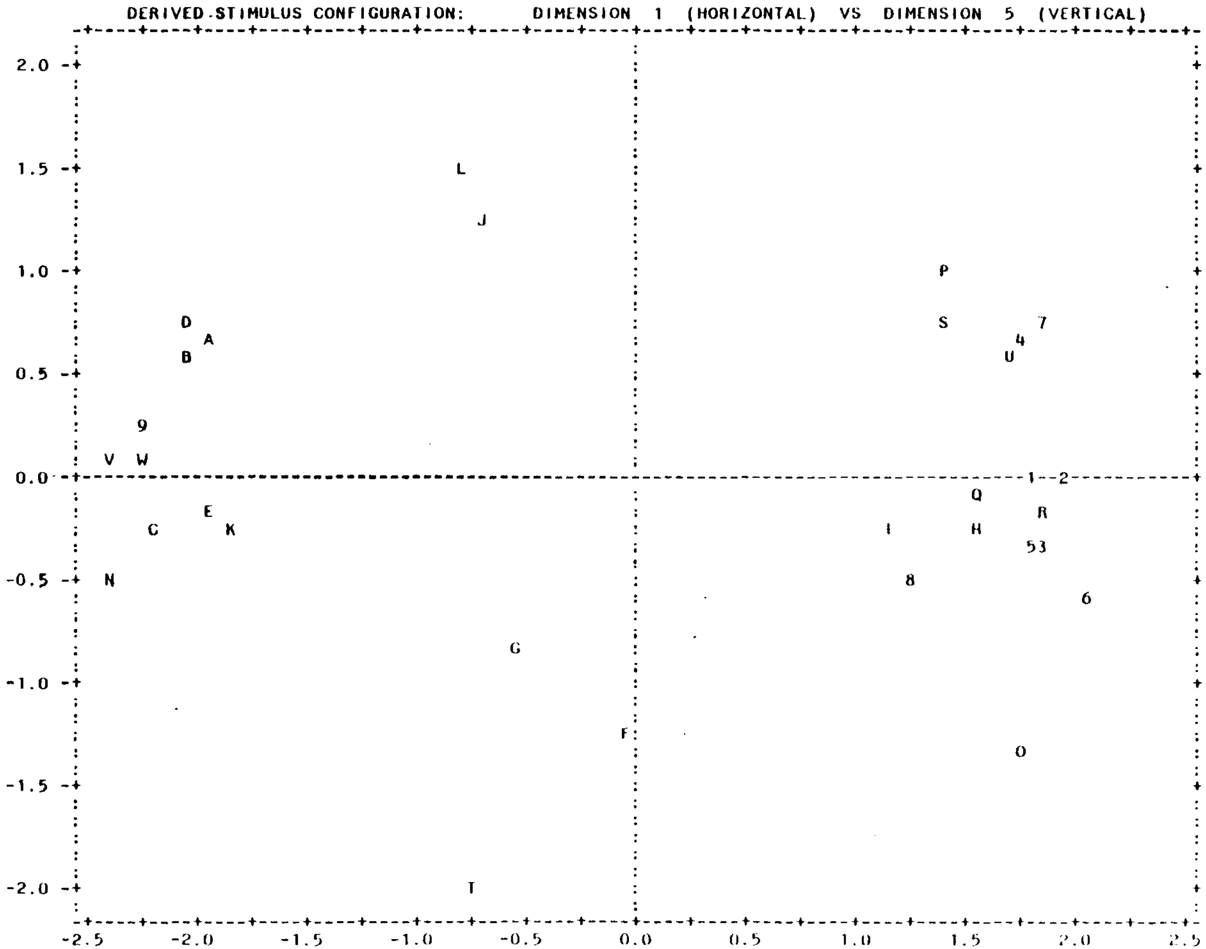


Figure 140: Six-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 5

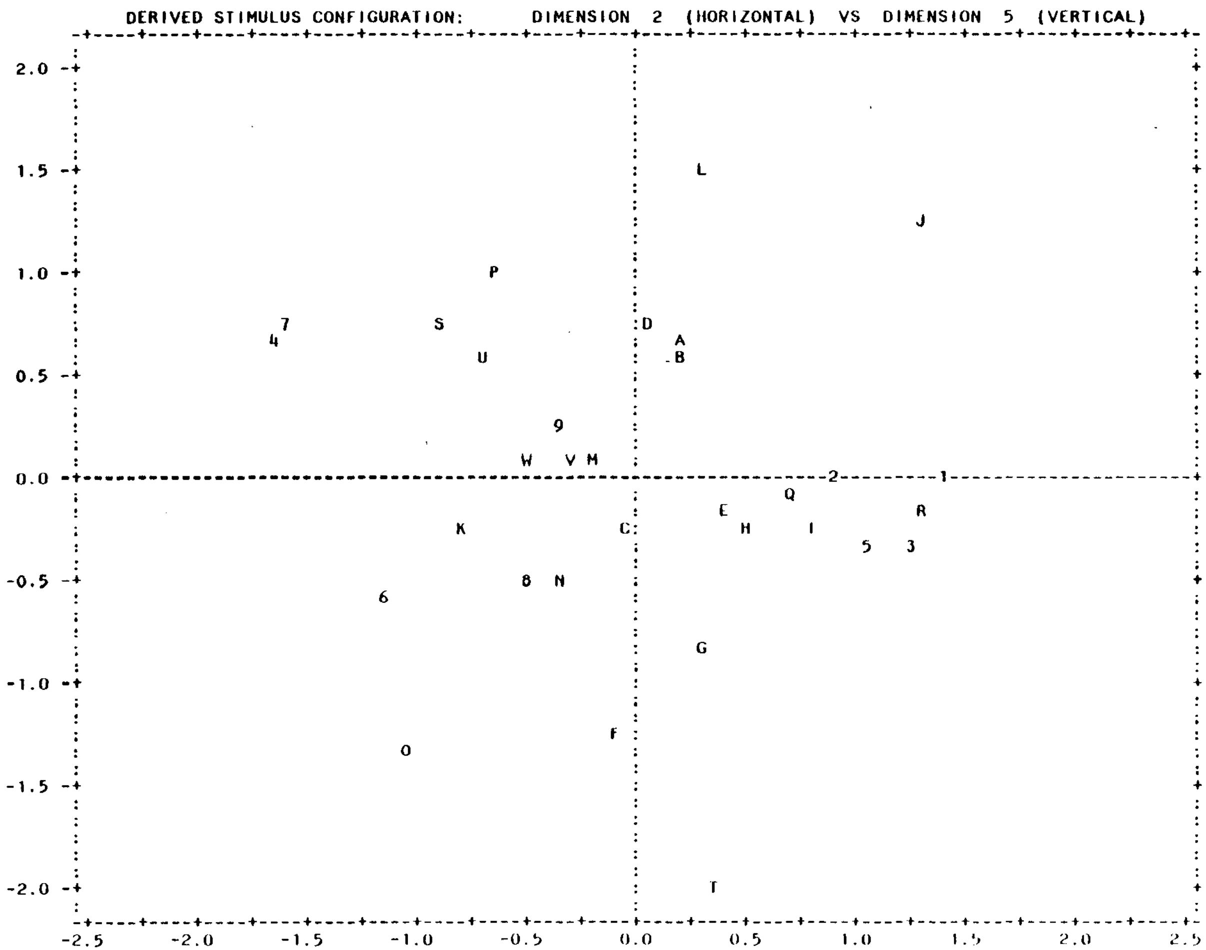


Figure 141: Six-Dimensional MDS Solution for Attribution Group; DIM 3 x DIM 5

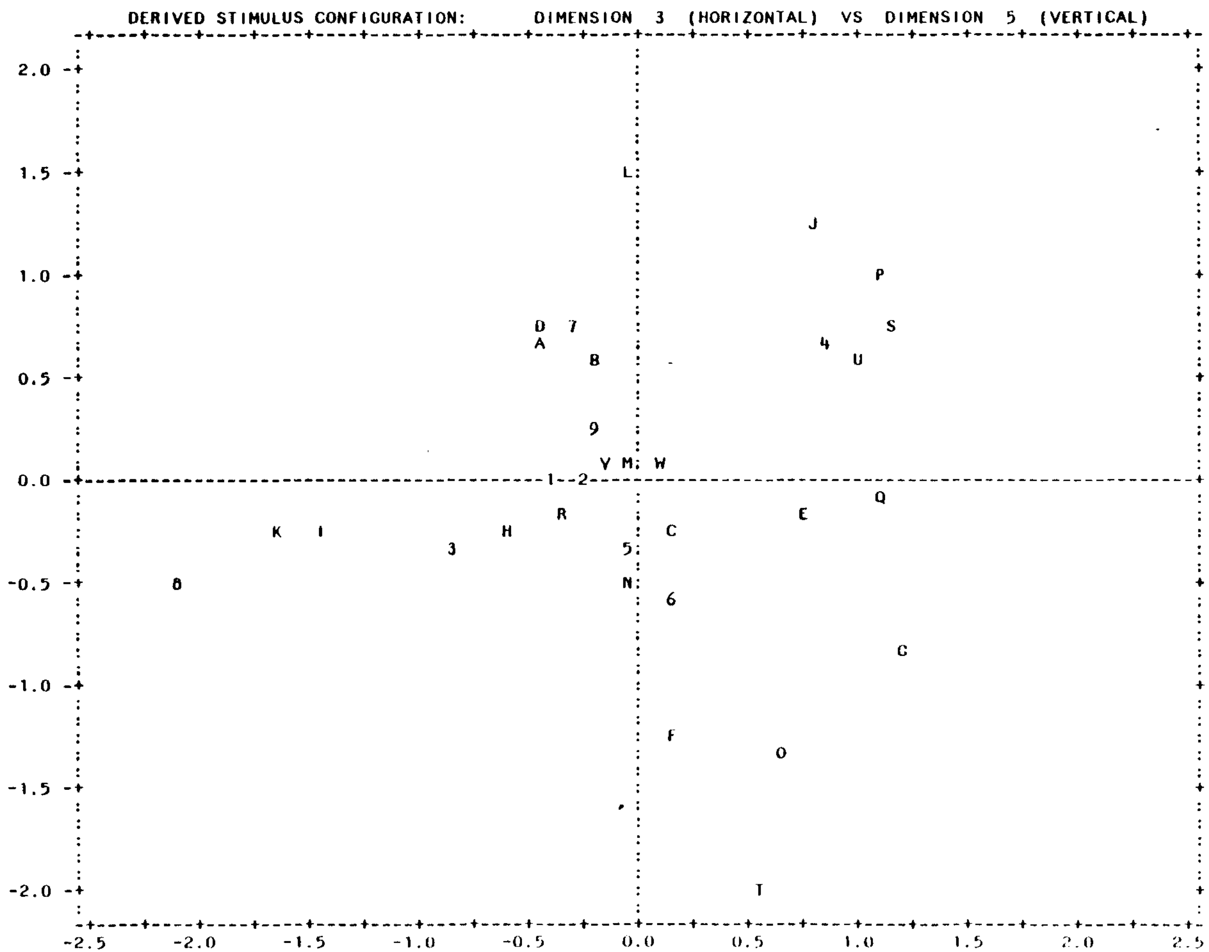


Figure 142: Six-Dimensional MDS Solution for Attribution Group; DIM 4 x DIM 5

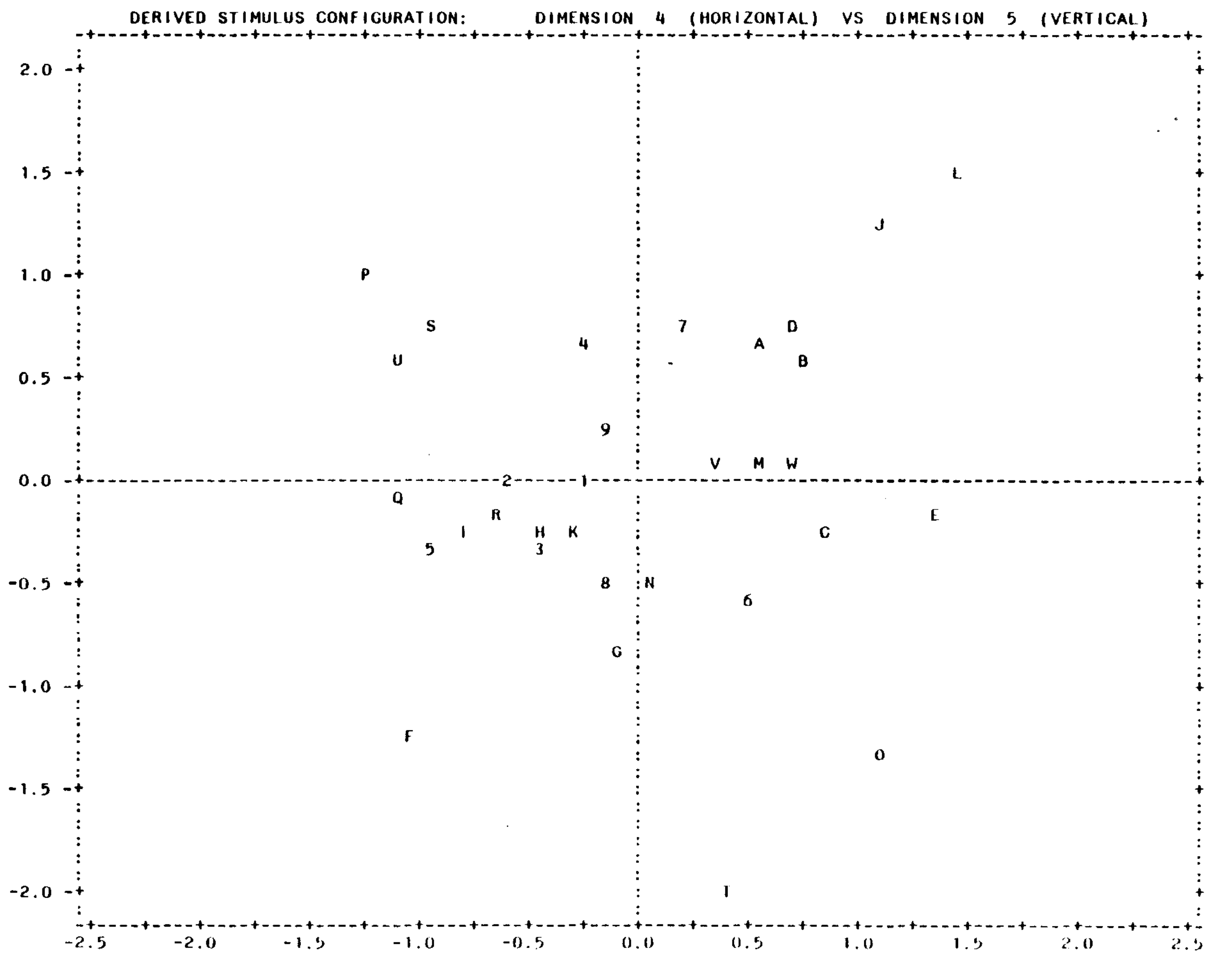


Figure 143: Six-Dimensional MDS Solution for Attribution Group; DIM 1 x DIM 6

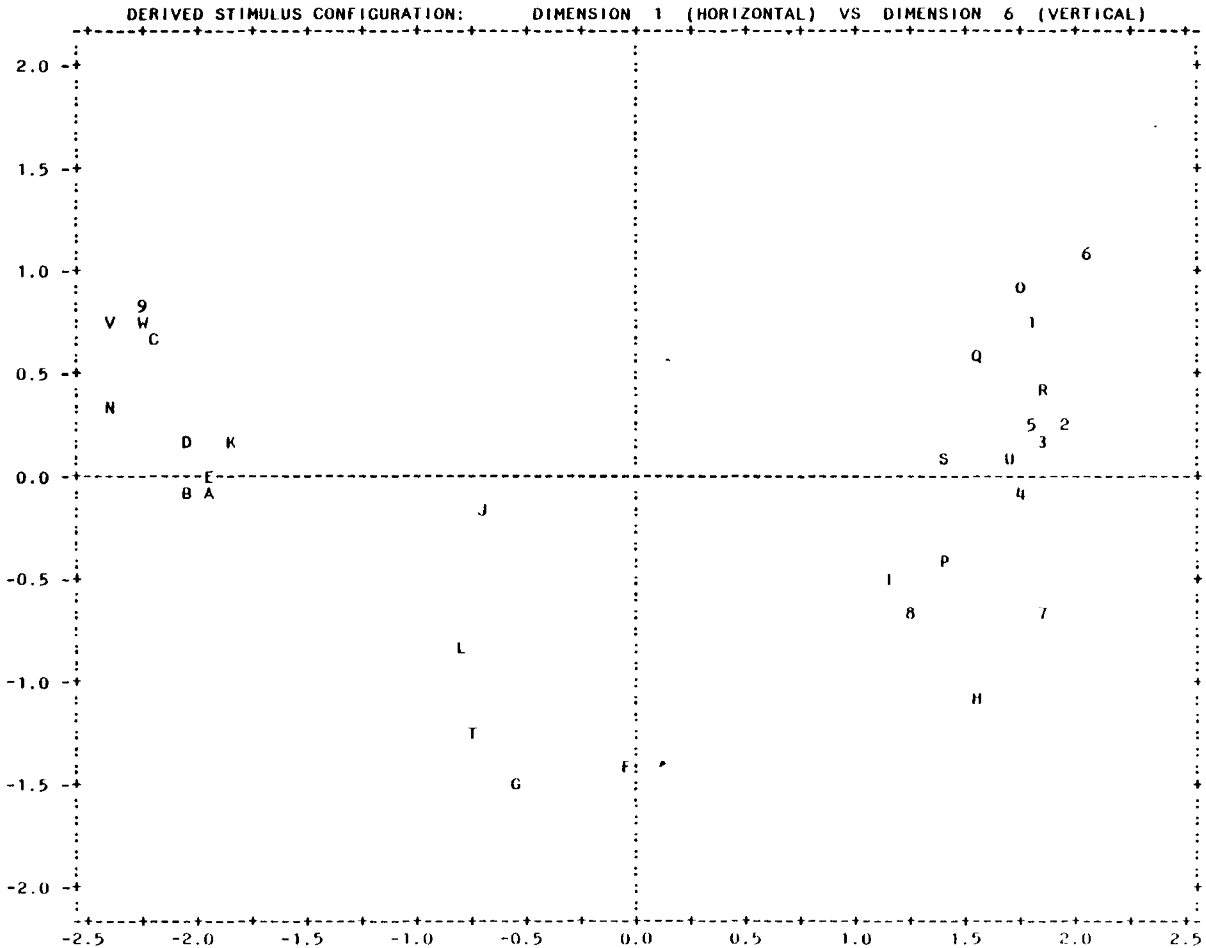


Figure 144: Six-Dimensional MDS Solution for Attribution Group; DIM 2 x DIM 6

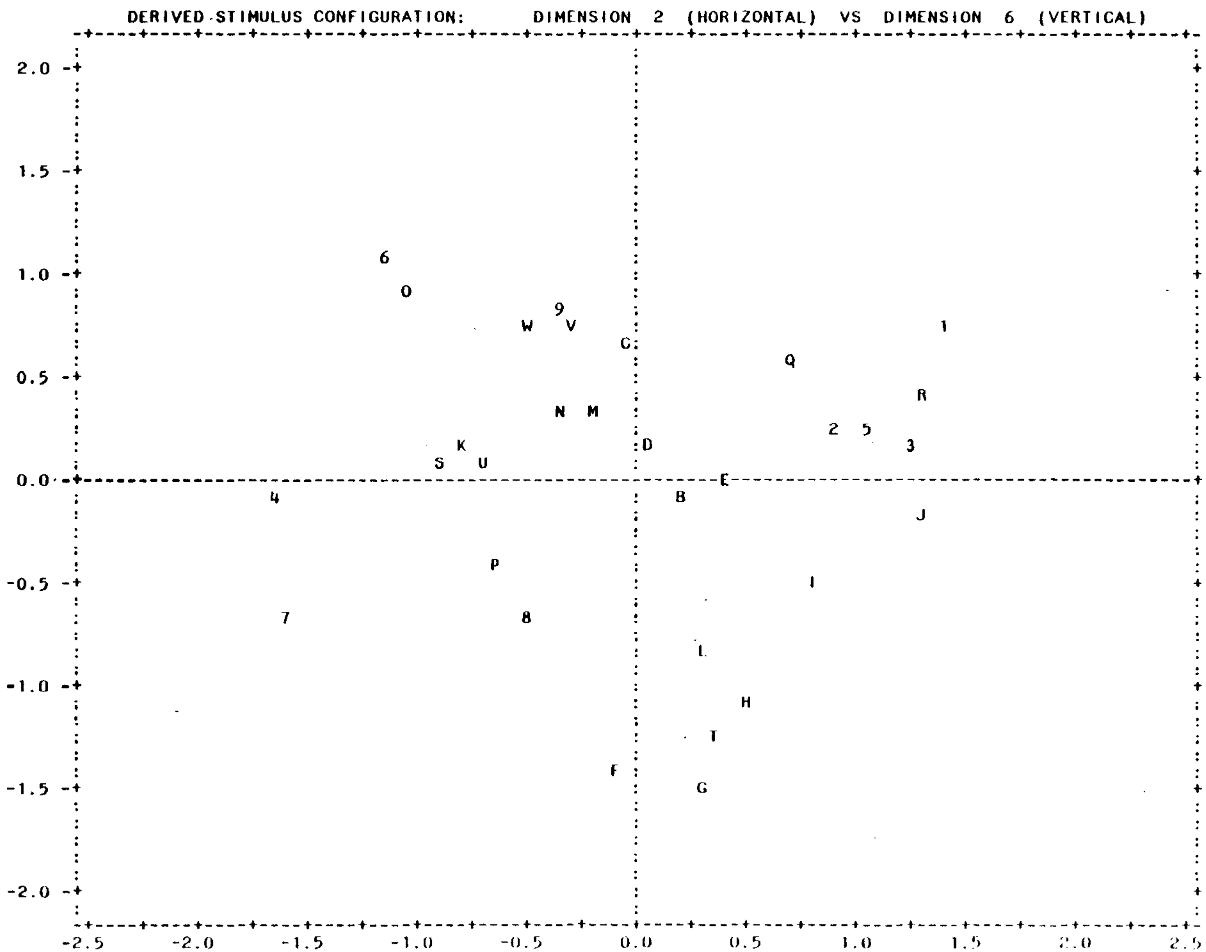


Figure 145: Six-Dimensional MDS Solution for Attribution Group; DIM 3 x DIM 6

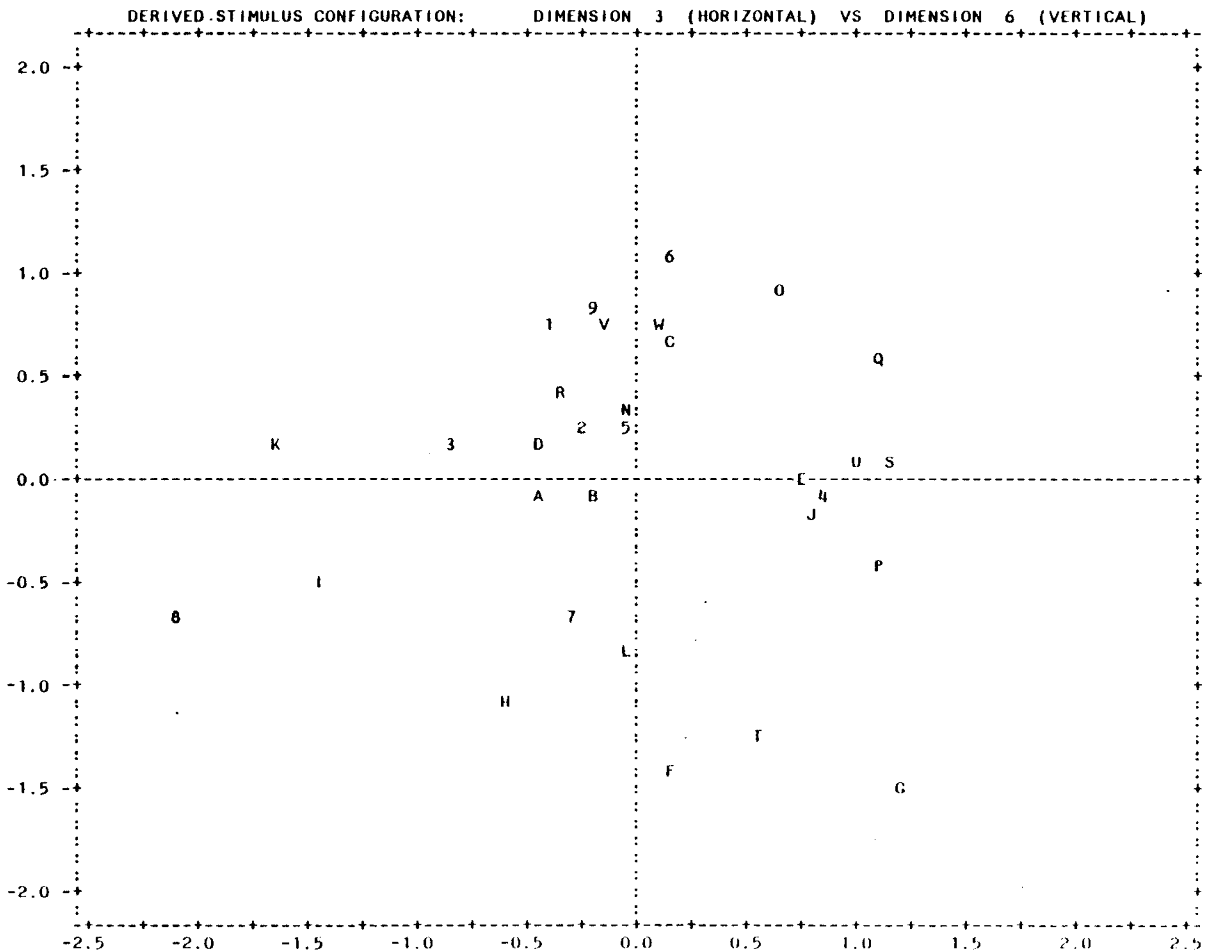


Figure 146: Six-Dimensional MDS Solution for Attribution Group; DIM 4 x DIM 6

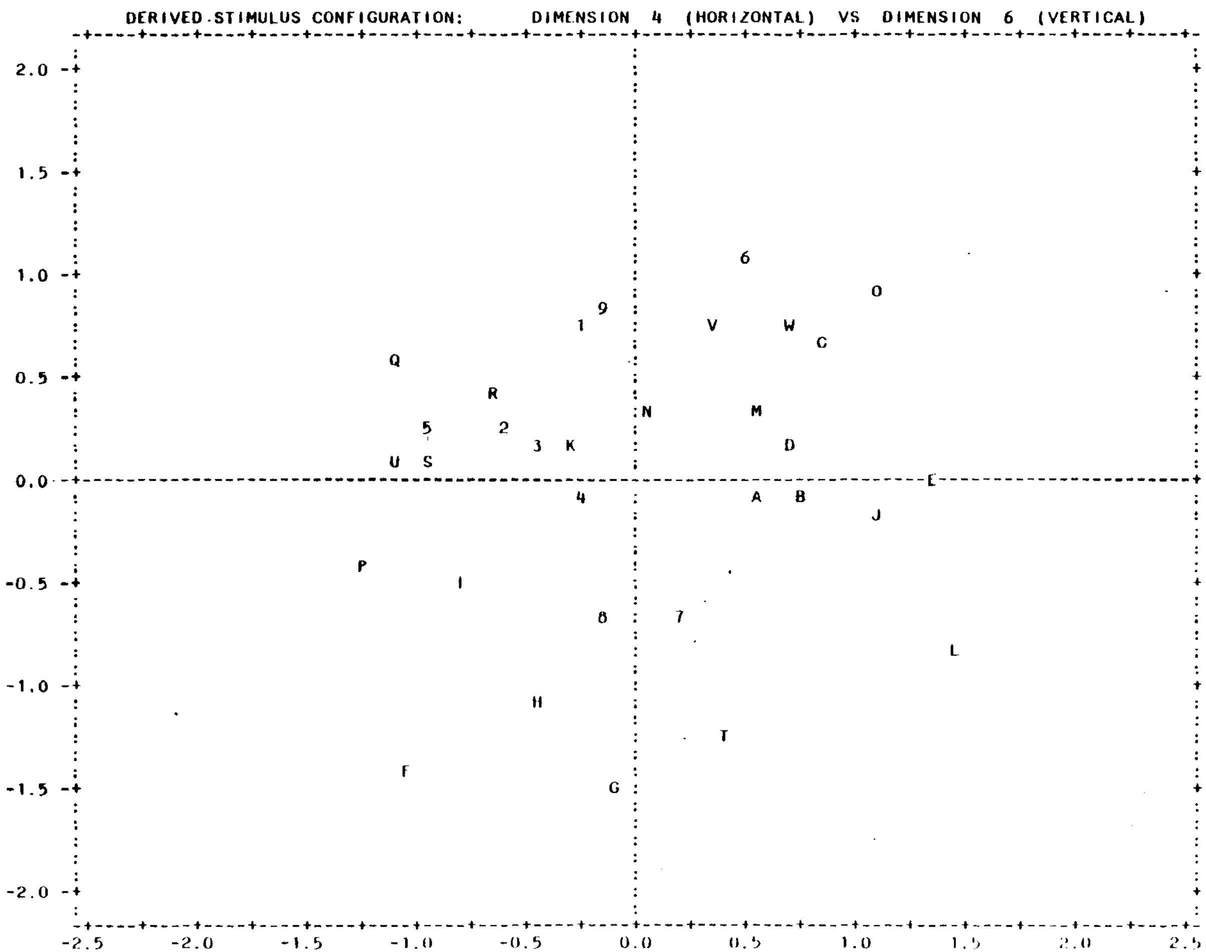


Figure 147: Six-Dimensional MDS Solution for Attribution Group; DIM 5 x DIM 6

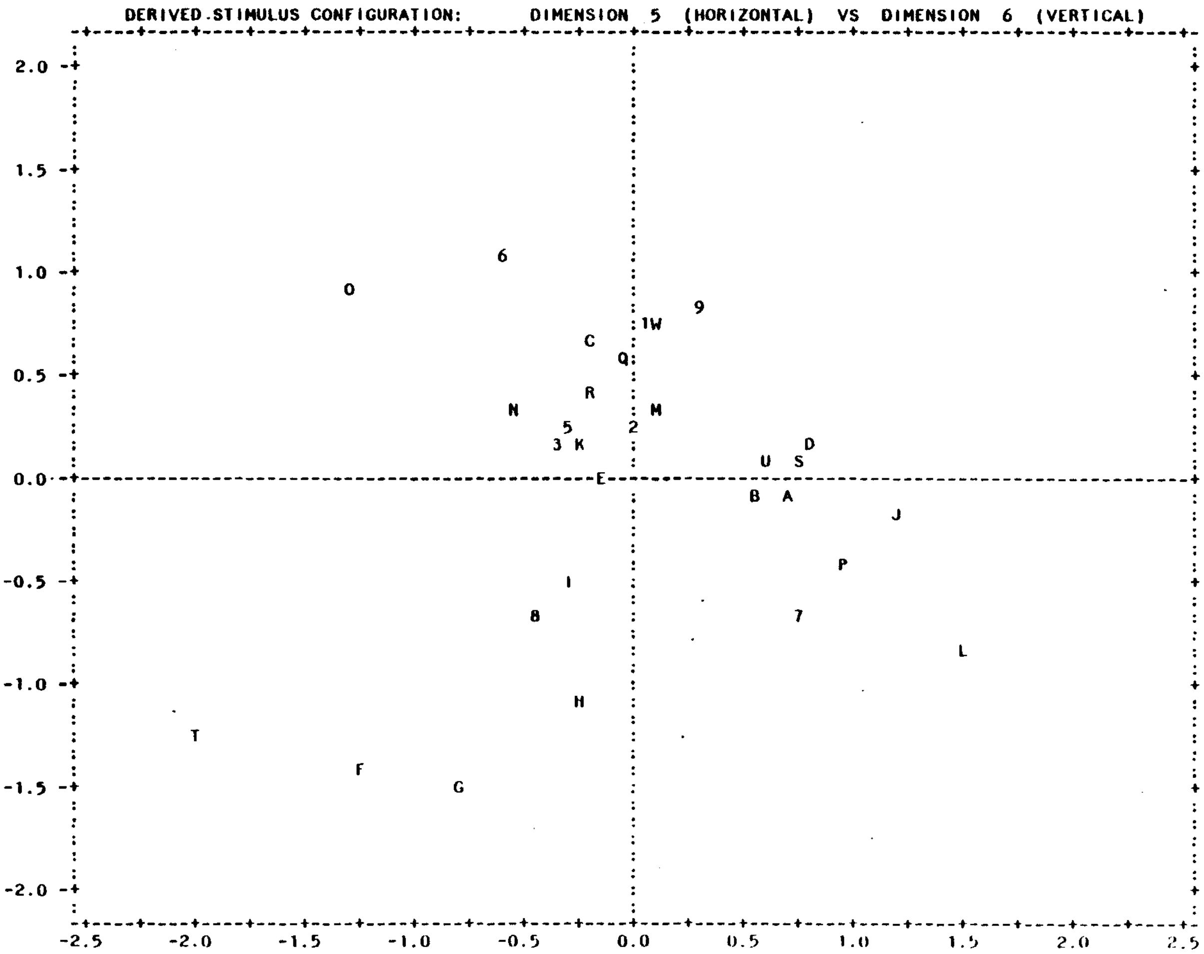


Figure 148: Six-Dimensional MDS Solution for Attribution Group; Linear Fit Plot

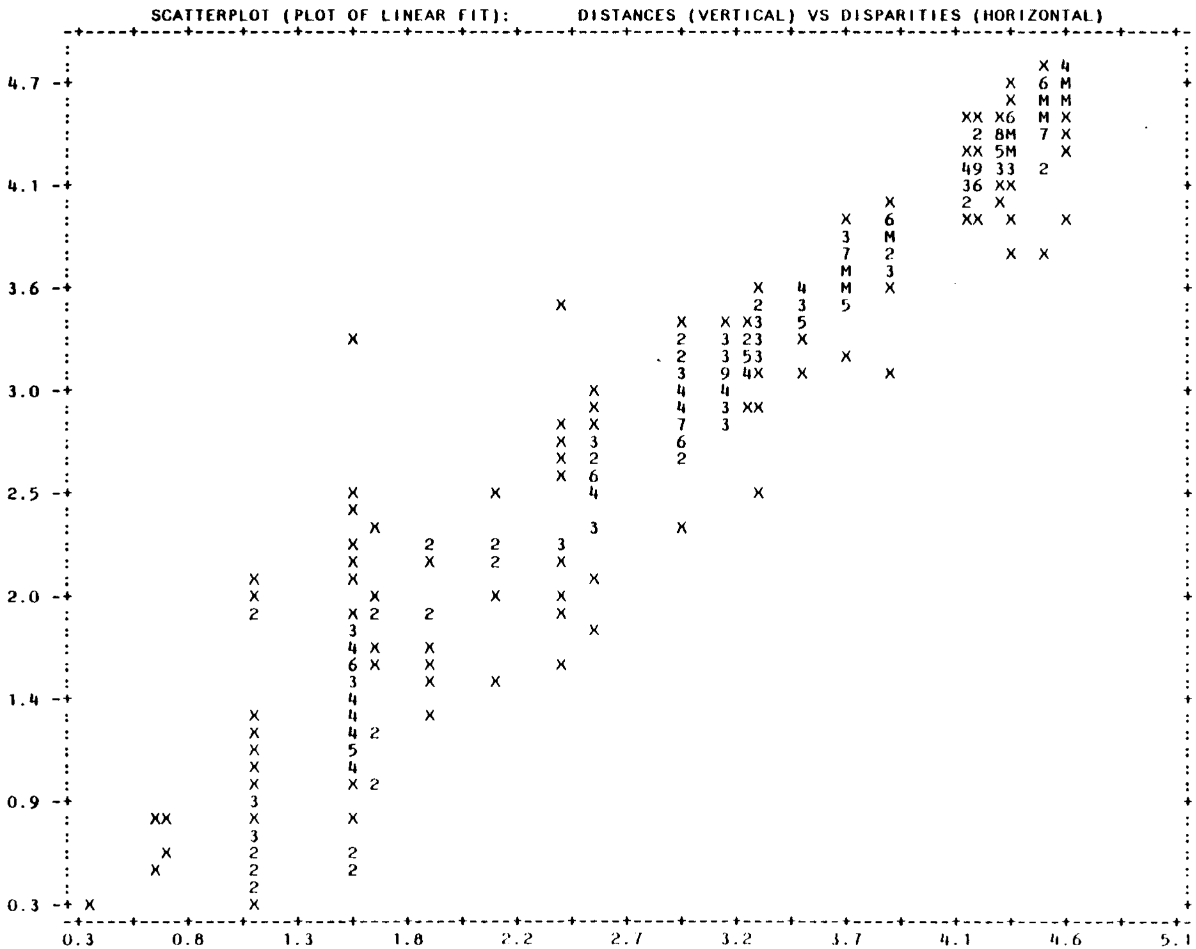


Figure 149: Six-Dimensional MDS Solution for Attribution Group; Nonlinear Fit Plot

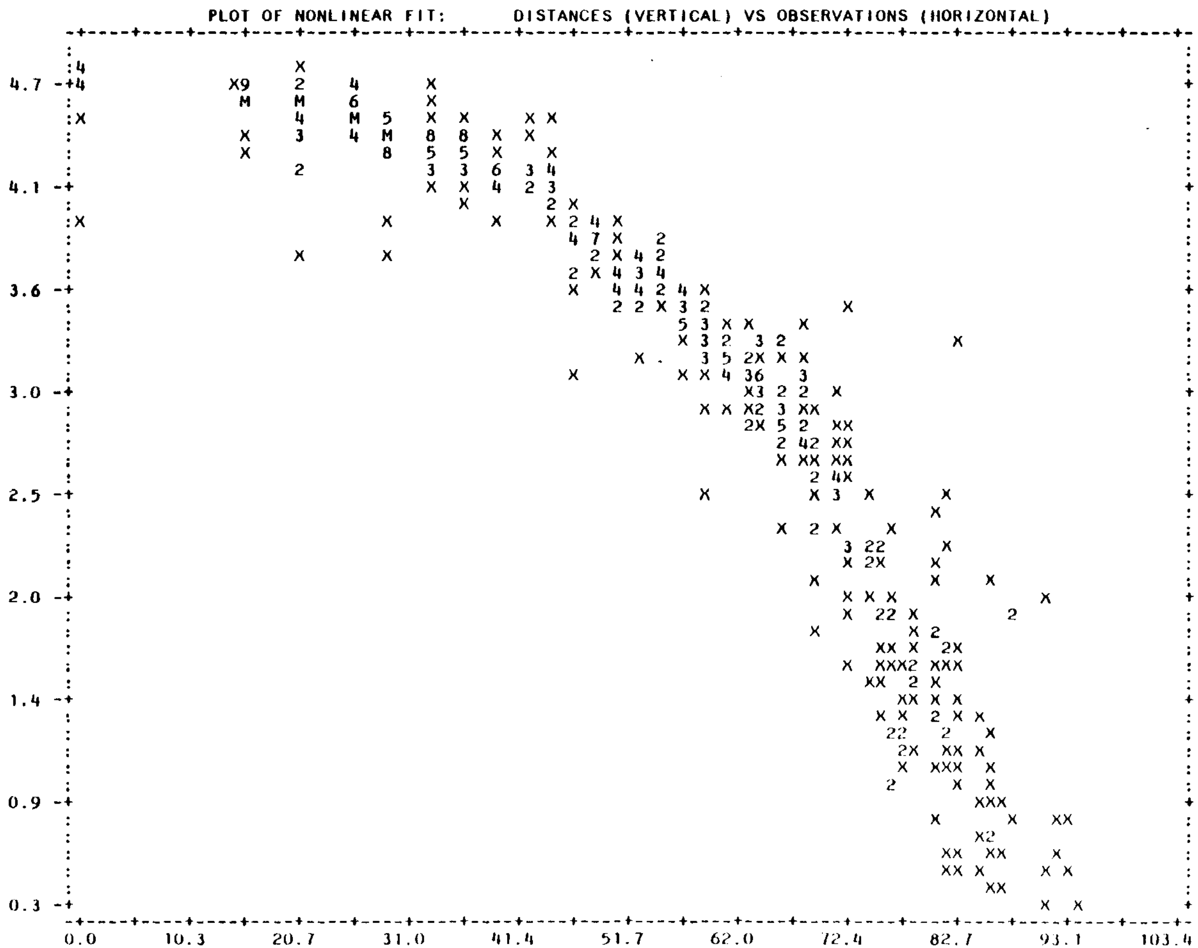
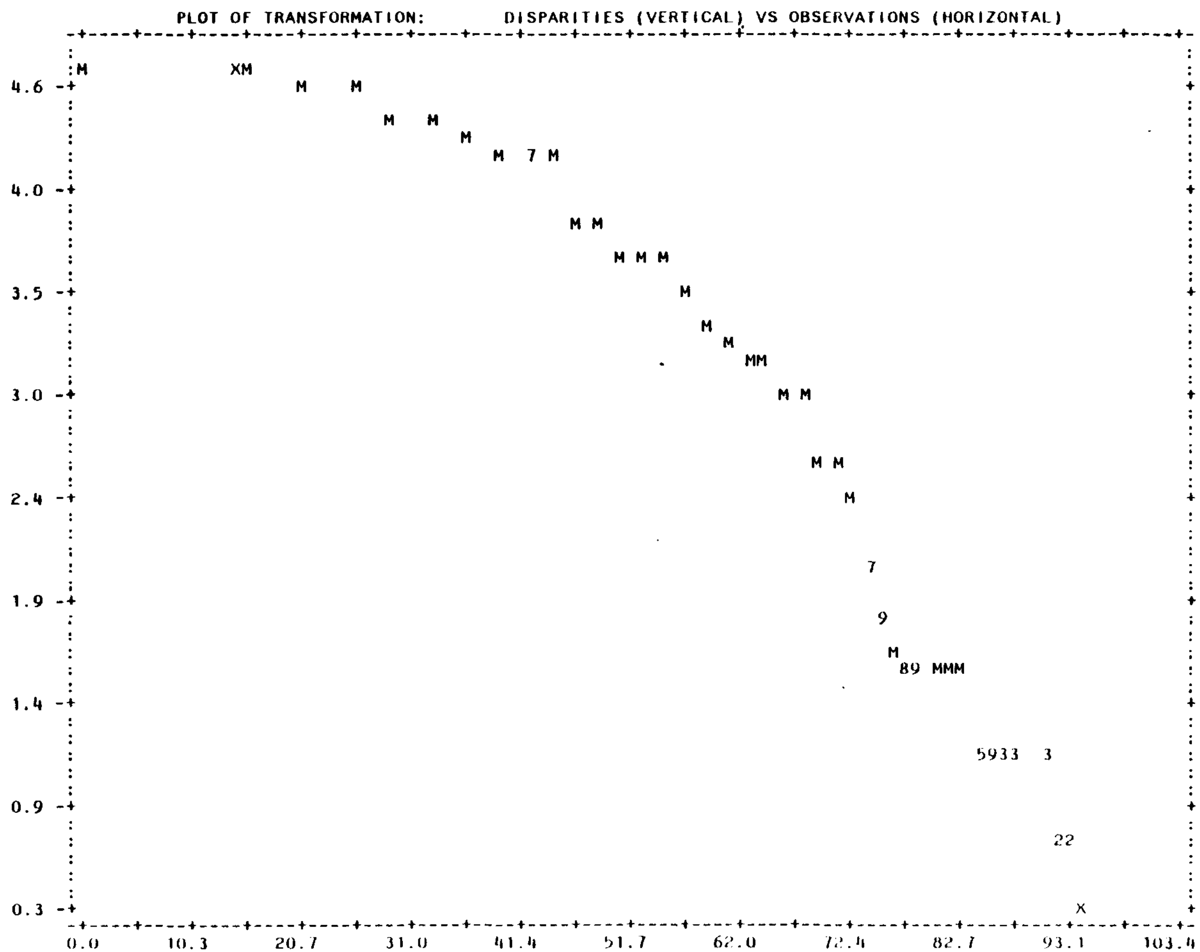


Figure 150: Six-Dimensional MDS Solution for Attribution Group; Transformation Plot



APPROVAL SHEET

The dissertation submitted by Karen D. Multon has been read and approved by the following committee:

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

July 9, 1990
Date

Dr. Steven D. Brown, Director