SEGMENTATION AND MULTIDIMENSIONAL SCALING ANALYSIS OF NEWSPAPER READERS

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ABSTRACT

SEGMENTATION AND MULTIDIMENTIONAL
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NEWSPAPER READERS

By

Douglas Craig Palmer

This thesis reports techniques for achieving metric measures of image concepts and describes the use of such data: (1) in producing segments having differing images of a newspaper, and (2) as the basis for computer-generated message strategies for all subjects en masse and for specific segments. The study examined the probable effectiveness of appealing to various segments with singular messages.

The study began with fifty depth interviews with readers of the State News, the Michigan State University newspaper. The nine most frequently occurring image concepts were abstracted. To these were added four concepts representing parts of the newspaper that the State News management wished to promote, the general concept "State News," and the concept "ME" to allow subjects to show psychological distances between themselves and the other concepts.

Some 132 students judged dissimilarities between all possible pairs of concepts. Metricity was gained by providing a standard of distance against which subjects could make distance judgments: "If editorials and comics are 100 units apart, how far apart are x and y?"

Distances between the "ME" concept and the other concepts served as data for a factor analysis, which produced evidence for four segments. For each segment and for all subjects, distances among all concept pairs were analyzed using the GALILEO program for metric multidimensional scaling, providing evidence for the following interpretations:

Segment I, characterized by preference for campus news, demonstrated preferences for other attributes of the newspaper, yet did not generalize favorability to the State News as a whole.

Segment II, labelled "purposeful, serious readers," did not consider campus news as relevant or interesting, were least favorable toward the newspaper, and many read other newspapers. It was inferred that this segment would prefer more national and international news.

Segment III, labelled "skimmers," read little of the State News yet was satisfied with it. Because this mostly male segment was small, and well satisfied, it was recommended that no promotion be directed at "skimmers."

Segment IV preferred feature sections and read the newspaper primarily for entertainment. This was the segment most favorable to the newspaper.

An operation in the GALILEO program called Automatic Message Generator was used to select statistically optimum message concepts for promotion. Theory underlying AMG use assumes that change in distance between the "ME" concept and other concepts can be influenced by changes in other interpair distances. Thus it is theoretically possible to decrease distance between "ME" and "State News" by decreasing distances between "State News" and other concepts at appropriate locations in

multidimensional space. The AMG chooses optimal concepts by comparing vectors between "State News" and other concepts.

Thus messages emphasizing the concepts "practical" and "Campus News" should evoke favorable responses from segments one and four. AMG analysis suggests that including the concept "coupons" should improve favorability with other segments as well. For promoting classified ads, the AMG could produce no single strategy suitable for all segments.

The thesis makes recommendations for improving selection of image concepts, for including an "ideal point" with the "ME" concept, for sample sizes appropriate to segmentation, and for evaluating computer generated message concepts.

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To Jo

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INTRODUCTION

This paper is primarily the building, exploration and discussion of a method of inquiry and analysis. The setting is the area jointly inhabited by market segmentation and multidimensional scaling. The area is not virgin territory, as several researchers including Green and Carmone, Aaker, Neidell, Stefflre and others have conducted productive explorations using various segmenting techniques in combination with various multidimensional scaling algorithms. This study constructs yet another system of analysis techniques aimed at satisfying the following objectives.

The first objective is to systematically identify and collect data on the variables actually used by the audience to define and judge the object under investigation. These operant variables will be used to segment the market.

The second objective is based on the assumption that if two segments will react similarly to a given message, they may be considered similar in that situation. Thus the objective is for the system to yield promotional message strategy that accomodates the similarities between groups as well as the differences. The proposed method is meant to give greater control to an advertising or promotion manager by offering accurate predictions of the probable responses that can be expected from various segments to a variety of messages.

Because undifferentiated strategies are usually less expensive and more easily managed than differentiated strategies, it is in the interest of efficiency and cost effectiveness to take advantage of the similarities as well as differences between segments where there is a reasonable likelihood of success. The proposed analysis is intended to offer a measure of the probable success of appealing to more than one segment with the same strategy.

The third objective of this method is to offer a measure of the probable effect of a message on various segments in order to avoid a situation wherein an advertisement has strong appeal to one target group and a negative effect on another. Even when different strategies are adopted for each segment, it is to the advertiser's advantage to control the competing message elements. In this way exposure to messages targeted to another segment, an inevitability in some campaigns, will have minimum negative consequences.

To be widely useful, the method must also be sensitive enough to identify segments among even relatively homogeneous markets.

The study undertaken to formulate this segmentation plan involved the measurement of readers' images of the State News, Michigan State University's daily newspaper. The newspaper audience was selected because a mass medium such as a newspaper necessarily appeals to a wide variety of interests simultaneously, and though the State News audience is relatively homogeneous in many demographic characteristics, it is expected to contain various segments based on other operant variables.

Because of the author's interest in image type problems, parts of the analysis scheme were selected for a theoretical or demonstrated

value in dealing with these problems. One practical result of the study will be the identification of some State News image problems and some recommendations.

The definition of the term "image" as used in this paper was taken largely from Aaker and Myers (1975) and refers to the set of meanings people use to remember, describe and relate to the object. An image problem may be defined as a situation where a product is considered unfavorable by a market even though the product attributes are considered favorable. An image problem may result from inappropriate attribute or product symbols, inappropriate ordering of the symbols, or from inconsistencies in the market's collective perception. Manipulation of attribute symbols is a vital part of image strategy.

This study is exploratory in nature, and the report should be sufficiently complete so that replication of the method is possible given even a superficial knowledge of multidimensional scaling, minimal statistical competencies, and adequate motivation. It is hoped that the exploration will be at least interesting, perhaps even stimulating.

In the first chapter, the diverse theoretical background of the study is explored and general assumptions are derived. Issues surrounding the general assumptions and pertinent measurement problems are raised. Chapter II reviews the literature bearing on the theory and issues presented in Chapter I. The third chapter describes the methodology used to apply the theory. Chapter IV presents the results and discussion, then summarizes the study and draws implications for future research.

CHAPTER I

THE SPACIAL MODEL AND THE IMAGE STUDY

Image: A Working Assumption

In the introduction, a general definition of 'image' was suggested that refers to the set of meanings people use to remember, describe and relate to the object under consideration. In a discussion of brand image from which this definition was derived, Aaker and Myers (1975) develop the proposition that an image is subject to the common human tendency to reduce a vast array of meanings to a summary form or stereotype. In this way, potentially complex cognitive structures or processes can be conveniently referenced by an individual.

The summary form of an object can be considered its image, and is determined by the physical attributes of the object; the experiences acquired by dealing directly with the object (e.g., using a product); the functions the object performs (social as well as physical); and communication about the object. People use stereotyping to capture essential meaning, to make communication easier, and to distinguish among different types of classes of objects or people.

These assumptions about the components and uses of images contain implications for measurement and analysis which are operationalized in this study. One major implication follows from the notion that the image of a product is a concept which relates objective and subjective product attributes, past experiences and relevant communication

simultaneously. While several models of cognitive structure exist which may be applied to this notion of image, the spacial model has intuitive appeal, is prominent in several disciplines, and has generated measurement techniques that are becoming staples in the fields of Communication and Marketing.

Two Spacial Models of Cognition

Seven spacial models of cognition were reviewed by Craig (1976) and five were found to be too ambiguous for general applicability. The remaining models, developed by Osgood and Woelfel respectively, share the important element whereby the conceptual structure of (n) objects or concepts is represented by an n x n matrix giving the dissimilarity or distance relations among all concepts. In the Osgood "semantic space" model, the matrix represents the semantic structure of the set of concepts and is "plotable" in a space of n dimensions or fewer. In Woelfel's model, the matrix is analyzed through the use of a metric multidimensional scaling routine yielding a coordinate space of n-1 or fewer dimensions in which the concepts are "plotable."

Both models have stimulated considerable interest, and the Osgood model in particular has been widely applied by marketing researchers in image studies. The main point to be made here is that a product image (as previously defined) may be represented by a n x n concept dissimilarities matrix where the concepts correspond to the attributes, functions, and experiences of the product.

While the two models contain similar definitions of conceptual structure, applications of each model are quite different due to some of the basic assumptions. The Osgood model assumes a semantic space

spanned by a set of fundamental factors derived from analysis of the now familiar "semantic differential" scales. Research suggests three such orthogonal factors are Evaluation, Potency, and Dynamism, and, of course, others may be derived depending on the adjectives scaled in the semantic differential.

The important general assumptions about Osgood's space have to do with interpretability. Dimensions of the space are assumed to represent potential semantic scales or attributes of judgment and the spacial origin is the point of neutral meaning. There is the assumption that cognitive change is equivalent to motion in cognitive space, but this is a minor assumption in the Osgood model because a change in the meaning of a concept on a semantic differential would not generally be expected to change the factor structure of the scales or the meanings of other concepts.

The Woelfel model derives its structure from direct, ratio-level, pairwise distance estimates by subjects. There is no assumption of an attribute space with fundamental factors, although attributional differences are assumed to underlie the distance judgments. The dimensions of the cognitive space, then, are not <u>assumed</u> to have psychological significance, although they <u>may</u> have significance. Interpretability of the space in this model depends on the extent to which pairwise differences between concepts fall into interpretable patterns. Depending on the concepts scaled, patterns may occur in clusters, dimensions, or other forms, but validity is in no way enhanced by interpretability. The key assumption of Woelfel's model is that change in conceptual definition equals movement of the concept in space relative to other concepts. Because the structure is derived from

complete pairwise distance judgments, the motion of an object implies change in its relation to all other objects.

In the final analysis, while other differences arise as artifacts of measurement techniques, the key distinction between models is that Osgood focuses on cognitive structure and Woelfel focuses on cognitive change. It may be added that the Woelfel model is limited to the study of aggregate phenomena, where the Osgood model is not. This is due to the greater difficulty of the judgment task required by ratio distance judgments. Because reliability is inversely proportional to the difficulty of the judgment task (Barnett, Serota & Taylor), the Central Limits Theorem and the Law of Large Numbers must be applied. Thus the mean response for each cell of the matrix converges the true population mean as the sample size increases. Reliability, then, is a function of sample size (Craig; Woelfel and Danes).

The problem under study in our case requires generalization of the findings to the student population. A sample large enough to meet this requirement should also be adequate for reliable application of the Woelfel model. In cases such as this, the limitation to the study of aggregate data becomes a moot point.

Image and Cognitive Change

Because the improvement of product image directly implies cognitive change, the mathematical advantages of the unbounded metric in Woelfel's model make it appropriate for this study. These mathematical advantages are derived from the metric inputs (consisting of any positive real number and therefore unbounded) which, when subjected to multidimensional scaling procedures, may be factored

without standardization and are therefore fully retrievable. This implies that, given the same unit of measurement, data from two or more points in time are directly comparable as coordinate spaces rotated to a mathematical criterion of congruence.

Another mathematical tool resulting from the measurement technique concerns the prediction and measurement of message effects in the conceptual space. To analyze the validity of these measures and predictions, we must first explore the theoretical bases for their use.

It was noted in the discussion of Osgood's model that marketing researchers have applied it extensively to a variety of problems. Actually, many applications have used a modified version of the Osgood model which retains the assumptions about cognitive structure, interpretable attribute dimensions and meaningful (i.e., neutral) origin. The difference lies in the measurement techniques used to derive the structure. Where Osgood routinely utilizes the factored semantic differentials, many researchers have used non-metric versions of the direct, pairwise distance estimates advocated by Woelfel. This provides the uniform, direct measure which relates each concept to every other concept. The use of direct measures, rather than statistically inferred measures of interconcept relationships, adds support to the notion that it is a valid measure of cognitive change. Osgood's paradigm involves statistically inferred measures of change in the relationships between concepts.

While direct measure of interpair relations enhances the applicability of Osgood's model to cognitive change, another problem arises from the non-metric measures. Since ordinal measures of dissimilarity are sensitive only to changes in rank order, these measures reveal

little about the real distances in the space. Ordinal measures were thought to be necessary to describe individual differences with adequate reliability, however, so methods were devised to artificially generate a metric configuration from nonmetric data. These methods, which only approximate the original data, give us the present techniques commonly known as nonmetric multidimensional scaling.

Of the many contributions to marketing, advertising, and communication research made by practitioners of nonmetric MDS, one theoretical construct has been developed which has special significance for promotion strategists. This is the representation of the subject's position in the space relative to the other scaled objects, the attribute dimensions, or both.

Ideal and Ego as Scaled Concepts

In product marketing, political campaigning and other ventures which attempt to influence the choice made by a constituency between competitors, it is axiomatic that the chosen alternative will be the one toward which there is the greater degree of favorability.

There are two approaches to the measurement of favorability which are commonly used with spacial models of cognition. Perhaps the most familiar of these methods involves comparing each scaled item to what the subject considers an ideal choice. For example, various coffee brands would be compared to some ideal coffee of the subject's own definition.

Usually, the attributes (dimensions) which are the basis for comparison are known prior to measurement. These may be derived from subject interviews, prior research, or some other method. Knowledge of

these attributes not only aids interpretation, but are usually assumed to be necessary for the subjects to adequately conceptualize an ideal brand or object.

The use of the ideal point has long been associated with nonmetric MDS research designs and the Osgood-type spacial model. The Osgood model allows the necessary interpretability of attribute dimensions and nonmetric similarities estimates between real items and the ideal can be anchored to specific attributes. Thus a question may take the form: "In terms of richness of flavor, is coffee X or coffee Y more similar to your ideal coffee?"

While the nature of the instrument may vary with the problem under study, the assumptions surrounding the use of ideal points are fairly uniform. These assumptions have been stated succinctly by Green and Carmone (1970) in Multidimensional Scaling and Related Techniques in Marketing Analysis, a thorough review of MDS applications in marketing.

The primary assumption is that an individual can be positioned in an evaluative attribute space and that this position is represented by the individual's ideal point--that combination of attribute levels which would tend to be preferred over all others. The assumption then follows that scaled objects closer (i.e., more similar) to an ideal point will tend to be preferred over those farther away. A third major assumption is that similarities data (which does not include the ideal point) may be analyzed jointly with preference data (which relates the ideal to all other items). Because the nonmetric approach allows interpretation of individual data, the unique point for every individual or for any group of subjects may be included in the joint configuration. This joint space analysis capability is a formidable

advantage for the nonmetric approach in that segments represented by very small samples may be analyzed without loss of measurement reliability.

Another approach to including the evaluative element in a multidimensional space is to scale an ego-related concept along with other concepts of concern. This, in its simplest form, may be the concept ME. Other forms, which may be preferred in certain situations, could be MY VOTE, MY PURCHASE, MYSELF, etc. The 'ego' concept, like the ideal point, is thought to have special properties with regard to behavior. The notion in purchase behavior terms is that brands whose perceived images are most compatible with the self-image will be chosen over brands with less compatible images. In more general terms, the theoretical assumption is that perceived similarity between ego and a concept is predictive of the behavior toward that concept. Favorability and choice (where a choice is to be made) will be inversely related to concept-ego separation.

These two approaches to evaluative measurement in multidimensional designs are conceptually similar, although their derivations have led to somewhat different usage. The ideal concept is typically assumed to represent the subject's position vis-a-vis specific attributes, whereas the concept ME is assumed to represent the self-image. Attributes or concepts used to define the self-image need not be specified. While the constraints of a specific research problem are probably the best criterion for choosing between the two, the ego concept is the more general in that no assumptions about image constructs or components are required. On the other hand, there are situations, involving new products for example, where knowledge of the attributes used in

evaluation would be highly beneficial, even essential.

Regardless of which concept is used to represent the position of the subject, two substantial implications arise which are relevant to this study. The first is an implication for promotion strategy in general, and rests on the assumption that the most desirable position for the promotion object would be closest to the subject's position. It follows that the optimum promotion strategy would result in movement of the promotion-object, over time, to a position of least separation from the subject.

The second implication involves the use of these concept-ego separations in a segmentation analysis. In a discussion of criteria for evaluating segmenting plans, Aaker and Myers conclude that the plan should use segmenting variables which are related directly to market response. Suitable measures of market response might be product sales, intention to buy, use of a service, voting choice, etc. If concept-ego (or concept-ideal) separation is indicative of favorability and behavioral intent, subjects with similar concept-ego separation patterns may be considered relatively homogeneous segments with regard to behavior. This study proposes a segmenting plan which employs these assumptions.

Application of the Theory: An Exploratory Design

At this point, there is a need to survey the literature bearing upon the theoretical models and assumptions discussed in this chapter. Before beginning the literature review, however, it will be helpful to the reader if the design of the present study is outlined in relation to these theoretical notions. Previous research may then be

brought to bear on the theory and, at the same time, the overall status of the proposed method can be considered in light of the available evidence.

There are two general objectives of dominant concern in this study and several related purposes. The major objectives are: (1) to segment the readers of the State News based on readers' images of the newspaper; and (2) to develop a promotion strategy that can be expected to increase favorability toward the State News. It is hoped that the method also be capable of allowing predictions of the probable responses from the various segments toward a variety of promotional messages. The purpose for this is to be able to avoid a situation wherein an advertisement has strong appeal for one target group and a negative effect on another. Ideally, in addition to predicting probable responses from the segments, the method should yield promotional message strategy that accomodates the similarities between groups as well as the differences. This would be a formidable advantage in that segments that would react similarly to a given message could be considered similar in that situation.

In our case, the managers of the State News want to run promotional messages within the pages of the newspaper, making it desirable to develop a strategy which appeals to all segments if possible. This "undifferentiated strategy," if you will, would be less expensive and more easily managed than differentiated strategies, so it is in the interest of efficiency and cost effectiveness to take advantage of the similarities as well as differences between segments where there is a reasonable likelihood of success. The proposed method is intended to offer a measure of the probable success of appealing to more than one

segment with the same strategy, and at the same time avoid adoption of competing strategies for different segments.

It was pointed out in the discussion of image at the beginning of this chapter, that an image is essentially a multidimensional construct involving several objective and subjective elements. It was shown that spacial models exist that are capable of representing the full dimensionality of a set of concepts which are components of an image. Thus, to apply a spacial model, the first major step in the design must be to determine the concepts which make up the image. In this study, depth interviews and simulations of the State News reading experience were conducted to generate the list of concepts. Interviews were nondirective in order that the selected concepts be operant.

In order to choose between the spacial models, the objectives of the study were brought to bear. In this case promotional objectives directed the choice. It was theorized that increasing the favorability of an image involves cognitive change and that the model developed by Woelfel is specifically suited to the study of cognitive change on an aggregate level. This results from the fully metric input which allows for direct comparison of spaces at two (or more) points in time, or for two (or more) segments. While the Osgood model involves assumptions which enhance the interpretability of the space (i.e., all dimensions represent known attributes), the Woelfel model does not necessarily deny interpretability. In this light, the Woelfel model was chosen for application in this study.

The concepts derived from the depth interviews were subjected to direct, ratio level, pairwise similarities judgments by a sample of the target population. The responses were analyzed using GALILEO,

a metric multidimensional scaling program developed by Woelfel and his associates specifically for use with the spacial model.

After the MDS solution was obtained for the aggregated data, the pairwise comparisons were used to segment the sample. The procedure used to accomplish this applies the theory relating concept-ego separation to behavioral intent. The subjects' judgments of the similarity between themselves and every other scaled item were subjected to Q-factor analysis to derive relatively homogeneous segments.

Q-factoring is based on correlations between people, rather than items, so the factors product evidence for groups who exhibit similar patterns of concept-ego separations.

In deciding whether to use an ideal point or an ego-related item to represent subject positions, previous research played an important role. It will be shown in Chapter II that the use of the ideal has been more widespread in segmentation studies but that both approaches have shown substantial promise. A greater contribution may perhaps be made by submitting a study utilizing the "ego," or self-image approach.

Using the methods of analysis described above, message strategy will be suggested which is designed to increase each segment's favorability toward the State News. Increasing favorability is operationalized as the movement of the State News, a concept in perceptual-evaluative space, to a position as close as possible to the position of the segment's aggregate ME. The methodology designed to produce this perceptual change (or motion, in spacial terms) is detailed in Chapter III.

Summary

The theoretical models and assumptions relevant to this study have now been set forth. Application of the theory to the present problem has been outlined in this chapter so that theory and application can be jointly examined in light of previous research.

Two spacial models were discussed in terms of cognitive structure and cognitive change issues. Metric and nonmetric scaling approaches were discussed, as were methods of introducing evaluative elements into the analysis. Theoretical implications were related to objectives of the study, resulting in an outline of the research design. In the next chapter, prior research will be brought to bear on the theory and the design.

CHAPTER II

PRIOR RESEARCH

In this chapter, evidence from earlier research will be presented on several issues of central interest to this study. These issues include (1) the utility of the spacial model; (2) behavioral implications of motion in cognitive space; and (3) segmentation with MDS. Following the discussion of these issues, the design of the present study is evaluated in light of the prior research.

Utility of the Spacial Model

The largest body of research dealing with spacial cognitive structures utilizes the "interpretable dimensions" model. Both nonmetric MDS and "semantic space" studies tend to support the utility of a general spacial model, but the issue of interpretable dimensions has raised doubts in the minds of some. For example, the consistent use of factored attribute scales in the Osgood paradigm makes it difficult to challenge the assumption that attribute dimensions are fundamental to spacial structure. The method begs the question.

Robert Craig (1976) has conducted an extensive review of research into spacial cognitive structures in which the utility of the spacial model is supported, this despite some reservations about methodological problems, such as the one mentioned above. Craig's findings are best described in his own words:

> Because of its emphasis upon producing an interpretable space of small dimensionality, nonmetric MDS can be and has been used to determine the utility of a spacial concept of cognitive structure. A representative, indeed almost comprehensive source for the current theory and application of nonmetric MDS in the behavioral sciences is the two volume collection by Shepard, Romney and Nerlove (1972). A review of the papers in those volumes tends both to further evidence the utility of the spacial model of cognition and to justify our suspicion of Osgood's method of operationalizing that model. Many MDS studies, that is, have found interpretable spacial configurations, but many of those studies also suggest that not all interpretable multidimensional spacial representations of cognitive structures also have interpretable dimensional structures. Spacial structures may appear as interpretable clusters, circumplexes, or other nondimensional forms (p. 32-33).

As to the validity of the spacial model and of operationalizing the model using MDS, Craig finds that:

> Perhaps the most compelling evidence, however, comes from those studies which have related spacial representations to human behavior assumed to depend upon the cognitive similarity of objects. That such relations hold has been demonstrated for the substitutability of consumer products (Stefflre, 1972) and of political candidates (Mauser, 1972): products or candidates found by MDS to be closer together are more likely to be substituted for one another (switched among) in the market or electoral arena. Jones and Young (1972) found that frequency of social communication could be predicted from distances among people in a spacial representation of a social structure.
>
> In sum, both semantic space and nonmetric MDS research tend to confirm the utility of a spacial model of cognition, in that those studies have shown that the spacial representation is stable, valid on its face, and reliably related to other human behavior (p. 34).

Behavior and Motion in Cognitive Space

In the preceding chapter, a spacial model advocated by Woelfel was presented in which it was argued that interpretability is neither necessary or sufficient to support the spacial model, for the concept of space implies motion.

Interest in the study of motion in cognitive space has led some researchers to favor metric measures for their greater sensitivity than the ordinal methods of nonmetric MDS. In this light, the GALILEO system was developed by Woelfel and his associates. GALILEO is a set of measurement techniques and computer programs for metric MDS analysis of aggregated data. A detailed description of GALILEO may be found in Serota (1974), but an overview has been supplied by Barnett, Serota, and Taylor (1976):

> The subjects are given a complete (n(n-1)/2) list of pair comparisons for the concepts being scaled (n=the number of concepts). They are asked to make ratio judgments of the dissimilarity between concepts using the form:
>
> if x and y are u units apart, how far apart are concept a and concept b?
>
> Such an item wording requests a distance judgment from a respondent (". . . how far apart are a and b?"). However, it requests that this judgments be made as a proportion of a standard distance provided by the researcher ("if x and y are u units apart . . ."). This format allows the respondent to report any positive value; the scale is thus unbounded at the high end, continuous, and grounded with a true zero (two concepts are perceived to be the same).
>
> Since the data an individual may be unreliable (reliability being inversely proportional to the difficulty of the judgment task), and since the goal here is a measure of social or cultural conceptions (Serota, Fink, Noell, & Woelfel, 1975), one may use aggregation techniques to improve the measurements. By applying the Central Limits Theorem and Law of Large Numbers one finds that the arithmetic average of all responses for any cell in the matrix will converge on the true mean for the population as the sample grows large. Thus, aggregation eliminates the potential problem of unreliability and may serve as a measure of social conception.
>
> The mean distance matrix is further transformed to a scalar-products matrix which has been double-centered (Torgerson, 1958) to establish the origin at the centroid of the distribution. This matrix is subsequently factored to achieve a coordinate matrix whose columns are orthogonal axes and whose rows are the projections of the concept location on each of the axes. This space has the property of representing the average distance judgments for all possible pairs simultaneously. Additionally, the multidimensional

> space is constructed from the unstandardized distance vectors between all possible pairs, and all variance in the sample population is thus accounted for by the n-1 dimensional space.
>
> Finally, this procedure is repeated at each point in time and the spaces are rotated about the centroid to a least-squares best fit to provide approximations of the concept motions over time. From these resultant cross-time coordinate matrices one can fit curves (trajectories) of motion which describe the relational changes from the set (p. 229-230).

The Barnett, Serota and Taylor study also provides evidence as to the behavioral implications of motion in cognitive space.

The setting for that study was the congressional election near Detroit, Michigan in 1974. Using the GALILEO method, the study investigated four hypotheses. These were: (1) that candidates would converge over time with those issues with which they were publicly associated; (2) that identification of a candidate with issues closest to the average position for the respondents (ME) would cause that candidate to converge with the average ME; (3) the candidate whose distance from the average ME was minimized at the time of the election would be the candidate chosen by the population represented; and (4) that the total volume of the space would shrink as the election drew near.

Hypotheses One, Two and Three were considered to be supported by the results. The Democratic candidate converged with Crime Prevention, an issue with which he associated himself, and his distance relative to two concepts on which he made no comment remained stable. Crime Prevention and Busing were the concepts closest and farthest, respectively, from ME. Movement of the Democrat toward Crime Prevention and away from Busing was the basis for accepting Hypothesis Two.

To test the third hypothesis, the authors used the distance measures between the Democrat and ME and between the Republican and ME to predict the percentage of the vote for the two candidates. Using data collected five to seven days before the election, the predicted vote was 55.7 percent to 44.3 percent in favor of the Democrat. The actual vote was 57.7 percent for the Democrat and 41.3 percent for the Republican. The accuracy of this prediction was slightly better than those based on customary polling methods, and the hypothesis was accepted. Hypothesis Four, however, was rejected.

Limitations of the study such as the lack of experimental control, and the tendency to ignore some observed changes, are admitted by the authors. Nonetheless, the study is an impressive demonstration of the measure of cognitive change and behavioral implications.

Others working in the area of spacial models and behavior prediction give tentative support to the notion of predicting stimulus choice from similarities/preference data. Green and Carmone (1972) relate a summary of their experience after approximately 25 small scale studies using nonmetric MDS. Stimulus sets including political candidates, breakfast cereals, graduate business schools, T.V. programs, and many others had been studied using a number of methodological variations. The notion of an implicit ideal point had been explored as well as the explicit form. The sum of this accumulated experience in 1972 was the statement: "joint-space portrayals of stimuli and ideal points (or vectors) provide a useful conception of stimulus choice," but that serious questions remained about operationalizing the concept. They (like Barnett, et al.) suggested positing a function relating choice probability to distance from ideal and suggested estimating the

parameters of the function from purchase data. Evidence of a study of this kind by Green or his associates has not, however, been found.

In the Barnett, Serota and Taylor study, the concept ME was used to represent the position of the subjects. It was stated in Chapter I that the use of the ego-concept was derived from self-image theory and that the assumption has been that items seen as most similar to the self-image will tend to be preferred over those seen as less similar.

A direct test of this hypothesis was conducted by Birdwell (1968) using semantic differential-type scales to measure self-images and images of automobiles. The specific hypotheses of the study were that (1) an automobile owner's perception of his car is essentially congruent with his perception of himself; and (2) that the average perception of a specific car type and brand is different for owners of different sorts of cars.

Twenty-two attribute scales suitable for describing either cars or people were selected to test the hypotheses. The measure of image congruity was the linear distance between self and car in semantic space, summed over all dimensions. The congruence of owner and automobile images was found to be statistically significant at the .01 level for owners of prestige cars, medium-priced cars, and low-priced cars; and significant at the .05 level for economy-compact owners. The first hypothesis was accepted.

Evidence on the second hypothesis showed that differences between groups was slight for two rather distinctive cars (Renault and Corvette), but significant for the six other models studied. The second hypothesis was therefore accepted.

Limitations of the Birdwell study include the method of selecting concepts. Objections could be raised to measuring images of people and cars on scales which were, in the words of the author, "arbitrarily selected." On the other hand, the high statistical significance of the results suggest that congruence of self-image and product-image may play a role in purchase behavior in some product categories.

Segmentation: Ideal Point Profiles

It could be surmised that the notion of segmenting a market based on the positions of individual ideal points would occur to many researchers. Indeed, the practice is often discussed in the context of MDS applications.

Aaker and Myers, in their Advertising Management text, mention several approaches including the segmentation study of the Chicago beer market by Johnson. In this case, a modified multiple discriminant analysis was used to identify nine segments in relation to eight brands of beer. Several segments were found to be relatively great distances from available brands, suggesting market opportunities.

Green and Carmone (1970) compared the Tucker and Messick model, which uses component analysis of a subject-by-similarities matrix (as in Q-factor analysis), to a two-group discriminant analysis method. The question was whether subjects who were shown color photographs of cars, in addition to brand names, would give different similarities responses than subjects given brand names only.

The Q-type analysis revealed that subjects clustered according to patterns largely unrelated to treatment condition. Two-group discriminant analysis confirmed the evidence of other, more dominant

factors. The authors suggest correlating clusters, or "points of view," with demographic and socioeconomic data to develop a richer view of the segments.

The interesting consideration from the viewpoint of the present study is that while a number of methods have been advanced for individual differences scaling using ideal points, the corresponding area in self-image oriented models is surprisingly barren. No doubt evidence on this approach to segmentation would be equally interesting. Comparison of the two models in terms of segmentation studies and behavior prediction are needed, as are experiments with scaling both concepts in one space.

Segmentation: Newspaper Readers

Some consistency has been found among reports on newspaper reader segments. There is substantial agreement, for example, that two segments are often found which differ as to the geographical scope of their interests. One usually reports greater interest in national and international news and major socio-political issues. The second group tends to prefer local news, human interest stories, and stories about rare or odd events close to home.

Bornholdt (1966) used Q-methodology and content analysis to study the preferences of college students. Subjects were asked to give importance and interest ratings to 48 different kinds of news items. The results showed three main types of reader. The first was similar to the "localite" description, preferring items on events close to campus, local human interest items, and a mixture of science, medicine, disaster and "oddity" stories of a local nature.

Another segment in the study preferred stories dealing with the Viet Nam War, birth control, freedom of the press, and civil rights issues. This group was interested in international and national events and issues.

The third segment in Bornholdt's study was difficult to distinguish from type one except for a greater preference for sports and less emphasis on localism. Similar preferences were expressed for disaster and human interest stories, but localness was less important.

Stephenson (1964) conducted several Q-studies to test his "Ludenic Theory" of newspaper reading. The measurement concepts included statements referring to the reader's feelings and understanding. Q-samples such as this distinguished between (1) the "well rounded" reader, interested in national and international news and who requires a daily metropolitan paper; (2) a "pleasure-reader" interested in features, human interest and sports; and (3) people who are primarily nonreaders. Examination of the statements used in the study suggests that any preference for localness could not be specifically expressed, but only implied from these statements.

Another study of college students, by O'Keefe and Spetnagel (1973) further supports the distinction based on local-national preference. In this case, regular newspaper users included those who desire detailed reports of national and international news and those who desire local news.

It appears that these broad classifications may be useful in analyzing the segmentation scheme presented in this paper. While failure to identify segments such as those discussed above would not necessarily be an indictment of the method, correspondence with prior

research is often an index of the appropriateness of a design.

The Research Design in Light of the Evidence

To briefly review the research design presented in Chapter I, concepts used to describe the domain of meaning for the State News are to be selected from nondirective interviews. Ratio level paired comparisons across all concepts comprise the similarities measures. In order to introduce an evaluative element into the configuration, the concept ME will be included among the concepts.

The distance measures between ME and all other concepts are to be the basis for identifying associations between subjects. Q-factor analysis will be used to identify segments based on these associations. Then a GALILEO metric MDS solution will be obtained for each segment which will be the basis for developing promotional message strategy for each segment.

The research conducted with spacial models has shown a high degree of utility in relating cognitive similarity to human behavior. Evidence is available which suggests that the distance of an object from an ideal choice, or a representation of self-image, is associated with the probability of choosing that object over competing items. Given this evidence, the use of a spacial representation of cognitive structure which includes an ego concept seems appropriate for use in developing promotional strategy. The selection of a metric model is warranted if one considers that promotion strategy implies cognitive change.

Segmentation based on object similarity to an ideal has substantial precedent. The same design, substituting self-image for ideal,

may be called for in light of Birdwell's findings of perceptual differences across categories of car owners.

The findings from earlier studies of newspaper reader segments may be compared to the results of the present study as one indication of the effectiveness of the proposed segmenting method.

In sum, the relationship between concept-ego separation in cognitive space and behavioral intent is tentative at best, but several researchers contend it is worth exploring. The remainder of this paper details one method for that exploration.

CHAPTER III

METHODOLOGY

The primary method of analysis used in this study, GALILEO, is a comprehensive method of data collection and multidimensional scaling (MDS) analysis with capabilities for direct comparison of a perceptual space in a time series and a method of selecting optimal message elements for use in persuasive communication.

Of special interest here is the data collection method and the nature of the resultant information. The GALILEO MDS program itself will not be examined in detail as that is an area requiring technical discussion not germane to this paper. The interested reader may consult the bibliography, especially Serota.

Developing the Concept Pool

The initial stage involves determining the concepts which represent or define the domain of meaning of the State News. For the purposes of this study, the population was defined as Michigan State University students living on campus. A sample of fifty subjects, chosen for heterogeneity in terms of age, class, socioeconomic status (SES), and use of the State News, was interviewed by members of John Sutherland's ADV 323 class winter term, 1977. A breakdown of that sample is in Table 1.

The interviews took place at the mutual convenience of interviewer and subject with the expressed purpose of recreating and

Table 1. Breakdown of Focus Interview Sample

Item	Number of Respondents
Class	
Freshman	8
Sophomore	7
Junior	10
Senior	15
Graduate	10
Total	50
Sex	
Female	23
Male	20
Not reported	7
Total	50
Age	
17	3
18	4
19	5
20	7
21	10
22	7
23	5
24	2
25	3
27	2
33	2
Total	50

Item	Number of Respondents
SES	
Lower	5
Lower Middle	15
Upper Middle	22
Upper	3
Not reported	5
Total	50
Regular Paper	
State News	25
Detroit Free Press	10
New York Times	3
State Journal	3
Detroit News	2
Wall Street Journal	1
Chicago Tribune	1
Not reported	5
Total	50
Occasional Paper	
Detroit Free Press	11
Detroit News	2
Wall Street Journal	2
State Journal	1
New York Times	1
Washington Post	1
Total	18

describing the subject's regular consuming behavior regarding the State News. After demographic and newspaper reading information was gathered, the subjects were given a copy of the State News and asked to recreate their normal reading behavior, describing the experience in detail. Subjects were encouraged to mention everything they noticed, liked, disliked, why items were read or overlooked, everything involved in reading the paper. If a regular section of the paper such as the sports or editorial page was not mentioned, the subject was asked to comment on the section. Otherwise the consuming story was ascertained in a nondirective fashion. A copy of the focus interview guide is given in Appendix A.

Most interviewers tape recorded the session and all interviews were written up with operant statements listed verbatim. An important assumption of this method is that operant statements include the most important concepts used by the subject to define the domain of meaning. The operant statements were tabulated according to the key noun, verb or adjective in the statement. This process is partly judgmental although great care was taken to preserve the context of the original statement. Roughly eighty statements represented the entirety of the consuming experiences. This rather large number of statements is the result of not collapsing categories until all the interviews were tabulated and the meaning of the statements became clear, as well as the fact that it is the nature of a mass medium to mean many, many things to its audience. One would therefore expect more different statements about a newspaper or television than a product such as potato chips because the category is much more broad.

Selection of Concepts

After all the statements were tabulated it was obvious that many categories could be collapsed either because they were used synonymously by the subjects or because they were polar opposites. The criterion for collapsing categories, then, was the obvious presence of a single underlying dimension. This, again, was judgmental to some extent but the context of the statements could always be relied upon for supporting evidence. When there was some doubt, the categories were left separated. The criterion of unidimensionality represented by one item can be justified since in the final instrument only one concept is required for the respondent to register his position relative to that attribute, unlike a semantic differential-type scale, for example.

The selection of items to be scaled in the final instrument is somewhat controversial and perhaps the weakest element in this methodology. Woelfel (1976) recommends selecting the most commonly occurring items on the ground that these are the concepts by which the subjects understand the topic and that the most frequently occurring are the most important. While this approach is appealing, it seems to nullify the value of the heterogeneous sample by leaving open the possibility that items uniquely important to certain minorities are categorically left out of the final instrument. There are several modifications which might be made to the selection process and some will be mentioned in the discussion section.

For this project, the first nine items were selected because of their common occurrence and four items were included at the request of the State News to determine their position relative to the more significant elements. The first nine items were Advertisements,

Interesting, Pictures, Coupons, Entertainment Page, Relevant, Campus News, Comics, and Practical. Practical represents an element of utility that was very common in the interviews but which was described by many different terms. Practical was judged to be inclusive of all the terms and phrases used. The four items added as "test" items were Editorials, Classifieds, the Book Page, and MSU Proper. The latter two items were new sections in the paper and so were of special interest to the State News management. Editorials and Classifieds were included to determine their position in readers' perceptual space and are interesting in that they represent items which were operant in roughly one fourth and one half as many interviews, respectively, as the nine most significant items (all of which were operant in more than 20 interviews). The items ME and The State News were also included. Scaling the ego concept introduces an element of evaluation into the data in that concepts closer to ego have been shown to be rated more favorable (Woelfel & Danes; Barnett, Serota, Taylor; Green & Carmone, 1972). Including the State News as a concept allows for analysis of its relationship to the salient elements and to the ego-concept.

The Survey Instrument

All possible pairs of the fifteen items (1/2 n(n-1)) were arranged in the survey instrument so that the subject's response would be a paired distance judgment based on the criterion distance of 100 units between two items randomly chosen. Thus the subjects were asked: If Editorials and Comics are 100 units apart, how far apart are A and B; A and C; and so on through 105 distance judgments. The subjects were also asked their major source of news; how often they read the State

News; what percentage of the State News they usually read; their use of other media; and demographic information. An example of the schedule is in Appendix A.

The instrument was pretested with fourteen subjects. The only significant change recommended was in the ordering of the pairs so that the first items encountered were concepts that could easily be associated by the respondents. This was accomplished to the satisfaction of the pretest group by reversing page one and page two. The order of the items was randomly assigned originally so it made little difference in that respect.

The small amount of structure in the instrument is in the form of each item (except ME) appearing on either side of the pair roughly an equal number of times and in that there are short series of pairs which include the same item. The pretest subjects found that this helped them conceptualize the relationship of one item to several other items at once.

Data Collection

A systematic random sample of 200 on-campus students was selected from the Fall 1976 Student Directory. One hundred thirty-three interviews were completed, again by students in Sutherland's ADV 323 class who received training from the author.

The data were collected between February 14 and 28, during which no unusual features or promotions occurred in the newspaper that would make the test period unrepresentative. Eliminating obviously frivolous responses and questionnaires less than 75 percent complete, 99 cases were utilized in the analysis (a usable response rate of 50 percent).

The analysis was a two stage process, the first stage using the GALILEO program on aggregate data and stage two being the segmenting procedure.

Program GALILEO

GALILEO is a package of computer programs, developed by Woelfel and associates, which utilizes paired distance judgment data and will accept raw distance scores, aggregate means scores in the form of a square symmetric matrix, or a centroid scaler products matrix as input. GALILEO will perform metric multidimensional scaling analysis; compute descriptive statistics; perform rotations for comparison of different samples or different time periods; and output printed statistics, printed and punched distance and coordinate matrices, and static and dynamic plots of two or three dimensions. The package has been described in detail by Kim Serota in his M.A. thesis, Metric Multidimensional Scaling and Communication: Theory and Implementation, 1974.

Another aspect of the GALILEO program which was used in this project is the Automatic Message Generator (AMG). The AMG is based on the assumptions that (1) concepts which are related in persuasive messages will converge in perceptual space, and (2) that change in distance between the concepts will be a proportion of the discrepency between the initial distance and the distance indicated in the persuasive message. The idea is to construct messages which will result in the target concept (i.e., the object of the promotion effort) moving closer to ego. There are several elements which affect this motion including the effectiveness of the message, the stability of the concepts (resistance to change), and the assumption that movement will be

a proportion of the separation of the two concepts. The effects of the message and the stability of concepts will be discussed in the next section but the third element is germane to the AMG.

Because any movement of the target concept toward ME will be a proportion of the distance and thus the two shall not actually meet, it is necessary to employ other concepts in the space to yield movement which will allow the target concept to be as close as possible to the ego. The AMG, given the target vector, will calculate vectors which should result from messages that associate the target concept with combinations of other concepts. The user then selects the concept(s) for which the resultant vector is most highly correlated with the target vector and, providing the concepts are appropriate, constructs messages designed to reduce the separation between the chosen concept(s) and the target concept. A section detailing the full procedure for interpretation of AMG output follows the discussion of the segmenting process. The AMG has obvious potential for advertisers and for this project, AMG output was used in a new and interesting way. That, however, is stage two of the analysis.

Data Analysis

Stage one, step one consisted of a preliminary analysis of aggregate data using the Distance Means Matrix Operation in GALILEO. The output provided descriptive statistics for all 105 pair distances; listed extreme values; the mean of all nonzero cells; the means matrix and sample sizes for each pair. The AMG was then used to list optimum messages for four target concepts: The State News, the Book Page, Classifieds, and MSU Proper. In each case the goal was moving the

target concept closer to ME.

Segmenting the Sample

The second stage of analysis begins with a method of dividing the audience based on variables which were operant in discussions concerning subjects' behavior toward the State News. As noted earlier, the distance between an item and ME is thought to be predictive of the behavior toward the item. The data collected contains judgments of the distance from ME to the most important elements. These judgments are assumed to contain evaluative components because of the inclusion of the ego, and so are valuable as segmenting variables because all items are operant in defining the domain of meaning of the State News for the sample.

The separation of an item and ME is presumed to be analogous to the separation of an item and an ideal point, used by Green and Carmone (and others) in market segmentation (see Chapter II). It has been common in studies using nonmetric MDS to represent the position of all subjects in a space, but our interest is in groups of people who demonstrate similar patterns of item-ME separations.

To analyze patterns of these distance judgments, scores for the fourteen pairs which include ME as one item were entered into a QUANAL factor analysis program. This is a Q-type factoring procedure, in which correlations between subjects become the basis for the factors. The factors, then, represent groups of subjects with similar patterns of scores. Factor loadings for each subject represent the degree to which the subject is associated with the group. According to Spearman's formula for testing the significance of factor loadings, a loading of

.44 or greater would be significant at the .10 level.[1] Eighty-five subjects showed factor loadings that were significant at the .10 level. Only these 85 were subjected to further analysis.

Besides factor loadings, each subject receives a "purity" measure, a statistic which represents the degree to which a subject loads highly on one factor and low on the others. The highest degrees of purity go to the subjects who load highly on only one factor. Those who have low to moderate loadings on several or all factors receive the lower purity scores. QUANAL output also includes for each factor: the arrays of z-scores on each item; a list of items which discriminate each factor from the others; and a list of items whose scores revealed a consensus across factors.

Four factors with eigenvalues greater than 1.0 were produced and cumulatively account for just over 50 percent of the variance in the sample scores. The correlations between factors (or segments) showed that the greatest positive correlation is .211 and the greatest negative correlation is -.233, giving no reason to assume nonlinearity among factors. Factor descriptions and interpretations are subsequently discussed.

Following the segmenting procedure, the raw data were separated into segments and run, one segment at a time, through the Coordinate and AMG operation of the GALILEO program just as with the aggregate data. The result of all this is a set of measures for each segment of

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[1] The Spearman formula is SE x alpha (expressed in z-standard deviation units). Thus SE = $\frac{1}{\sqrt{n \text{ of items}}}$ and alpha = 1.645 at the .10 level. $\frac{1}{\sqrt{14}}$ 1.645 = .440 = a factor loading significant at the .10 level.

the appropriateness of alternative messages based on the concepts scaled into the perceptual domain.

In order to help interpret the character of each segment, two subjects from each segment, with high factor loadings and purity measures, were selected for reinterviewing. The subjects were asked to characterize their position toward the State News and react to a description which resulted from interpretation of the QUANAL and GALILEO output. They were also given three messages and asked to choose the one that was most likely to increase their favorability toward the State News.

One message was predicted by the AMG to be the best message for that segment. That is, the movement resulting from this message should be along a vector most nearly identical to the target vector. The second message was one predicted by the AMG to be acceptable for all segments. This message strategy, with one theme and some variations, was found by comparing AMG solutions for all segments and the aggregate. The third message in the set was one predicted by the AMG to be relatively ineffective for the segment in question. The purpose of asking subjects to make this choice was to determine if there was a difference in initial reaction to a message which has been selected especially for one segment, a message which is meant to be effective across all sements, and a message which should be relatively ineffective.

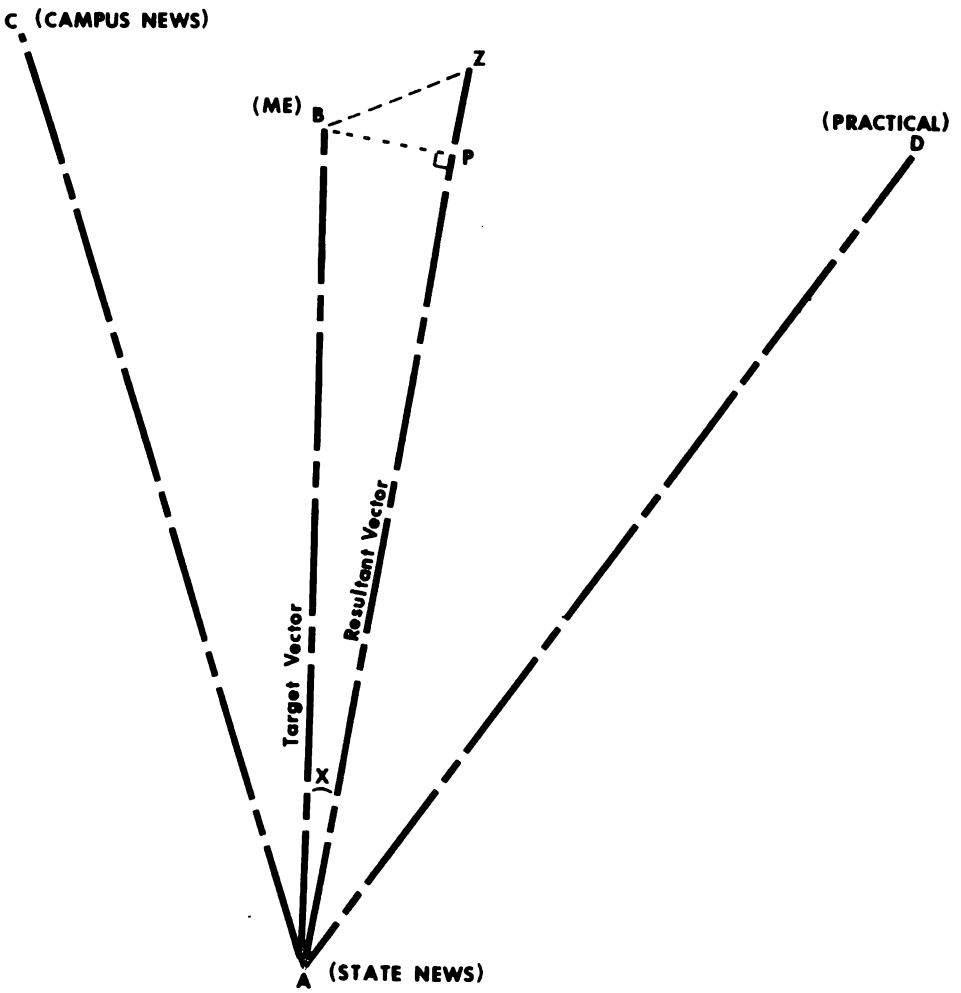
Interpretation of AMG Output

The message meant for use with all segments was selected by examination of AMG results for all segments plus the aggregated subjects. Interpretation of AMG output involves the comparison of two vectors, a

target vector which represents the desired concept motion and a resultant vector which is the path along which the target concept will move when linked in a persuasive message with other scaled concepts.

An illustration should elucidate the procedure. (Refer to Appendix B for AMG output.) In this case the target concept is the State News and the objective is to move it closer to ME. The vector that would perfectly achieve this objective is the target vector. In Figure 1, it is the line between A and B. In a two concept message solution, the target concept would be related to two other scaled concepts, such as Campus News and Practical (C & D in Figure 1). For each two concept possibility, the AMG provides the length of the resultant vector (distance AZ); the scalar product, which is used to calculate resultant vectors; the correlation coefficient between target and resultant vectors; Theta, the angle of the two vectors; the ratio of the resultant length to target length; right angle length, the distance along the resultant vector which the target concept must move to reach the point closest to the objective (distance AP); target to right angle point distance, this is as close to the objective as the target concept will get using this message strategy (distance BP); and finally, target to resultant distance, or the distance from the objective to the end of the resultant vector (distance BZ). This indicates how far the target concept will be from the objective if it is allowed to move to the end of the resultant vector.

Interpreting AMG output involves first looking at the correlation or theta values. The higher correlations correspond to lower thetas and represent resultant vectors close to the target. Right angle length and target to right angle point distances are inspected to



A = State News

B = ME

C = Campus News

D = Practical

AZ = Resultant length

Angle X = theta

$\frac{AZ}{AB}$ = resultant to target ratio

AP = right angle length

BP = target to right angle point

BZ = target to resultant distance

Figure 1. Two-Dimensional Illustration

see 1) how far the target concept must move to be as close as possible, and, 2) how close it will actually get. Obviously, a greater right angle length means asking for greater changes in audience perceptions and will therefore require more, or stronger, messages. In most cases, the smallest target to right angle point distances will correspond to the highest correlations. Target to resultant distance is useful in decision making when a small budget restricts the promotion campaign to a "best shot" effort or when follow-up studies are not planned. Because it is likely that the target concept will continue along the resultant vector until its direction is changed or until the end of the vector is reached, a low target to resultant distance means that overshooting the right angle point will not be disastrous as would a very large target to resultant distance. In many cases this distance will put the target concept farther from the goal than it started. In other cases, the end of the resultant vector is so close to the right angle point that overshooting is no problem whatsoever.

For one segment in this study, a message (or set of messages) linking the concepts Pictures, Classifieds and Practical to the State News would result in the State News moving along a vector correlated .999 with the target vector. The State News would need to move 68.596 units along this vector to reach the right angle point when it would be less than 4 units from ME. At this point it would be advisable to end the motion along the resultant vector since continuation would eventually put the concept over 32 units from ME. Changing direction in this case might well involve a campaign associating the State News and ME only. This would keep the concepts as close as possible under stable circumstances.

While examining AMG output for all segments, attention was paid to find any message which would result in correlations greater than .95 for two or more segments. This search was also conducted using correlations of .9 or better as the criterion. Many instances of correspondence were observed and an interesting pattern was identified that involved all segments. This was among the most important findings in this study and will be examined thoroughly in the following section.

The resultant to target vector correlations will play a decisive role in the selection of message strategies in the next chapter. It should be remembered that these correlations serve as predictors of the change in perceptual structure that is expected to occur as a result of exposure to persuasive messages. While other factors will also be considered, resultant to target vector correlations will be used as an index of the probable audience response to the messages selected.

CHAPTER IV

FINDINGS AND DISCUSSION

The format of this section will be to go through the method, one step at a time, and discuss the findings at each stage in terms of their contribution to the study. Limitations and advantages of the method and use of the findings will be emphasized. Some suggestions follow.

The first step in the GALILEO methodology is the development of a concept pool. In this study, all operant statements about the paper were recorded verbatim. Then, GALILEO concepts were selected from the statements. While some researchers might question the need for recorded interviews, it preserved the full context of the newspaper use experience and offered insight into the meanings of the concepts.

A question was raised earlier about the use of the 10 to 15 most frequently occurring concepts as the scaled items. Having made the effort to maximize heterogeneity in the sample, it would seem to be advantageous for the scaled items to reflect the heterogeneity of the concept pool. For the purposes of segmentation, low frequency items may be important in the definition of segments. The other side of the problem is that using low frequency items in a segmenting study could result in factors discriminated by items which many subjects consider unimportant.

If collection of the concept pool were somewhat formalized to allow convenient coding, factor analysis might be performed on the concepts to generate an item set based on more dimensions of the concept pool than the "most frequently occurring" strategy. The set of items scaled could be representative of the relative importance of the factors by making the number of items selected from each factor proportional to the eigenvalue for the factor.

In this study, the nine most frequently occurring items were selected and four items with lesser frequencies. The purpose for this was to determine the position of the four "lesser" items relative to the "dominant" aspects of the newspaper. Including so-called "less significant" items into the perceptual picture in no way invalidates the space.

Significance may be one of the criteria people use to estimate perceptual distances. Thus one interpretation of the extreme separation of MSU Proper and ME on the most important dimension (85 percent of real distance accounted for) would relate that separation and the rare occurrence (five times in 50 interviews) of MSU Proper in the operant concept pool. The Book Page, which had an even lower frequency, does not exhibit the same extreme distance from ME (See Table 2 for comparison). This could be because subjects may use any criteria to separate items and may change criteria at any time. The true effect of item selection on the spacial coordinates remains to be tested.

The issue of the assumptions involved in interpreting paired distance data has been referred to in preceding chapters vis-a-vis the role of the ego concept. It was stated that an evaluative element is introduced by scaling the subject into the solution and that this

Table 2. Concept Distance From ME (aggregated data) and Frequency in Concept Pool

Concept	Distance from ME	Frequency in Concept Pool
State News	70.42	*
Advertisements	58.98	50
Interesting	46.38	37
Pictures	56.87	28
Coupons	74.70	28
Entertainment Page	54.60	21
Relevant	35.70	21
Campus News	54.61	29
Comics	60.39	34
Book Page	98.38	1
Editorials	144.87	5
Classifieds	72.88	10
Practical	43.16	22
MSU Proper	836.34	5

*Not chosen from concept pool, see Chapter II, Selection of Concepts.

notion has been empirically supported. But again, the actual nature of the subjects' evaluation criteria is unknown. In this study, the assumption is that the solution is a perceptual representation. Separation between an item and ego is assumed to be a special case involving evaluation, which does not permeate the solution.

The mean distance between each pair of concepts, as well as the standard deviation (SD) and other descriptive statistics, is part of the output from the Distance Means Matrix operation in GALILEO. The mean of all cells, or the average pair distance was 98.2, very close to the criterion pair distance of 100. The SD being a measure of dispersion, is useful in estimating the relative stability of a two-concept relationship across people. Looking only at the distances of each item from ME (see Table 3), the average distance was 67.2 and the average SD 9.06 (the disproportionate influence of concept 14 being nullified). In assessing image problems, criterion such as a mean distance greater than plus one standard deviation from the average would reveal problems for the Book Page, Editorials and MSU Proper and would show particularly favorable response to the items Relevant and Practical. Using similar criteria (SD + 1SD from average SD) for estimating stability of concepts would show the Entertainment Page and Practical as especially stable in relation to the aggregate ME, and Coupons, Editorials, and MSU Proper as having more variance across people in the sample.

For a richer view of the State News audience, the sample was segmented by Q-factoring respondents using the distances between ME and the 14 other concepts. As previously mentioned, the working assumption is that the distance from ME to an item is predictive of

Table 3. Concept to ME Distances and Standard Deviations for Aggregated Data

Concept	Mean Distance from ME	Standard Deviation
State News	70.42	9.09
Advertisements	58.98	7.72
Interesting	46.38	7.94
Pictures	56.97	9.73
Coupons	74.70	11.65
Entertainment Page	54.60	4.98
Relevant	35.70	9.07
Campus News	54.61	7.26
Comics	60.39	7.82
Book Page	98.38	8.97
Editorials	144.97	18.61
Classifieds	72.88	9.18
Practical	43.16	5.79
MSU Proper	836.34	156.04

Mean of all cells in 15 x 15 concept-distance matrix = 98.18.

Average distance from ME = 122.03.
Standard deviation of distance from ME = 207.39.

Average distance from ME, excluding MSU Proper = 67.08.
Standard deviation of distance, excluding MSU Proper = 28.37.

Average standard deviation = 19.56.
Standard deviation from the average standard deviation = 39.41.

Average standard deviation, excluding MSU Proper = 9.06.
Standard deviation from average standard deviation, excluding MSU Proper = 3.34.

behavior toward the item. Four factors with eigenvalues greater than 1.0 were provided for interpretation. To aid that interpretation, two subjects with high pure loadings and purity on a factor were reinterviewed by telephone (see Chapter III, Segmenting the Sample). GALILEO means and coordinates also contributed to the interpretation of each segment. The results follow.

Factor One: General Local Interest

Factor one represents 26 individuals with significant loadings (see Chapter II: Data Analysis) or 31 percent of the sample. The group is characterized by a broad general interest. People in this segment are more interested in Campus News than any other group and show relatively high favorability toward every other scaled item except the Book Page (see Table 4). The Book Page is seventy-five percent farther than any other item from ME. They are very heavy users of radio, television, and newspapers, and read the State News nearly every day although they do not necessarily read it thorougly (Table 5). This factor is two-thirds female, two-thirds twenty or younger. and tends to read the State News primarily for general campus oriented news. These people are, as one subject put it, "open to just about anything."

The emphasis on general campus oriented news in this segment is highly suggestive of the "localite" description given in relation to the Bornholdt study (Chapter II, Segmentation: Newspaper Readers). Those readers preferred campus news, local human interest items, science, disaster, medicine, and what was termed "oddity" stories. The parallels in descriptions from Bornholdt and the present study, though

Table 4. Concept to ME Distances and Standard Deviations for Segment One*

Concept	Mean Distance from ME	Standard Deviation
State News	68.69	15.19
Advertisements	59.23	18.98
Interesting	30.19	14.66
Pictures	49.69	23.10
Coupons	42.42	9.78
Entertainment Page	41.80	15.33
Relevant	30.00	17.43
Campus News	37.50	15.35
Comics	39.80	10.85
Book Page	119.42	87.43
Editorials	66.15	10.41
Classifieds	58.07	10.13
Practical	39.04	22.05
MSU Proper	46.34	31.06

*Only includes scores for subjects with significant Q-factor loadings (Chapter III: Data Analysis).

Mean of all cells in 15 x 15 concept distance matrix = 56.70.

Average distance from ME = 52.02.
Standard deviation of distance from ME = 22.9.

Average standard deviation = 21.56
Standard deviation from the average standard deviation = 19.85.

Table 5. Item Array and Profile: Segment One

Item	Z-score
Book Page and ME	3.39
MSU Proper and ME	.28
State News and ME	.22
Classifieds and ME	.16
Editorials and Me	.09
Pictures and ME	.01
Advertisements and ME	-.17
Practical and Me	-.43
Entertainment Page and ME	-.43
Coupons and ME	-.54
Interesting and ME	-.58
Comics and ME	-.62
Relevant and ME	-.66
Campus News and ME	-.72

n = 26

Major News Source:	Radio	T.V.	Mag.	News-paper	State News	Friends		
	.17	.10	.03	.33	.33	.03		
Age:	18	19	20	21	22	23	24	25+
	.20	.17	.27	.20	.10	0.0	.03	.03
Class:	Fresh.	Soph.	Junior	Senior	Grad.			
	.23	.20	.23	.20	.10			
SES/Sex:	Lower	Low/Mid	Up/Mid	Upper	M	F		
	0.0	.40	.50	.06	.33	.60		
Read State News, Days:	1	2	3	4	5			
	.03	.07	.10	.20	.53			
Percent of Paper Read/Day:	0-40	41 to 69	70 to 100					
	.17	.33	.50					
Number of Other Papers Read:	0	1	2	3+				
	.33	.50	.17	0.0				
Number of Magazines:	0	1	2	3+				
	.43	.17	.20	.20				
Hours of T.V./Week:	0	1-5	6-10	11-20	20+			
	.10	.47	.23	.17	.03			
Hours of Radio/Week:	0	1-5	6-10	11-20	20+			
	.13	.30	.10	.10	.37			

All figures are proportions. Some item totals may not equal 1.00 due to rounding or nonresponse by some subjects.

tenous, are difficult to ignore.

Factor Two: Purposeful, Serious Readers

Segment number two, 24 people or 28 percent of the subjects, may be termed the "purposeful, serious" readers. This type of reader values things practical, interesting and above all, relevant. Unlike type one, these people do not generally define relevant news as campus news. Therefore the State News is not the major source of news for this type (radio outranks the State News in this category). Distributions of age and class level are skewed toward the older, upper-class members. This group is closest to MSU Proper and farthest from Comics and the Entertainment Page (see Table 6). They are also farthest from the State News. Most people in this segment get the paper daily but only one-third reads more than 70 percent regularly. Probably because of their interest in things practical and relevant, of the four segments, this group is also the closest to Advertisements.

Again, parallels with prior research are evident. In the Bornholdt study and in studies by Stephenson, findings indicated one segment characterized by nonlocal, more serious or "hard" news interests. Stephenson suggested that the segment required a daily metropolitan paper and Table 7 shows that most of these people take a paper other than the State News. The figures also suggest that some members of this segment consider radio a viable alternative as a major news source.

Factor Three: Skimmers

Type three is the "skimmer." It is the smallest segment with only 13 people (or 15 percent of the subjects). Only half of this

Table 6. Concept to ME Distances and Standard Deviations for Segment Two*

Concept	Mean Distance from ME	Standard Deviation
State News	68.21	21.86
Advertisements	46.00	14.10
Interesting	36.25	10.36
Pictures	60.53	19.38
Coupons	53.57	15.10
Entertainment Page	79.28	18.21
Relevant	33.32	12.92
Campus News	54.82	14.72
Comics	85.82	7.20
Book Page	66.78	11.10
Editorials	56.67	14.61
Classifieds	56.85	18.48
Practical	45.08	14.05
MSU Proper	44.14	9.57

*Only includes scores for subjects with significant Q-factor loadings (Chapter III: Data Analysis).

Mean of all cells in 15 x 15 concept distance matrix = 59.5.

Average distance from ME = 56.2.
Standard deviation of distance from ME = 15.2.

Average standard deviation = 14.4.
Standard deviation from the average standard deviation = 4.08.

Table 7. Item Array and Profile: Segment Two

Item	Z-score
Comics and ME	2.52
Entertainment Page and ME	1.04
Book Page and ME	.69
State News and ME	.55
Editorials and ME	.41
Classifieds and ME	.17
Coupons and ME	-.24
Pictures and ME	-.24
Campus News and ME	-.26
MSU Proper and ME	-.40
Advertisements and ME	-.50
Practical and ME	-.85
Interesting and ME	-1.24
Relevant and ME	-1.65

n = 24

Major News Source:	Radio	T.V.	Mag.	News-paper	State News	Friends						
	.33	.17	.10	.17	.23	0.0						
Age:	18	19	20	21	22	23	24	25+				
	.13	.13	.17	.20	.17	0.0	.10	.07				
Class:	Fresh.	Soph.	Junior	Senior	Grad.							
	.20	.13	.17	.30	.20							
SES/Sex:	Lower	Low/Mid	Up/Mid	Upper	M	F						
	.13	.23	.43	.07	.43	.43						
Read State News, Days:	1	2	3	4	5							
	.03	0.0	.07	.17	.73							
Percent of Paper Read/Day:	0-40	41 to 69	70 to 100									
	.23	.43	.33									
Number of Other Papers Read:	0	1	2	3+								
	.27	.50	.20	.03								
Number of Magazines:	0	1	2	3+								
	.20	.40	.30	.10								
Hours of T.V./Week:	0	1-5	6-10	11-20	20+							
	.33	.30	.23	.03	.10							
Hours of Radio/Week:	0	1-5	6-10	11-20	20+							
	.13	.23	.10	.23	.27							

All figures are proportions. Some item totals may not equal 1.00 due to rounding or nonresponse by some subjects.

segment reads 70 percent or more of the State News regularly and some of the things they skip most are the Advertisements, the Coupons and the Comics. This segment is nearly tied with type four as being closest to the State News, however (see Table 8). This nearly all male group is not a heavy media use group but finds its needs met adequately by the State News.

The literature review did not locate specific references to a segment such as this. However, segment three may contain people who, except for the ready availability of a free newspaper, would be nonreaders rather than skimmers. This is only conjecture, but the focus interviews showed some evidence of this situation.

Factor Four: Enjoyment Seeking

Factor four represents 22 of the subjects (or 26 percent) who may be characterized by their "feature" orientation (Tables 10 and 11). In fact, these people are into entertainment. They are heavy users of television and newspapers, and most take regular magazines (often 2 or 3). This group is closest of all to the State News, the Entertainment Page, the Comics, and the Book Page. They are farthest of the segments from MSU Proper, Editorials and Classifieds. One third of this enjoyment oriented group is 20 years or less, and the State News is definitely the major news source.

This group shows some of the characteristics of Stephenson's "pleasure-readers," that is a preference for feature sections of the newspaper. In this case, as with the other segments, direct comparison with other studies is difficult because very different sets of concepts have been used. Parallels that do exist among elements of the studies

Table 8. Concept to ME Distances and Standard Deviations for Segment Three*

Concept	Mean Distance from ME	Standard Deviation
State News	90.50	29.85
Advertisements	78.14	27.13
Interesting	112.00	36.93
Pictures	69.21	25.31
Coupons	264.42	121.46
Entertainment Page	50.85	22.43
Relevant	39.50	29.33
Campus News	105.85	138.81
Comics	89.64	66.52
Book Page	135.85	48.29
Editorials	59.64	25.37
Classifieds	71.07	21.31
Practical	54.83	23.09
MSU Proper	75.35	19.30

*Only includes scores for subjects with significant Q-factor loadings (Chapter III: Data Analysis)

Mean of all cells in 15 x 15 concept distance matrix = 116.17.

Average distance from ME = 92.6.
Standard deviation of distance from ME = 55.8.

Average standard deviation = 43.4.
Standard deviation from the average standard deviation = 39.4.

Table 9. Item Array and Profile: Segment Three

Item	Z-score
Coupons and ME	3.45
Comics and ME	.47
Book Page and ME	.01
State News and ME	-.02
Advertisements and ME	-.03
Classifieds and ME	-.16
Interesting and ME	-.26
MSU Proper and ME	-.37
Pictures and ME	-.45
Editorials and ME	-.46
Campus News and ME	-.49
Entertainment Page and ME	-.52
Relevant and ME	-.58
Practical and ME	-.61

n = 13

Major News Source:	Radio	T.V.	Mag.	News-paper	State News	Friends		
	.20	.20	0.0	.27	.27	0.0		
Age:	18	19	20	21	22	23	24	25+
	.13	.13	.20	.20	.27	0.0	0.0	.07
Class:	Fresh.	Soph.	Junior	Senior	Grad.			
	.13	.27	.13	.27	.20			
SES/Sex:	Lower	Low/Mid	Up/Mid	Upper	M	F		
	.07	.33	.33	0.0	.87	.13		
Read State News, Days:	1	2	3	4	5			
	.07	.07	.13	.07	.67			
Percent of Paper Read/Day:	0 to 40	41 to 69	70 to 100					
	.47	.13	.40					
Number of Other Papers Read:	0	1	2	3+				
	.20	.73	.07					
Number of Magazines:	0	1	2	3+				
	.60	.20	.20					
Hours of T.V./Week:	0	1-5	6-10	11-20	20+			
	.20	.53	.13	.13	0.0			
Hours of Radio/Week:	0	1-5	6-10	11-20	20+			
	.13	.27	.20	.13	.27			

All figures are proportions. Some item totals may not equal 1.00 due to rounding or nonresponse by some subjects.

Table 10. Concept to ME Distances and Standard Deviations for Segment Four*

Concept	Mean Distance from ME	Standard Deviation
State News	67.76	15.92
Advertisements	52.69	16.69
Interesting	26.96	10.86
Pictures	52.19	14.80
Coupons	49.38	12.60
Entertainment Page	41.92	6.70
Relevant	23.73	9.32
Campus News	60.07	9.71
Comics	39.92	16.60
Book Page	69.23	21.42
Editorials	477.15	162.74
Classifieds	108.15	25.62
Practical	36.10	10.35
MSU Proper	3929.38	1687.64

*Only includes scores for subjects with significant Q-factor loadings (Chapter III: Data Analysis).

Mean of all cells in 15 x 15 concept distance matrix = 217.

Average distance from ME = 359.61.
Standard deviation of distance from ME = 1033.87.

Average standard deviation = 144.07.
Standard deviation from the average standard deviation = 446.06.

Average distance from ME excluding MSU Proper = 84.5.
Standard deviation of distance excluding MSU Proper = 119.9.

Average standard deviation excluding MSU Proper = 24.7.
STandard deviation from average SD excluding MSU Proper = 41.6.

Table 11. Item Array and Profile: Segment Four

Item	Z-score
Editorials and ME	2.01
MSU Proper and ME	2.00
Classifieds and ME	1.52
Campus News and ME	.02
State News and ME	-.04
Book Page and ME	-.31
Advertisements and ME	-.39
Coupons and ME	-.55
Practical and ME	-.55
Pictures and ME	-.60
Entertainment Page and ME	-.62
Comics and ME	-.78
Interesting and ME	-.83
Relevant and ME	-.88

n = 22

Major News Source:	Radio	T.V.	Mag.	News-paper	State News	Friends			
	.28	.08	.04	.16	.40	0			
Age:	17	18	19	20	21	22	23	24	25+
	.04	.16	.28	.16	.04	.16	.04	.04	.08
Class:	Fresh.	Soph.	Junior	Senior	Grad.				
	.24	.28	.12	.12	.24				
SES/Sex:	Lower	Low/Mid	Up/Mid	Upper	M	F			
	0.0	.52	.44	.04	.36	.56			
Read State News, Days:	1	2	3	4	5				
	0.0	.12	.04	.25	.56				
Percent of Paper Read/Day:	0 to 40	41 to 69	70 to 100						
	.28	.28	.40						
Number of Other Papers Read:	0	1	2	3+					
	.32	.56	.16	0.0					
Number of Magazines:	0	1	2	3+					
	.16	.40	.28	.16					
Hours of T.V./Week:	0	1-5	6-10	11-20	20+				
	.16	.40	.40	.04	0.0				
Hours of Radio/Week:	0	1-5	6-10	11-20	20+				
	.12	.36	.08	.32	.12				

All figures are proportions. Some item totals may not equal 1.00 due to rounding or nonresponse by some subjects.

are, nonetheless, interesting and informative in their own right.

Four Factors Considered

It should be noted that these factors, which account for just over 50 percent of total variance in the sample (21 percent, 12 percent, 10 percent, and 8 percent, respectively), are remarkably distinct from one another. All correlations between factors fall between -.233 and +.211 (Table 12). This supported by the segment interpretations and elements of congruence with earlier studies, indicates that even when applied to a population which, on the surface, appears to be relatively homogeneous (college students living on campus), segmentation along 14 operant, ratio level distance measures can be a sensitive discriminating instrument.

Table 12. Correlations Between Types

	1	2	3	4
1	1.000	.211	-.066	.164
2	.211	1.000	.128	.062
3	-.066	.128	1.000	-.179
4	.164	.062	-.179	1.000

In future, nonexploratory studies, it may be advisable to include demographic information, product usage information, media behavior, etc., as additional segmenting variables. It would also be advisable to increase the survey sample size so that factors will be of sufficient size that reliability of MDS solutions will be assured.

In this study, factor number three is small enough to raise questions about the stability of that solution.

Identifying Problem Areas

The method used earlier to determine image problems from the aggregated data (using interpair distance means and standard deviations) can likewise be applied to the segments. This, in concert with the preceding segment interpretations, leads to the following analysis of the State News image.

For the sample as a whole and all segments except the entertainment-loving type four, there is considerable distance between the ME and the Book Page. This, of course, is to be expected in the case of a new section in the paper. It is possible that the position of the Book Page has changed somewhat between data collection and interpretation, as exposure to and familiarity with the section has increased.

Within the general-interest type one, there is a somewhat paradoxical condition with respect to the State News. While the expression of overall favorability is evident in nearly all attributes of the product and reiterated in the interviews, the distance from the State News to the aggregate type one ME is surprisingly large (refer to Table 4). Only type two perceives the State News to be more distant.

Because relationships to all scaled concepts are used to locate each item in the space, inconsistencies are often found in dissimilarities data. For example, people might report that A & B and A & C are very similar, but that B & C are very dissimilar. These relationships violate the definition of real Euclidian space, given by these triangular inequalities:

$$s_{ij} + s_{ik} \geq s_{jk}$$

$$s_{ij} + s_{jk} \geq s_{ik}$$

$$s_{ik} + s_{jk} \geq s_{ij}$$

where s equals the interpoint distance.

Most nonmetric algorithms eliminate the "imaginary" (i.e., negative) eigenvectors resulting from these violations of Euclidian space. Woelfel and Danes (1977) suggest that respondents are ambiguous and uncertain in their definitions of some stimuli and that these negative eigenvectors accurately gauge the extent of the inconsistency. They also cite research as showing systematic and stable behavior of the imaginary eigenvectors. The inference is that they are not the result of random measurement error, as was previously believed, and so should be preserved in the MDS solution. GALILEO preserves the imaginary eigenvectors.

If the apparent inconsistency in type one's perception is due to ambiguous definition of the stimuli, it should be considered an image problem. The problem is that while the individual attributes of the newspaper are being considered favorably, the favorability is not being generalized to the State News as a whole.

The representation of type two, the serious, purposeful reader (Table 6), shows the Entertainment Page, Comics and the State News to be extremely distant from the type two ego. The characterization for this segment suggests that, for the State News, the problem is not completely one of image. The State News apparently does not satisfy this group's needs in the areas of news. There are, however,

many aspects of the paper which are considered favorably by this segment and might be used in messages designed to improve this group's image of the paper.

The skimmers, type three, appear from all indications to be quite favorable toward the newspaper. Advertisements, especially Coupons, are widely separated from this group, however. There is the possibility of improving this situation by relating Coupons to Practical, the concept closest to this group. Not being heavy readers of the paper, however, it may be difficult to reach this segment with messages in the State News. This being a small segment with high favorability toward the paper as a whole suggests that promotion directed specifically at this segment not be given high priority.

The fourth segment, the entertainment seekers, consider the State News closer than does any other group. In fact, all concepts are relatively close to the ego except Classifieds, MSU Proper, and Editorials. It may be that MSU Proper will move gradually to a more favorable position as it becomes recognized as a regular section. At this point, a target vector between MSU Proper and ME would be of such great length that no potential message solution could be found that would move MSU Proper the required distance. It is also rather assumptive to mount a campaign suggesting similarity between this entertainment oriented group and Editorials and Classifieds. There is, however, enough instability (identified by score standard deviations, as before) in the distance to Editorials to consider it an opportunity, but probably only for a subgroup within the type.

Implications for Decision Areas

The remainder of this paper will be devoted to selecting suitable concepts to use in promotional messages. Before that problem is addressed, however, it should be recognized that the sort of data analysis and interpretation used in this study to select message concepts also contains implications for other product and advertising decisions.

A good example of an implication for product change may be found in the description of the purposeful, serious readers' perception of the State News. These readers appear to require more in the areas of national and international news, and reportage on national and global issues than is currently being offered in the State News. Should the editors desire to appeal more to segment two, these changes would appear to be essential.

An advertising decision area that would be aided by this type of research is the casting of characters to be used in ads. The prospects should be able to identify with the characters, particularly in "life style" advertising. In an appeal to the skimmers, for example, the character must be male, should be recognizably active, and somehow related to the campus, perhaps by wearing an MSU t-shirt. This character is involved in what is happening on campus and is not prone to passive media use. The skimmers should identify with him.

An advertising decision that is especially common to newspaper advertisers is whether or not to use incentives such as coupons. The evidence from this study shows that coupons are highly favored by segments one and four, favored somewhat by segment two, and not at all favored by segment three.

The problem of deciding on a setting for the advertisement may also be solved using this analysis system. Segment four, the enjoyment seekers, perceive themselves as being very media oriented. They take newspapers and several magazines, enjoy books and photographs, are relatively heavy users of T.V. and, especially, radio. The room setting which would appeal to these readers may include these items. Comfort and enjoyment may guide the choice of furnishings.

For the audience to identify with the advertisement, the ad must include items and activities that the audience perceives as similar to themselves. The analysis and interpretation of interpair distance judgments can be very helpful in determining the appropriate items. The most critical factor here, as in other parts of the study, is that the scaled concepts must include items relevant to the decision area. Where this need is met the analysis system can be very helpful to decision makers.

Selecting a Message Strategy

In view of the preceding analysis, there appear to be image problems for the State News in two segments and satisfactory image situations in two others. Obviously, a promotion strategy for segments one and two should not adversely affect groups three and four. More germane to this study, is there a message strategy that would enhance the position for the State News for both problem segments?

It may seem wasteful to segment the audience and then treat segments alike. In the extreme, of course this would be true. But it is not wasteful to treat segments similarly where there are similar problems and differently where there are different problems.

If two (or more) problem groups respond to similar messages, more resources are available to target on the segment-specific problems. This in fact represents an increase in precision and an efficient use of resources. It broadens the scope of the manager's view of the market to include more areas of distinction and similarity among the segments.

By systematically reviewing the AMG output, looking for combinations of concepts that would give the desired results, one combination appears to correlate very highly with target vectors for segments one and two. A message or campaign relating the State News to Campus News and Practical would represent a vector correlated .972 with the target for type one. The same campaign, with the occasional addition of the concept Coupons would yield a correlation of .995 in group two. The occasional use of Coupons in the strategy is needed to increase the correlation from just below .9 to nearly identical with the target.

It is very common for promotion strategy to be based on a theme with occasional variations for the benefit of a certain segment. In this way it is possible to tailor a general theme to the different segments.

In order to determine the effects of this campaign on other segments, who presumably will be exposed to it, AMG output for those groups was consulted. For type three, the skimmers, this strategy would be most satisfactory. The best possible message for this group happens to include Coupons & Practical. In addition, this association of Coupons and the State News is a way of drawing Coupons toward ME, which helps solve the only serious image problem in the segment, that involving Coupons.

The effect of the Campus News-Practical strategy on type four is likely to be very positive. The AMG predicts change in the position of the State News along a vector correlated .973 with the optimum, or target, vector. Some final judgmental criteria must be applied, however, before this strategy is adopted. This criteria involves determining whether the concepts recommended make sense in the face of the segment descriptions. For type one, the recommendation capitalizes on two of the most favored concepts, especially Campus News. Likewise, the concepts used are all very close to type two. For group three, Practical is the most favored concept and its association with Coupons and the State News will serve double duty, enhancing the position of the paper as well as the problem concept Coupons. For the fourth segment, the closest of all to the State News, the strategy suggested not only does nothing to upset a good situation but can only serve to improve it. Considering the appropriateness of these concepts, along with the economy and ease of managing a single message strategy, the conclusion here is to recommend the adoption of the Campus News-Practical message strategy.

Classifieds: A Different Problem

In the foregoing example, it was shown that a general strategy could be applied to a rather general problem with what amounts to a tailoring procedure for each segment. Another situation of interest to the State News (and others) would involve the promotion of one specific attribute, or section of the paper, as opposed to promoting the State News as a whole.

In this example, the object is to move Classifieds to a more

favorable perceptual position, ultimately attempting to bring about greater use of classified ads. The data for aggregated subjects in Table 3 shows Classifieds to be greater than average distance from ME (excluding the disproportionate effect of MSU Proper on the mean), but well inside the one standard deviation "problem" criterion. Inspection of the item arrays, however, shows that different types of readers rated Classifieds very differently (Tables 5, 7, 9, 11).

Comparison of types one and two reveals some interesting statistics. In each case Classifieds holds a position approximately .17 Z-scores from ME, but coordinates in multidimensional space show that Classifieds hold entirely different positions for the two groups (Table 13 & 14). For type two, the purposeful reader, the very best message strategy indicated by the AMG yields a resultant to target vector correlation of .846, not as great as some in the previous example. The messages for this segment appear appropriate in that they would relate Classifieds to Relevant and Advertisements, concepts very close to type two. The logical message approach (e.g., Classifieds = Relevant Ads) may be particularly appropriate for this serious segment.

The strategy indicated for segment one, the general-interest group, also appears to be very appropriate. The one message combination yielding a correlation greater than .90 implies the inclusion of Classifieds in a list of things the State News offers especially for this group, namely, Campus News, Classifieds, and Coupons. All are practical and relevant and therefore, appealing to this type of reader. This strategy links Classifieds to one of the most favored concepts, Campus News, and Coupons, another highly favored concept. This type of

Table 13. Three Dimension Coordinates: Factor One

	Concepts	Three-Dimensional Coordinates		
1	State News	64.06	9.61	-.40
2	Advertisements	40.39	41.11	-25.64
3	Interesting	24.45	-25.11	-2.99
4	Pictures	32.19	-29.98	-4.73
5	Coupons	20.42	41.07	-12.66
6	Entertainment Page	35.08	-14.37	-26.73
7	Relevant	27.82	-.43	10.95
8	Campus News	34.89	-12.51	13.08
9	Comics	20.57	-31.42	-36.25
10	The Book Page	131.97	-6.88	-9.47
11	Editorials	46.01	-19.01	49.63
12	Classifieds	33.31	51.02	15.19
13	Practical	30.67	18.62	13.55
14	MSU Proper	38.95	-10.87	13.16
15	ME	0.00	0.00	0.00

Table 14. Three Dimension Coordinates: Factor Two

	Concepts	Three-Dimensional Coordinates		
1	State News	65.12	-5.38	-18.53
2	Advertisements	34.78	29.86	-10.71
3	Interesting	30.43	-7.23	11.52
4	Pictures	48.80	-8.63	12.00
5	Coupons	28.27	46.96	-5.33
6	Entertainment Page	78.68	-3.76	-10.51
7	Relevant	23.91	-.14	1.08
8	Campus News	39.61	-21.75	-20.31
9	Comics	73.03	18.56	42.61
10	The Book Page	42.76	-14.14	15.85
11	Editorials	25.51	-44.88	6.07
12	Classifieds	23.02	31.24	-27.33
13	Practical	25.96	.30	-18.04
14	MSU Proper	18.16	-30.08	-24.66
15	ME	0.00	0.00	0.00

Table 15. Three Dimension Coordinates: Factor Three

	Concepts	Three-Dimensional Coordinates		
1	State News	-1.77	92.62	-25.01
2	Advertisements	4.52	104.57	-22.05
3	Interesting	2.50	81.10	52.60
4	Pictures	507.24	18.13	-2.28
5	Coupons	-22.69	287.18	-10.15
6	Entertainment Page	1.61	42.37	2.56
7	Relevant	3.61	27.60	28.14
8	Campus News	-3.94	92.35	-5.37
9	Comics	10.55	40.96	42.29
10	The Book Page	2.94	9.63	79.24
11	Editorials	-299.91	-1.59	121.92
12	Classifieds	-395.64	9.91	-92.44
13	Practical	-2.46	76.11	8.34
14	MSU Proper	3.27	52.20	17.36
15	ME	0.00	0.00	0.00

Table 16. Three Dimension Coordinates: Factor Four

	Concepts	Three-Dimensional Coordinates		
1	State News	1034.05	20.29	27.41
2	Advertisements	1016.14	-22.98	-13.71
3	Interesting	1021.22	22.87	27.87
4	Pictures	1032.39	38.12	39.09
5	Coupons	960.41	-674.32	736.56
6	Entertainment Page	974.42	690.73	-713.59
7	Relevant	1033.30	20.84	26.52
8	Campus News	1026.92	46.56	-1.40
9	Comics	693.88	762.22	665.36
10	The Book Page	1027.09	27.50	-44.35
11	Editorials	1079.77	26.50	69.74
12	Classifieds	991.65	-743.11	-643.47
13	Practical	1029.62	-30.23	-3.51
14	MSU Proper	4793.02	5.65	6.05
15	ME	0.00	0.00	0.00

message also seems to fit the general, wide range of interest characteristic of the segment.

Looking at the position of Classifieds relative to the skimmers, segment three, it is apparent that this group actually judges Classifieds closer to themselves than does any other group. This, along with the very small size of the segment, might give a manager second thoughts about planning a special effort for this group. Unfortunately, there is no real correspondence between appropriate messages for this group and those for any other, meaning that this segment analysis system cannot help reduce the cost of appealing to this segment.

It may be recalled that the entertainment-seeking segment four had judged Classifieds to be very distant from the ME. It is not surprising, then that yet another strategy is called for in directing appeals to this group. Fortunately, there are several satisfactory message solutions, including one that is very appealing because of its simplicity. In this case, the resultant vector would correlate .93 with the target simply by associating Classifieds with the State News. The simplicity in this strategy is appealing because of the idea that this segment never thought of the paper as anything but entertainment. The addition of Interesting and Practical to the message set would increase the correlation with the target vector, but this strategy asks the segment to change its definition of Interesting from that which is entertaining to include the Classifieds. For this segment, the simpler strategy appears to be more appropriate. The systematic use of program output, data interpretation and judgmental criteria has resulted in completely different message strategies for three segments and a recommendation not to make a differentiated effort for segment three.

Message Strategy: A Summation

This discussion has shown the process of systematic determination of problem areas using Z-score criteria (which may be altered for different problems) and multidimensional coordinates, and the selection of potential message components using AMG output along with segment interpretation and specific managerial judgments. Two types of problems, the first dealing with the general image of the newspaper and the second concerning the use of part of the State News product, call for different types of solutions and the proposed system of analyses provided these. The appropriateness of the solutions was discussed but tested only superficially.

The test was part of the telephone interviews conducted with eight subjects to aid interpretation of segments. The segments were asked, "Which of the following combinations of concepts tend to make you more favorable toward the State News?" They were then read the combinations which yield the highest resultant to target correlation, the combination selected for the theme of the State News promotion (with the appropriate variation, if any), and a combination selected for its medium to low correlation. The result was that half found the message with the highest correlation most appealing, and half favored the general-theme message. None chose the lower correlation message.

CHAPTER V

SUMMARY AND SUGGESTIONS

Summary

A methodology has been presented which attempts to satisfy several objectives. One objective has been to identify and collect data on concepts which are appropriate for use in an operant segmentation scheme and which are suitable for multidimensional perceptual analysis. Theoretical issues surrounding the utility and operationalization of spacial models were discussed. A second objective has been to use the unique advantages of metric MDS as applied in the AMG operation of GALILEO to aid the advertising or promotions planner in directing appeals to a differentiated audience. It was shown how a planner may select a message strategy that accomodates the similarities as well as the differences between segments. The working assumption has been that if two segments react similarly to a message, they may be considered similar in that situation.

Examples of very different problems were subjected to systematic analysis and solutions suggested. Discussion of the appropriateness of the solutions followed and it was concluded that the method satisfied minimum criteria by yielding different types of strategies for different problems. Evaluation of the three strategies as well as Monte Carlo experiments are encouraged.

"Conclusions" may not be an appropriate concept in an exploratory study such as this, but the results indicate that the method put forth may have value for the very pragmatic reason that it may allow more control over strategy development in terms of cost-effectiveness and efficiency in targeting to segments.

There may be a place for a method such as this when the scale of problems and decisions are large enough to warrant the energies required to gather and, especially, analyze the necessary data. There is a great deal of output to deal with and a strong, objectives-oriented manager is needed to keep from being overwhelmed by the information available. There could easily be a situation of too many choices, and the decision-maker could have to make an arbitrary choice in the end. Nonetheless, a framework has been constructed for experimentation and development in the combined area of segmentation and multidimensional scaling.

Suggestions

There are some areas that may be singled out as priorities for future research. First, and most obvious is the need to concept-test various message strategies produced by this analysis using rigorous procedures. A case with known results could be used to measure the effectiveness of the system.

A weak element in this method, as in other scaling methods, appears to be concept selection. Many authors, including Stefflre (Multidimensional Scaling, V. II, p. 72), Aaker & Myers (Chapter five, 1975), and others, have recently addressed the problem and many methods have been considered. Among the most promising for segmenting

purposes may be factor analysis of a large concept pool. There is a need for a comparison of methods specifically for dissimilarities applications.

As was mentioned in Chapter II, both ideal points and ME have been used to represent the position of the subjects in the MDS solution. While the positions represented by these two concepts may be similar, doubt remains as to their interchangeability. Experimental designs analyzing the relationship between the two, as well as studies which include both concepts could contribute much to this area.

Another valuable contribution to be made to this method is some measure of the weights that should be assigned to each concept as an indication of the difficulty in trying to change its position. Woelfel has proposed some theoretical notions to this end, but Craig, for one, has found them difficult to operationalize and control.

The most immediate measure of the value of this methodology would be the implementation of the promotion strategies suggested and evaluating them by doing another survey using the same instrument and comparing the multidimensional representations.

APPENDICES

APPENDIX A

INTERVIEW SCHEDULES

APPENDIX A

Focus Interview Guide

TO THE INTERVIEWER: What we are looking for as a result of this interview is a description of how the subject reads the State News; verbatim opinion statements about what the subject likes and dislikes in the paper; reasons for using the paper (e.g., to find out national news, movie listings, sale ads, etc.) and some personal information.

Purpose: My class project involves describing in detail how an individual uses a newspaper.

Demographic Information: Class: F__ S__ J__ Sr__ G__ Age: _____

Sex _____ Live On-Campus _____ Off-Campus _____

Race or Ethnic Background _____

Socioeconomic Background: Lower _____ Low-Middle_____

Upper-Middle _____ Upper _____

Do you read a newspaper regularly?

Which one(s)?

Why?

Do you ever read other papers? Which?

Under what circumstances would you?

(Give the subject a copy of the State News, have her/him go through the paper as s/he normally would and describe what s/he notices, reads, likes, dislikes. . . everything involved in reading the paper. Record description and comments. PROBE.)

(If the subject doesn't mention some of the following sections, ask her/him to comment. For example: "You didn't mention the little 'Inside Friday' box, do you usually read it?" or "There was no Entertainment Page today, but when there is do you read it?")

SECTION

___ Front Page

___ 'INSIDE/Weather' box

___ Focus World/Nation, etc.

___ Second Front Page

___ Opinion Page

___ Entertainment

___ Book Reviews

___ Sports

___ Classifieds

___ It's What's Happening

___ Comics

___ TV Listings

___ Ads (What kinds of ads attract your attention?)

___ Advertising Supplements

How often do you read the State News?

Where do you pick it up? When?

Where and when do you usually read it?

What would you say is the best newspaper?

The worst? Why?

Paired Distance Judgment Schedule

Remember: Editorials and Comics are 100 units apart.

Duplicate Card: 06	1-6	
	7-8	
0107	9-17	the State News & Relevant _____
0104	18-26	the State News & Pictures _____
0108	27-35	the State News & Campus news _____
0103	36-44	the State News & Interesting _____
0115	45-53	the State News & ME _____
0913	54-62	Comics & Practical _____
0910	63-71	Comics & the "Book Page" _____
0914	72-80	Comics & "MSU Proper" _____
Duplicate Card: 07	1-6	
	7-8	
0911	9-17	Comics & Editorials _____
0912	18-26	Comics & Classifieds _____
0915	27-35	Comics & ME _____
0901	36-44	Comics & the State News _____
0609	45-53	"Entertainment Page" & Comics _____
0613	54-62	"Entertainment Page" & Practical _____
0611	63-71	"Entertainment Page" & Editorials _____
0612	72-80	"Entertainment Page" & Classifieds _____
Duplicate Card: 08	1-6	
	7-8	
0615	9-17	"Entertainment Page" & ME _____
0608	18-26	"Entertainment Page" & Campus news _____
0607	27-35	"Entertainment Page" & Relevant _____
0610	36-44	"Entertainment Page" & the "Book Page" _____
0811	45-53	Campus news & Editorials _____
0810	54-62	Campus news & the "Book Page" _____
0815	63-71	Campus news & ME _____
0813	72-80	Campus news & Practical _____
Duplicate Card: 09	1-6	
	7-8	
0814	9-17	Campus news & "MSU Proper" _____
0809	18-26	Campus news & Comics _____
0812	27-35	Campus news & Classifieds _____
0208	36-44	Advertisements & Campus news _____
0203	45-53	Advertisements & Interesting _____
0204	54-62	Advertisements & Pictures _____
0207	63-71	Advertisements & Relevant _____
0206	72-80	Advertisements & "Entertainment Page" _____
Duplicate Card: 10	1-6	
	7-8	
0209	9-17	Advertisements & Comics _____
0205	18-26	Advertisements & Coupons _____
0215	27-35	Advertisements & ME _____
0509	36-44	Coupons & Comics _____
0507	45-53	Coupons & Relevant _____
0515	54-62	Coupons & ME _____
0510	63-71	Coupons & the "Book Page" _____
0501	72-80	Coupons & the State News _____

Remember: Editorials and Comics are 100 units apart.

ID#_____	1-5		
Wave: 1	6		
Card: 01	7-8		
0712	9-17	Relevant & Classifieds	1
0715	18-26	Relevant & ME	
0710	27-35	Relevant & the "Book Page"	
0709	36-44	Relevant & Comics	
0708	45-53	Relevant & Campus News	
0713	54-62	Relevant & Practical	
0711	63-71	Relevant & Editorials	
0714	72-80	Relevant & "MSU Proper"	
Duplicate	1-6		
Card: 02	7-8		
1011	9-17	the "Book Page" & Editorials	
1014	18-26	the "Book Page" & "MSU Proper"	
1012	27-35	the "Book Page" & Classifieds	
1015	36-44	the "Book Page" & ME	
1013	45-53	the "Book Page" & Practical	
1002	54-62	the "Book Page" & Advertisements	
1001	63-71	the "Book Page" & the State News	
0411	72-80	Pictures & Editorials	
Duplicate	1-6		
Card: 03	7-8		
0406	9-17	Pictures & "Entertainment Page"	
0408	18-26	Pictures & Campus news	
0405	27-35	Pictures & Coupons	
0410	36-44	Pictures & the "Book Page"	
0415	45-53	Pictures & ME	
0407	54-62	Pictures & Relevant	
0409	63-71	Pictures & Comics	
1213	72-80	Classifieds & Practical	
Duplicate	1-6		
Card: 04	7-8		
1215	9-17	Classifieds & ME	
1214	18-26	Classifieds & "MSU Proper"	
1203	27-35	Classifieds & Interesting	
1204	36-44	Classifieds & Pictures	
1202	45-53	Classifieds & Advertisements	
1201	54-62	Classifieds & the State News	
1405	63-71	"MSU Proper" & Coupons	
1401	72-80	"MSU Proper" & the State News	
Duplicate	1-6		
Card: 05	7-8		
1404	9-17	"MSU Proper" & Pictures	
1402	18-26	"MSU Proper" & Advertisements	
1403	27-35	"MSU Proper" & Interesting	
1406	36-44	"MSU Proper" & "Entertainment Page"	
1415	45-53	"MSU Proper" & ME	
0102	54-62	the State News & Advertisements	
0106	63-71	the State News & "Entertainment Page"	
0105	72-80	the State News & Coupons	

Remember: Editorials and Comics are 100 units apart.

Duplicate Card: 11	1-6		
	7-8		
0511	9-17	Coupons & Editorials	____
0508	18-26	Coupons & Campus News	____
0506	27-35	Coupons & "Entertainment Page"	____
0315	36-44	Interesting & ME	____
0304	45-53	Interesting & Pictures	____
0308	54-62	Interesting & Campus News	____
0307	63-71	Interesting & Relevant	____
0309	72-80	Interesting & Comics	____
Duplicate Card: 12	1-6		
	7-8		
0310	9-17	Interesting & the "Book Page"	____
0306	18-25	Interesting & "Entertainment Page"	____
0305	27-35	Interesting & Coupons	____
1114	36-44	Editorials & "MSU Proper"	____
1113	45-53	Editorials & Practical	____
1115	54-62	Editorials & ME	____
1112	63-71	Editorials & Classifieds	____
1103	72-80	Editorials & Interesting	____
Duplicate Card: 13	1-6		
	7-8		
1102	9-17	Editorials & Advertisements	____
1101	18-26	Editorials & the State News	____
1314	27-35	Practical & "MSU Proper"	____
1315	36-44	Practical & ME	____
1303	45-53	Practical & Interesting	____
1304	54-62	Practical & Pictures	____
1305	63-71	Practical & Coupons	____
1301	72-80	Practical & the State News	____
Duplicate Card: 14	1-6		
	7-8		
1302	9-17	Practical & Advertisements	____
1312	18-26	Practical & Classifieds	____
0512	27-35	Coupons & Classifieds	____

What would you say is your major source of news? _____

Age: _____ Class Level: F(1)___ S(2) ___ J(3) ___ Sr(4) ___ M(5)__ D(6)__

Social-Economic Background: L__ LM__ UM__ U__ Sex:____

How often do you read the State News: _____ days per week

What percent of the paper would you say you usually read: _____%

Do you read any other newspapers? NO (0) ____ Yes (1) ____

(if yes, which ones:

Do you regularly read any magazines? No (0) ___ Yes (1) ____

(if yes, which ones:

How many hours of TV do you watch per week? ____ Radio hrs/week? ____

Interviewer Number: ____

Subject: _____

APPENDIX B

APPENDIX B

This appendix is intended to be used in conjunction with the section on Interpretation of AMG Output in Chapter III. The output included here is only a fraction of the total, but contains the statistics on all message strategies mentioned in the text.

The concept numbers referred to by the AMG correspond to the following list.

1 = State News
2 = Advertisements
3 = Interesting
4 = Pictures
5 = Coupons
6 = Entertainment Page
7 = Relevant
8 = Campus News
9 = Comics
10 = Book Page
11 = Editorials
12 = Classifieds
13 = Practical
14 = MSU Proper
15 = ME

On the first page of output shown, the target vector has been established by connecting the target concept State News, with ME, called the start concept. The first message solution shown says that relating the State News to the Entertainment Page (concept 6) and MSU Proper (concept 14) will result in motion along a vector correlated .933 with the target vector. Using this message strategy, the State News would be as close as possible to ME after moving 64.083 units along the resultant vector. At that point the two concepts would be 24.738 units apart.

Segment One

AUTOMATIC MESSAGE GENERATOR---TWO PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 1 CONCEPTS ARE NOT LABELED
LENGTH OF TARGET CONCEPT VECTOR 69.690

/CONCEPT	//RES. LNTH//	SCLR PROD//	COR. COEF//	THETA	// RES TG//	RT ANG LNTH//	TG TO RT ANG RT DIS//	TG TO RES//
6-14	74.886	4798.950	.933	21.11	1.090	64.083	24.738	26.99
7-10	157.614	8709.296	.804	36.45	2.294	55.257	40.808	110.19
7-11	91.560	4971.349	.790	37.77	1.333	54.296	42.078	56.21
7-12	77.631	4605.743	.864	30.27	1.130	59.328	34.623	39.16
7-13	62.845	3447.803	.799	37.00	.915	54.862	41.337	42.1
7-14	65.496	3821.662	.849	31.85	.953	58.350	36.248	38.05
8-10	163.725	9894.333	.880	28.39	2.383	60.433	32.658	139.33
8-11	98.688	6156.385	.908	24.75	1.437	62.382	28.759	46.32
8-13	69.413	4632.840	.972	13.68	1.010	66.743	16.247	16.47
8-14	79.11	5006.699	.921	22.88	1.152	63.287	26.709	31.04
9-10	163.438	9168.336	.817	35.25	2.379	56.097	39.646	114.43
10-11	182.209	10738.086	.858	30.92	2.653	58.933	35.292	126.23
10-12	171.152	10372.480	.882	28.09	2.492	60.604	32.339	115.19
10-13	155.298	9214.540	.864	30.26	2.261	59.334	34.613	102.32
10-14	168.576	9588.399	.828	34.10	2.454	56.879	38.515	118.19
11-13	95.738	5476.593	.833	33.62	1.394	57.204	38.030	54.14
11-14	104.744	5850.452	.813	35.60	1.525	55.853	39.936	63.18
12-13	90.645	5110.987	.821	34.93	1.320	56.385	39.235	52.9
12-14	82.412	5484.846	.969	14.33	1.200	66.554	17.007	23.25
13-14	72.461	4326.906	.863	29.62	1.155	59.714	33.954	36.27

Segment Code Target = State News

4- 6-14	111.176	6604.448	.865	30.14	1.619	59.4[illegible]	34.491	[illegible]
4- 7- 8	93.868	5933.094	.920	23.05	1.366	63.2[illegible]	26.[illegible]	[illegible]
4- 7- 9	90.470	5207.097	.838	33.08	1.317	57.5[illegible]	37.49[illegible]	[illegible]
4- 7-10	199.312	10514.794	.768	39.83	2.912	52.75[illegible]	43.994	[illegible]
4- 7-11	119.190	6776.847	.828	34.14	1.735	55.95[illegible]	38.547	[illegible]
4- 7-13	97.917	5253.301	.781	38.65	1.425	53.651	42.896	[illegible]
4- 7-14	101.053	5627.161	.811	35.84	1.471	55.695	40.222	[illegible]
4-8- 9	94.913	6392.133	.980	11.36	1.382	67.347	13.527	30.[illegible]
4- 8-10	205.764	11699.831	.828	34.13	2.995	56.863	38.543	[illegible]
4- 8-11	127.327	7961.883	.910	24.45	1.854	62.531	28.435	[illegible]
4- 8-13	105.387	6438.338	.869	27.21	1.534	61.093	31.406	[illegible]
4- 8-14	113.272	6812.197	.876	28.90	1.649	60.140	33.193	[illegible]
4- 9-10	206.003	10973.834	.775	39.15	2.999	53.270	43.369	[illegible]
4- 9-13	84.381	5712.341	.986	9.77	1.228	67.697	11.651	20.35
4- 9-14	102.188	6086.200	.867	29.88	1.488	59.559	34.225	[illegible]
4-10-11	221.346	12543.584	.825	34.41	3.222	56.670	38.823	[illegible]
4-10-12	201.217	12177.978	.881	28.23	2.929	60.522	32.492	[illegible]
4-10-13	199.316	11020.038	.805	36.40	2.902	55.289	40.764	[illegible]
4-10-14	210.502	11393.897	.788	38.00	3.064	54.127	42.295	[illegible]
4-11-13	125.359	7282.091	.846	32.26	1.825	58.090	36.665	[illegible]
4-11-14	133.433	7655.950	.835	33.36	1.942	57.377	37.771	[illegible]
4-12-13	100.829	6916.485	.999	3.04	1.468	68.596	3.639	32.44
4-13-14	139.082	6132.404	.818	35.07	1.588	56.219	39.473	[illegible]
5- 6-10	198.362	11573.072	.849	31.86	2.888	58.343	36.259	[illegible]
5- 7-10	190.271	10595.784	.811	35.84	2.770	55.688	40.218	[illegible]
5- 7-12	105.055	6492.231	.900	25.89	1.529	61.739	29.993	[illegible]

Segment two

AUTOMATIC MESSAGE GENERATOR---THREE PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 1 CONCEPTS ARE NOT LINKED
LENGTH OF TARGET CONCEPT VECTOR 86.214

/CONCEPT	/RES. LNTH/	/SCLR PROD/	/COR. COEF/	THETA	/ RES.TG/	/RT ANG LNTH/	/TG TO RT ANG RT DIST/	/TG TO REC/
5- 8- 9	149.725	~~9990.194~~	~~.975~~	12.00	~~2.135~~	66.723	14.183	84.20
5- 8-13	111.567	7570.433	.995	5.88	~~1.536~~	67.856	6.986	44.27
5- 9-10	166.375	9576.286	.844	32.46	2.439	57.558	36.639	114.81
5- 9-12	159.879	8626.697	.791	37.72	2.344	53.958	41.734	113.83
5- 9-13	147.588	8271.240	.822	34.76	2.164	56.043	38.899	99.45
5-10-12	115.734	7511.982	.952	17.91	1.697	64.907	20.982	54.99
5-10-13	127.908	7156.525	.820	34.89	1.875	55.951	39.122	81.93
5-12-13	125.798	6206.936	.723	43.67	1.844	49.340	47.103	89.81
6- 7- 8	147.129	9170.072	.914	23.98	2.157	62.327	27.723	99.22
6- 7- 9	178.752	9870.879	.810	35.95	2.620	55.221	40.348	129.86
6- 7-10	154.852	8756.163	.829	34.01	2.270	56.546	38.155	125.45
6- 7-11	142.402	8585.895	.884	27.89	2.088	60.293	31.909	95.59
6- 7-12	142.117	7806.575	.805	36.36	2.383	54.931	40.445	96.11
6- 7-13	134.956	7451.117	.809	35.96	1.978	55.212	40.061	80.24
6- 7-14	136.762	8206.698	.880	28.40	2.005	60.017	32.439	93.35
6- 8- 9	193.879	11775.755	.899	27.08	2.842	60.737	31.650	136.71
6- 8-10	169.802	10661.039	.920	23.01	2.439	62.785	26.668	114.29
6- 8-11	163.710	10490.771	.939	20.05	2.400	64.082	23.362	112.34
6- 8-12	159.422	9711.451	.893	26.75	2.337	60.916	31.698	113.13
6- 8-13	157.067	9355.993	.873	29.16	2.303	59.567	33.241	113.11
6- 8-14	161.276	10111.574	.919	23.20	2.364	62.697	24.874	112.13
6- 9-10	203.055	11761.946	.820	34.89	2.977	55.955	39.114	113.13

Segment two Target = state News

2- 6- 8	161.985	10242.391	.927	22.04	2.375	63.230	25.995	1 [illegible]
2- 6- 9	192.172	10943.197	.835	33.41	2.817	56.945	37.556	1[illegible]
2- 6-10	170.808	9828.482	.844	32.49	2.504	57.541	36.076	11[illegible]
2- 7-11	141.696	9658.213	.999	2.25	2.077	68.162	2.675	73.58
2- 6-12	161.668	8878.893	.805	36.38	2.370	54.921	40.[illegible]59	11[illegible]
2- 6-13	152.167	8523.436	.821	34.80	2.231	56.014	36.931	1[illegible]
2- 6-14	145.029	9279.016	.938	20.29	2.126	63.980	23.658	[illegible]
2- 7- 9	140.996	7785.768	.810	35.95	2.067	55.220	40.[illegible]5	[illegible]
2- 7-10	116.957	6671.053	.836	33.26	1.715	57.039	37.[illegible]14	[illegible]
2- 7-12	118.208	5721.464	.710	44.80	1.733	48.402	48.067	[illegible]
2- 7-13	98.909	5366.007	.795	37.31	1.450	54.252	41.351	[illegible]
2- 8- 9	150.238	9690.644	.946	18.99	2.202	64.502	22.197	[illegible]
2- 8-12	127.460	7626.340	.877	28.70	1.869	59.833	32.759	[illegible]
2- 8-13	115.302	7270.883	.924	22.42	1.690	63.060	26.013	[illegible]
2- 9-10	165.356	9276.735	.822	34.67	2.424	56.102	38.809	[illegible]
2- 9-11	138.957	9106.466	.961	16.11	2.037	65.634	18.932	[illegible]
2- 9-12	157.832	8327.146	.773	39.34	2.314	52.760	43.239	[illegible]
2- 9-13	137.795	7971.689	.848	32.00	2.020	57.852	36.143	[illegible]
2-10-11	120.397	7991.751	.973	13.32	1.765	66.378	15.719	56.26
2-10-12	126.072	7212.431	.839	33.00	1.848	57.219	37.153	[illegible]
2-10-13	129.290	6856.974	.777	38.97	1.895	53.036	42.900	[illegible]
2-11-13	98.806	6686.705	.992	7.21	1.448	67.675	[illegible]8.558	[illegible]
2-12-13	125.969	5907.385	.687	46.57	1.847	46.835	49.338	[illegible]
3- 4- 5	112.929	7124.071	.925	22.36	1.655	63.085	25.952	[illegible]
3- 4- 6	170.269	8909.631	.767	39.91	2.496	52.327	43.762	[illegible]
3- 4- 7	116.646	5752.202	.723	43.70	1.710	49.313	47.131	[illegible]
3- 4- 8	135.652	7657.078	.827	34.16	1.939	56.447	33.361	[illegible]

Segment two

AUTOMATIC MESSAGE GENERATOR---TWO PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 12
LENGTH OF TARGET CONCEPT VECTOR 56.852

/CONCEPT	//RES. LNTH//	SCLR PROD//	COR. COEF//	THETA	// RES TG//	RT ANG LNTH//	TG TO RT ANG PT DIST//	TG TO RES/
1- 2	107.946	3932.839	.641	50.14	1.899	36.433	43.643	87.78
1- 3	96.940	2194.726	.398	66.53	1.705	22.640	52.149	96.77
1- 4	116.849	997.879	.150	81.36	2.055	8.540	56.207	122.02
1- 5	114.041	3197.473	.493	60.45	2.006	28.038	49.457	99.21
1- 6	141.396	3881.372	.483	61.13	2.487	27.450	49.786	124.35
1- 7	92.206	3069.359	.586	54.16	1.622	33.288	46.087	74.80
1- 8	119.192	3031.374	.447	63.43	2.097	25.433	50.846	106.66
1- 9	141.310	3761.890	.468	62.08	2.486	26.622	50.234	125.21
1-10	121.795	1475.437	.213	77.70	2.142	12.114	55.546	122.94
1-11	115.099	1655.742	.253	75.34	2.024	14.387	55.001	114.74
1-13	98.973	3107.129	.552	56.48	1.741	31.394	47.398	82.54
1-14	105.940	1315.271	.218	77.39	1.863	12.415	55.480	108.74
2- 3	61.737	2306.297	.657	48.92	1.086	37.357	42.856	49.31
2- 4	96.267	1109.449	.203	78.30	1.693	11.525	55.671	101.39
2- 5	95.512	3309.044	.609	52.45	1.680	34.645	45.076	79.74
2- 6	122.141	3992.943	.575	54.90	2.148	32.691	46.513	100.82
2- 7	66.175	3180.930	.846	32.27	1.164	48.068	30.357	35.35
2- 8	82.024	3142.945	.674	47.62	1.443	38.317	41.999	63.62
2- 9	118.033	3873.461	.577	54.74	2.076	32.817	46.424	97.84
2-10	97.407	1587.008	.287	73.35	1.713	16.293	54.467	97.75
2-11	58.323	1767.313	.533	57.79	1.026	30.302	48.103	55.67
2-13	78.732	3218.730	.719	44.02	1.385	40.882	39.517	54.71
2-14	54.787	1426.842	.459	62.74	.964	26.043	50.536	58.14

Segment Three

AUTOMATIC MESSAGE GENERATOR---TWO PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 1 CONCEPTS ARE NOT LABELED
LENGTH OF TARGET CONCEPT VECTOR 91.50

/CONCEPT	//RES. LNTH	//SCLR PROD	//COR. COEF	// THETA	// RES TG	//PT ANG LNTH	//TG TO RT ANG PT DIST	//TG TO RES
4-10	197.643	6748.624	.377	67.83	2.184	34.146	83.812	187.73
4-13	106.168	562.693	.059	86.64	1.173	5.306	90.345	135.41
4-14	136.733	-9161.330	-.740	137.76	1.511	-67.002	60.837	212.42
5-13	374.955	33763.866	.995	5.73	4.143	90.048	0.000	285.45
5-14	354.823	24039.843	.749	41.53	3.921	67.752	60.000	297.28
6- 7	76.162	-3408.626	-.495	119.64	.842	-44.755	78.659	144.25
6- 8	124.500	4958.212	.440	63.99	1.376	39.825	81.267	117.76
6- 9	135.554	3900.824	.318	71.46	1.498	28.777	85.803	139.48
6-10	150.951	2314.467	.169	80.25	1.668	15.333	89.192	162.32
6-11	80.220	-2569.759	-.354	110.73	.886	-32.034	84.641	144.19
6-12	95.403	3465.999	.401	66.33	1.054	36.339	92.888	101.78
6-13	87.972	-3871.464	-.486	119.10	.972	-44.008	79.088	153.48
7- 8	152.498	4445.099	.322	71.20	1.684	29.166	85.672	157.19
7- 9	95.277	3387.712	.393	66.87	1.053	35.557	83.223	102.43
7-10	179.592	1801.354	.111	83.64	1.984	10.030	89.943	191.98
7-11	87.332	-3082.872	-.390	112.96	.965	-35.301	83.332	148.27
7-13	86.633	-4384.577	-.559	124.01	.957	-50.611	75.028	156.41
8- 9	146.045	11754.549	.698	45.72	2.056	63.181	64.796	138.03
8-10	189.633	11168.191	.592	53.67	2.095	53.628	72.915	154.72
8-11	118.280	5283.965	.494	61.42	1.307	44.673	78.756	125.79
8-12	169.296	11319.724	.739	42.37	1.871	66.964	81.998	119.21

Segment four

AUTOMATIC MESSAGE GENERATOR---TWO PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 1 CONCEPTS ARE NOT LABELED
LENGTH OF TARGET CONCEPT VECTOR 67.768

/CONCEPT	//RES. LNTH	//SCLR PROD	//COR. COEF	// THETA	// RES TG	//RT ANG LNTH	//TG TO RT ANG PT DIST	//TG TO RES/
7-10	85.642	3855.531	.664	48.37	1.264	45.819	50.654	64.93
7-12	147.623	8377.061	.837	33.14	2.178	56.746	37.846	98.14
8-13	86.762	5720.267	.973	13.38	1.288	65.930	15.677	26.87
10-12	158.266	9188.893	.894	26.56	2.217	60.619	38.298	94.63
10-13	88.319	4369.946	.738	43.18	1.383	49.479	46.308	60.44
12-13	155.388	8891.476	.844	32.48	2.293	57.221	36.388	104.67

FINAL MESSAGES...GOOD LUCK DOUG DATA SET 1

AUTOMATIC MESSAGE GENERATOR---THREE PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 1 CONCEPTS ARE NOT LABELED
LENGTH OF TARGET CONCEPT VECTOR 67.768

/CONCEPT	//RES. LNTH	//SCLR PROD	//COR. COEF	// THETA	// RES TG	//RT ANG LNTH	//TG TO RT ANG PT DIST	//TG TO RES/
2-3-4	98.495	6512.166	.976	12.86	1.453	66.116	14.872	35.63
2- 3- 6	86.898	4823.323	.819	35.81	1.282	55.506	38.880	49.97

Segment four

AUTOMATIC MESSAGE GENERATOR---ONE PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 12
LENGTH OF TARGET CONCEPT VECTOR 108.096

/ CONCEPT	//CON TO TG DIST	//CON LNTH	//SCALAR PROD	/CORR COEF	//THETA	//RT ANGLE LNTH	//TG TC RT ANG PT DIST	//RT ANG ∗ CON/
1	51.447	67.768	6815.211	.930	21.51	100.566	39.637	1.484
3	112.249	26.964	-94.568	-.032	91.85	-3.489	108.039	-.129
8	109.167	60.076	1688.185	.260	74.93	28.181	104.379	.468
10	101.859	69.230	3051.146	.408	65.94	44.073	98.703	.637

FINAL MESSAGES...GOOD LUCK DOUG DATA SET 1

AUTOMATIC MESSAGE GENERATOR---TWO PAIR MESSAGE SOLUTION
START CONCEPT 15
TARGET CONCEPT 12
LENGTH OF TARGET CONCEPT VECTOR 108.096

/CONCEPT	//RES. LNTH	//SCLR PROD	//COR. COEF	// THETA	// RES∗TG	//RT ANG LNTH	//TG TC RT ANG PT DIST	//TG TC RES/
1- 3	90.106	6721.144	.690	46.37	.834	74.591	78.236	79.76
1- 8	124.458	8503.396	.632	50.80	1.151	68.324	83.765	100.83
1-10	118.206	8866.357	.772	39.45	1.094	83.467	68.687	76.97
3- 8	84.442	1594.117	.175	79.94	.781	18.878	106.434	125.01
3-10	88.042	2957.378	.311	71.90	.814	33.587	102.745	116.28
4-11	668.385	34157.193	.528	58.12	6.183	57.089	91.791	618.15
6-11	500.144	7628.359	.141	81.89	4.627	15.252	107.014	496.56
7- 8	81.268	6460.636	.736	42.65	.752	73.506	73.236	73.26
7-10	45.642	7823.596	.845	32.32	.792	31.352	57.788	58.07

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