International Journal of Intercultural Relations, Vol. 4, pp. 77-95, 1980
Printed in the USA.
0147-1767/80/010077-19$02.00/0

METRIC MULTIDIMENSIONAL SCALING AND AUTOMATIC MESSAGE GENERATION APPLIED TO THE TOURISM INDUSTRY: THE CASE OF ISRAEL

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ABSTRACT. The present paper demonstrates the use of metric multidimensional scaling analysis to determine messages which could be utilized to enhance tourism for a particular region. An example utilizing the case of Israel is studied here in order to illustrate these techniques. Thirty professors and their spouses were interviewed to obtain ratio estimates of differences among 16 concepts associated with the focal concepts of "Israel" and "my vacation." Data were analyzed using the metric program GALILEO (T.M.), which rendered a ratio-scaled configuration of the concepts in a multidimensional space. Further, using an algorithm called the Automatic Message Generator (T.M.), messages were formulated which would move "my vacation" closer to "Israel." The techniques and the results are presented so as to make them relevant to those persons in charge of the generation of messages in the tourism industry. It is argued in this paper that the use of these techniques

This is a revised version of a paper presented to the Intercultural Communication Division of the International Communication Association at its annual convention in Chicago, Illinois, April 25-29, 1978. The authors wish to acknowledge the assistance of Dr. Joseph Woelfel and Mr. Richard A. Holmes while at Michigan State University. Requests for reprints should be sent to Felipe Korzenny, Assistant Professor, Department of Communication, Michigan State University, East Lansing, Michigan 48824.

may facilitate the task of assessing and changing the attitudes of individuals with regard to their vacation preferences.

The elements that are used in decision-making by vacationers are of extreme importance for those in charge of tourism promotion. The goal of tourism promotion, simply stated, is to design message strategies which will increase (or decrease) the rate at which a particular cohort of individuals visit a particular geographic location. The working assumption which underlies any persuasive message strategy is that individuals' attitudes and beliefs influence their behaviors such that changes in their attitudes and beliefs produce corresponding changes in their behaviors. Hence, tourism promoters attempt to design and disseminate messages which will foster the development of an attitudinal orientation by potential consumers, which is likely to produce the desired change in their travel. The development of an effective message strategy then, requires knowledge of (a) the kind of information which influences travel decisions, (b) the form in which travel information is most effectively presented to potential consumers, and (c) the relative impact comparable messages structured to fit various mediums have on attitudinal structures (i.e., how much attitude change do certain mediums impart). While tourism promoters have learned a great deal about individuals' attentiveness to various media from "cost per thousand" computations, considerable uncertainty still surrounds the means by which effective message can be generated.

Traditional individual attitude measurement techniques (e.g., Likert scales or semantic differential scales) do not offer the level of precision required for detecting small changes over time. Further, they are limited in the amount of information which they are capable of yielding, and they are inherently characterized by high measurement error. Finally, they prove cumbersome when attempts are made to simultaneously represent data from several scales and/or time periods–making it difficult for comparisons to be made. Consequently, there is no systematic means for determining the *kind* or the *number* of messages which need to be distributed through the various available channels to bring about desired attitudinal orientations.

It will be the purpose of this paper to explicate a measurement procedure which can be utilized to (a) describe the attitudinal

orientation of an aggregate of individuals toward a particular vacation site or tourism service, (b) describe changes in the aggregates' attitudinal orientation over time, (c) aid in the construction of messages which will bring about specific changes in the aggregates' attitudinal orientation, and (d) evaluate the effectiveness of any message intervention or channel manipulation. The procedure itself is called metric multidimensional scaling, which is accomplished by employing a technique called the ratio judgement of separation (Danes & Woelfel, 1975). Based upon criteria specified by Einstein (1961) for the fundamental measurement of distance, this technique yields data arrayed in the form of a dissimilarities matrix appropriate for metric multidimensional scaling analysis (Torgerson, 1958).

Metric multidimensional scaling (MMDS) is a methodological technique which is capable of simultaneously representing attitudinal objects (or the attributes of those objects) in a n-dimensional space. The MMDS procedure begins by conducting in-depth interviews with a subset of the target audience, in which they are asked to discuss in some detail the topic of interest. By conducting these interviews the investigator can identify the concepts that members of the target audience themselves utilize to define, comprehend, and communicate about the topic of interest. While several concepts are initially generated, over the course of several interviews, several concepts and/or synonyms of concepts tend to be repeated. As it turns out, after conducting 25 or 50 interviews, the number of concepts which repeatedly emerge seldom number more than 15.

Once this set of concepts has been identified, the measurement instrument is created by (a) generating a list of complete paired comparisons utilizing the concepts generated in the interviews, and (b) selecting a "criterion-pair" to serve as a comparative standard against which all other judgements are to be made. This type of questionnaire then asks each respondent to judge the extent to which each concept *differs in meaning* from all other concepts. The format of the questions read as follows: If (concept A) and (concept B) are (U) units apart, how far apart are (concept X) and (concept Y)?

Once accomplished, these procedures make possible a mathematically precise definition of the meaning of any concept: since each concept C^i is defined by $1 \times (K-1)$ vector of separations from the K-1 other con-

cepts ... similarly, the cultural [or group] meanings of the n concepts defined by the culture [or group] is given by the n X n matrix of $\bar{s}$ separations among the n concepts averaged across members of the culture [or group]. (Woelfel, 1973, pp. 20-21)

When the data are aggregated in this manner, the resulting matrix $\bar{s}$ is called the means-distance matrix. The means-distance matrix is then double-centered and pre-multiplied by its transpose, yielding a scalar-products matrix. The orthogonal decomposition of the scalar-products matrix yields a matrix of eigenvectors which represents a rectilinear coordinate system upon which the concepts are projected as *vectors*. That is, each column vector of the eigenvector matrix represents one dimension of the multidimensional space (orthogonal to all other dimensions), and each row vector represents the position vector (R^i) of the i^{th} concept in the space (Davis & Snider, 1975; Woelfel, 1976).

The real utility of the MMDS procedure becomes clear with the inclusion of a concept which represents the "self-concept" (e.g., ME or MY VACATION) in the set of paired comparisons. Research has shown that the amount of favorability people express toward any concept is given by its location with respect to the "self-concept." For example, political candidates closer to the concept ME receive more votes during elections (Barnett, Serota, & Taylor, 1976). Similarly, the closer people perceive themselves to be to any innovation, the more likely that innovation is to be adopted (Taylor, Farace, & Monge, 1976). Hence, we would expect that the attributes closer to the concept "MY VACATION" would be major factors in the decision-making process of selecting a vacation site. Finally, once the initial MMDS configuration has been obtained, it is a relatively simple task to examine the configuration and derive messages which are effective in altering the configuration in some desired manner (e.g., moving the concept "ISRAEL" toward the concept "MY VACATION"). Assuming that concepts which are equated with each other move toward each other in the configuration, this is accomplished by examining the *resultant vectors* obtained when the start concept (ISRAEL) is equated with other concepts in the space and by selecting those which minimize the distance between the start concept (ISRAEL) and the target concept (MY VACATION), should the start concept move along the resultant vector as predicted. Thus, the MMDS procedure provides a clear-cut startegy for influencing the

attitudinal orientation of a cohort of individuals toward some vacation site or tourism service. The projected effect that various combinations of concepts which can be equated in a message will have on the overall configuration can be computed from the initial configuration to determine which combination of concepts will produce the *closest* approximation to the desired configuration. Further, the relative effectiveness of any message campaign can be quantified by comparing time-series data and calculating the total distance moved by the manipulated concepts.

The remainder of this paper will be devoted toward illustrating the message generating capabilities afforded by MMDS procedures. To facilitate this presentation, the metric multidimensional scaling computer program GALILEO (TM) (Woelfel, Serota, Holmes, Marlier, Danes, Fink, Gillham, Saltiel, & Barnett, 1976) was utilized for all analyses reported here. This metric program was employed because it offers distinct advantages over other nonmetric programs (such as TORSCA, INDSCAL, or KYST) in that:

1. Program GALILEO is based upon the assumption that ratio-level data will be input to generate a ratio-scaled configuration;
2. Program GALILEO does not attempt to constrain the configuration of concepts to a Euclidean space, but rather is based on Riemann geometric assumptions, and hence, can account completely for triangular inequalities;
3. Because of its metric properties program GALILEO is not subject to degenerate solutions;
4. The multidimensional space is constructed from unstandardized distance vectors, which means that all variance in the sample population is accounted for by the matrix of eigenvectors; and
5. Only program GALILEO has the "automatic message generator" and "message effectiveness" routines already built into its system.

METHOD

In the present study, we were looking for the attributes of importance in evaluating ISRAEL as a place for a vacation. Thirty professors at Michigan State University were personally interviewed in order to determine the key concepts which should be used in the analysis. From these in-depth interviews, ten concepts were selected for use in this study. Further, since this paper's goal was to be illustrative of the potential of MMDS, eight additional

TABLE 1
Concept Identification Numbers

Concept 1 is	Good beaches
Concept 2 is	Scenery
Concept 3 is	Close by
Concept 4 is	Interesting culture
Concept 5 is	Historical and archaeological sites
Concept 6 is	Sports activities
Concept 7 is	Night life and entertainment
Concept 8 is	Religious sites
Concept 9 is	Inexpensive
Concept 10 is	Good climate
Concept 11 is	Local ceremonies and festivals
Concept 12 is	Deluxe accommodations
Concept 13 is	Safety
Concept 14 is	Modern
Concept 15 is	English spoken
Concept 16 is	Interesting food
Concept 17 is	Israel
Concept 18 is	My vacation

concepts that were of theoretic or practical interest to the investigators were also cast into the paired-comparison questionnaire. Hence, the final questionnaire cast the 18 concepts in Table 1 into 153 nonredundant paired-comparisons. In this study, the "criterion pair" that was utilized was: *night-life* and *sports* are *100* units apart.

A nonrandom sample of 30 Michigan State University professors and their spouses were asked to fill out the questionnaire. All respondents were given detailed instructions on how to fill out the questionnaire, and no respondent filled out the questionnaire until all their questions concerning how to fill out the scales were answered. After completing the questionnaire, all 60 respondents were fully debriefed on the nature of the study.

RESULTS

In this section we will present the results of the metric multidimensional analysis with emphasis on the results rendered by the automatic message generator. Table 1 contains the listing of concept names and the number of each concept was assigned. Table 2 presents the means-distance matrix. The diagonal of the matrix contains zeros since there is no difference between a concept and

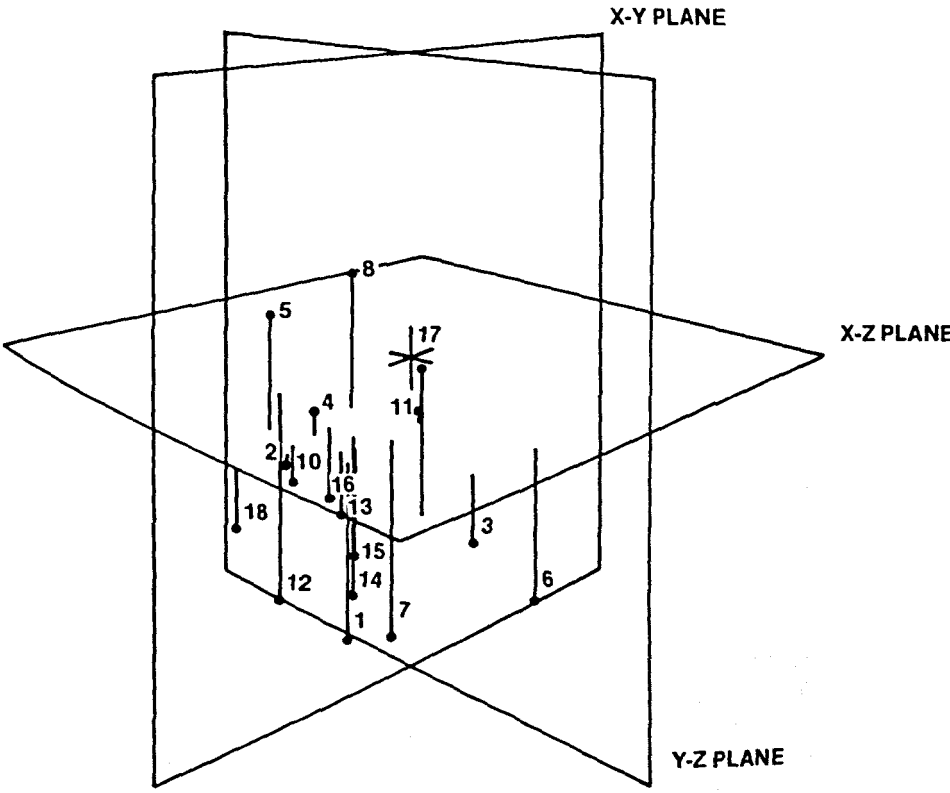

FIGURE 1. Tridimensional representation of mean differences among concepts.

itself. As can be observed in Table 2, the largest mean distance in the space is 335 units between the concepts "inexpensive" and "deluxe accommodations," while the smallest mean distance is 14 units between the concepts "ISRAEL" and "religious sites." This later result is quite interesting for it indicates that Israel is very closely associated with being a religious site, which is the traditional image of that country, and that it may be desirable to

TABLE 2

Matrix of Mean Differences Among Concepts

	VACATIONS			--GALILEO MEANS MATRIX				SET NO. 1
	1	2	3	4	5	6	7	8
1	0.000							
2	41.576	0.000						
3	127.473	72.807	0.000					
4	157.305	88.390	97.288	0.000				
5	198.983	99.237	131.949	35.069	0.000			
6	94.915	152.288	106.017	152.833	224.139	0.000		
7	76.271	156.780	95.085	107.931	204.433	114.153	0.000	
8	264.576	145.763	134.741	81.695	41.102	232.034	246.071	0.000
9	119.903	49.086	63.898	83.644	95.847	121.552	196.754	83.220
10	16.017	57.627	143.983	109.655	113.898	98.051	145.258	116.102
11	117.155	106.271	96.379	45.254	86.102	169.051	109.568	73.983
12	99.271	137.672	118.051	136.349	195.746	142.069	71.017	154.831
13	70.542	83.534	61.525	100.508	126.017	115.593	95.424	74.237
14	102.712	152.759	96.610	150.000	200.172	75.169	54.741	161.724
15	92.288	130.169	50.305	142.205	149.315	92.288	55.162	125.831
16	91.356	108.136	101.525	50.086	141.356	166.441	45.169	159.407
17	118.276	76.441	285.263	69.492	15.737	183.586	140.263	14.017
18	89.085	26.068	146.525	76.983	105.832	183.138	136.466	165.603

design a message strategy which emphasizes other attributes for those not interested in religious manifestations in their vacation plans.

Figure 1 illustrates the mean difference among concepts in a three dimensional representation. The distances appreciated in the figure may not look as far or close as the means matrix indicates, due to the perspective imposed by a three dimensional space. So, for example, concepts 8 and 17 look farther apart than concepts 2 and 18 when in reality the first pair's distance is much smaller than the second. However, while some of these problems with a three-dimensional representation are present, Figure 1 is still useful in providing a visual representation of the MMDS configuration, particularly since 78.5% of the distance variance is accounted for by the first three dimensions.

Further examination of Table 2 indicates that the concept "my vacation" is most closely associated with good beaches, scenery, good climate, safety, and English spoken. This reflects for our sample of professionals and their spouses that the most important attributes for vacation decision making are sunny, scenic beach resorts which are safe and where they can communicate with the inhabitants of the vacation site. While this may seem merely con-

VACATION --GALILEO MEANS MATRIX SET NO. 1

9	10	11	12	13	14	15	16	17	18
0.000									
87.586	0.000								
85.339	127.797	0.000							
335.259	119.915	129.322	0.000						
95.339	115.847	99.153	85.207	0.000					
189.483	138.559	119.153	46.390	79.846	0.000				
137.881	120.746	114.068	81.051	89.322	84.271	0.000			
132.966	118.814	79.153	73.814	142.797	132.759	127.672	0.000		
220.259	58.190	91.228	89.828	162.105	100.259	135.525	57.672	0.000	
110.431	46.220	146.466	133.983	68.534	107.414	85.298	101.610	216.538	0.000

gruent with "common sense" notions of what vacationers like, other more traditional scaling techniques would have rendered less precise information about the relative importance of each of these attributes. For example, the safety issue seems to be a factor of primary importance when evaluating Israel as a vacation site. The mean distance between "safety" and "my vacation" is 68.5 units, while the mean distance between "safety" and "Israel" is 162 units. While we understand our respondents might not perceive Israel as a safe place to vacation, given the recent turmoil in certain Middle East locations, our sample may have distorted and/or exaggerated perception of the actual dangers involved with a trip to Israel. Consequently, on an intuitive basis, one may guess that the single best message strategy to enhance tourism to Israel would be to equate the concept "Israel" with the concept "safety." However, there are several messages which would accomplish this goal as well as, if not better than this strategy. Determining what these messages are on an intuitive basis, however, is somewhat difficult given the complexities involved with simultaneously evaluating the importance of more than one concept in the vacation decision-making process. However, utilizing the automatic message generator (AMG) we can scan through all potential messages that will

TABLE 3

One Concept Message Solutions

AUTOMATIC MESSAGE GENERATOR---ONE PAIR MESSAGE SOLUTION
START CONCEPT 17
TARGET CONCEPT 18
LENGTH OF TARGET CONCEPT VECTOR 216.538

/CONCEPT/CON TO TG DIST/CON LNTH/SCALAR PROD//CORR COEF //THETA ///RT ANGLE LNTH/TG TO RT ANG PR DIST/RP ANG : CON/								
3	146.525	285.263	53397.137	.864	30.18	187.860	108.860	.656
6	189.134	183.596	22411.676	.564	55.69	122.070	178.851	.665
7	136.466	140.263	23960.848	.789	37.89	170.892	132.984	1.218
9	110.431	220.258	41603.794	.872	29.27	188.886	105.881	.858
11	146.466	81.228	16879.592	.854	31.30	185.027	112.489	2.028
12	133.983	89.827	18503.161	.951	17.96	205.986	66.772	2.293
13	68.534	162.105	34234.954	.975	12.76	211.190	47.829	1.303
15	85.288	135.525	28.990.922	.988	8.93	213.916	33.600	1.578

enhance Israel as a vacation site with relative ease and select those which are relatively optimal compared to all others. Further, the AMG can generate one, two, three, and four concept solutions. Table 3 presents the results of one concept message solutions. Table 4 presents the results of some two concept message solutions (those with correlation coefficients > .5), and Table 5 presents the results of some three concept solutions (again, those with correlation coefficients >.5). Four concept solutions are not examined in this paper because of the difficulties involved with constructing lengthy messages. In general, four concept solutions tend not to be utilized as often as more simple messages because of the complexity of constructing such messages vis-à-vis their relative impact.

One Concept Solutions

As can be seen from Table 3, there were 8 one concept messages which would move the concept "Israel" toward "my vacation." Three basic criteria were utilized to determine which of these messages were "optimal" among the total set:

1. The correlation coefficient; message solutions with a high correlation coefficient are considered better than solutions with a low correlation coefficient, since the correlation coefficient reflects the correlation between the target and resultant vectors;
2. The *angle* between the target vector and the resultant vector; message solutions with a small angle are considered better than solutions with a large angle between these two vectors: and

3. The *distance* between the target concept and the predicted movement of the start concept along the resultant vector; message solutions which minimize $c^2 = a^2 + b^2 + 2ab \cos\theta$, where

   c = the distance from the target concept
   a = the start to target distance
   b = the resultant vector length divided by the number of concepts in the message solution

Let's illustrate the best of the one concept message solutions in Figure 2. As can be seen in Table 3, under the column labeled "CORR COEF" (correlation coefficient), there are two very high correlations, one for concept 15 (English spoken) and another one for concept 13 (safety), however, the distance remaining from "English spoken" to "my vacation" is larger than the distance from "safety" to "my vacation" (85.23 vs. 68.53 units). This leads us to decide that "safety" may be a better concept to endorse than "English spoken" in order to try to move Israel to "my vacation." The above distance is labeled in Table 3 as "CON TO TG DIST" which means concept to target distance. This distance is

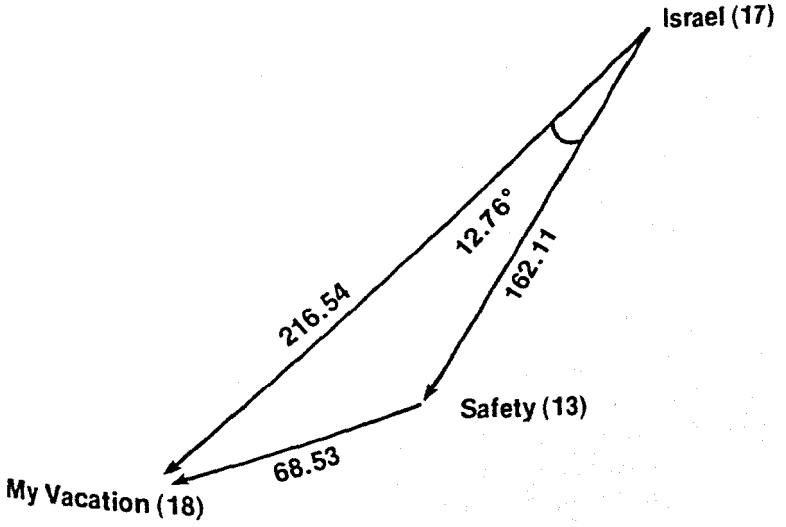

FIGURE 2. Illustration of the best one concept message solution.

the position at which Israel would stop movement in the conceptual space if we applied a message like, "Israel is a safe place to spend a vacation" (plus a rationale) to our target audience with maximal efficiency.

What the solution illustrated in Figure 2 indicates is that since "safety" is a concept highly associated with the idea of "my vacation," one's best strategy for bringing "Israel" close to "my vacation," is to endorse Israel as a safe place. Naturally, one would have to document such assertion and make it credible with substantive rationale. Since the main purpose of this paper is to illustrate the method, we did not deliver such a message, neither did we measure the concept structure at a second point in time. Had we done the above we should have expected to find "Israel" to be closer to "my vacation" than it was at the first point in time. It should be emphasized that multiple measurements over time are a necessity in order to maximially take advantage of GALILEO and the Automatic Message Generator. The first measurement of the concept structure or "mental map" enables us to identify message strategies that will change the configuration of concepts. Second and third measurements would have enabled us to evaluate our original message design, modify the delivery of future messages, and calculate the rate at which our concept of interest (Israel) moves toward the target concept (my vacation). While a promotional message should, in general, be kept short and only elaborate a small number of concepts, one concept may be too limited in its reaches. Two and three concept solutions may appeal to a larger number of individuals and, in essence, achieve greater effectiveness with increased efficiency and less repetition. In order to explore these possibilities, we move now to a discussion of two and three concept message solutions.

Two Concept Message Solutions

Table 4 contains the selected two concept solutions obtained when trying to move "Israel" toward "my vacation." The main difference between the one concept solutions and the two concept solutions (see Figure 3) is that through vector summation, the *resultant* vector of two concepts is evaluated for its potential in moving the start concept ("Israel") to the target concept ("my vacation"). In the one concept solution the concept vector itself was utilized instead of the vector summation resultant.

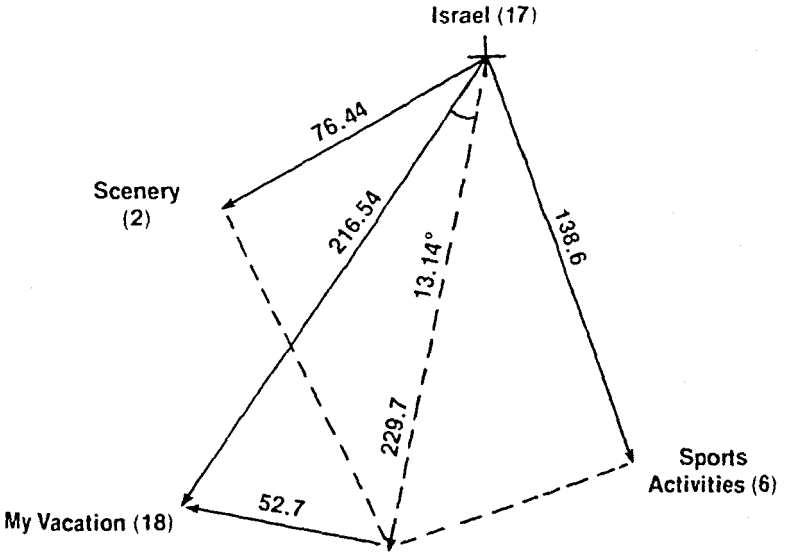

FIGURE 3. Illustration of the best two-concept message solution.

TABLE 4

Selected Two Concept Message Solutions

DATA SET 1

AUTOMATIC MESSAGE GENERATOR---TWO PAIR MESSAGE SOLUTION
START CONCEPT 17
TARGET CONCEPT 18
LENGTH OF TARGET CONCEPT VECTOR 215.538

/CONCEPT/RES. LNTH	//SCLR PROD///	COS. COEF///	THETA ///	RES:TG ///PT ANG	LNTH//TG TO PT	ANG PT DIST//TG TO RES/	
2- 6	229.704	48437.868	.974	13.14	1.061	210.871	49.218	52.70
2- 9	326.043	67629.986	.958	16.68	1.506	207.426	62.154	133.91
7-15	209.664	43914.957	.967	14.70	.968	209.454	54.936	54.94
9-10	314.095	66304.931	.975	12.87	1.451	211.038	48.232	111.73
9-16	293.257	61548.904	.969	14.24	1.354	209.881	53.282	98.95
11-13	243.659	51114.546	.969	14.35	1.125	209.779	53.681	63.48
12-13	253.854	52738.115	.959	16.38	1.172	207.750	61.065	75.52

Looking at Table 4 we see that there are at least two solutions that have a high correlation, namely the pair 2-6, and the pair 9-10. The 2-6 pair stands for "scenery" and "sports activities," and the 9-10 pair stands for "inexpensive" and "good climate." The first correlation is .974 and the second is .975. The resultant to target distance (TG TO RES), however, indicates that the resultant for pair 2-6 is closer (52.7 units) to the target "my vacation," than the resultant for the pair 9-10 (113.73 units).

Figure 3 illustrates the best two-concept message solution that we obtained. It tells us that when we geometrically add the concepts of "scenery" and "sports activities," we obtain a resultant vector that is very highly associated with the target "my vacation" ($r = .974$), and which if maximally efficient, would be the closest we can get to pairing vacation aspirations with Israel. In this case, the messages that should be delivered would include references to the scenery and sports activities of Israel. An example of one such message might be: "Enjoy your next vacation in the beautiful scenery of Israel, where you can practice your favorite sports, from skiing in the mountains of Jerusalem to swimming in the warm and clear waters of the Mediterranean Ocean."

Here again we must emphasize that this first measurement, in practice, would be complemented with over time follow-ups in order to obtain feedback with regard to the effectiveness of our strategy and in order to modify our messages to fit specific circumstances of the new concept configurations that may emerge.

Now we move to present the results of our last message generation solution.

Three Concept Message Solutions

Table 5 presents selected three concept message solutions that were obtained. Several message strategies seem to be available to us; however, the three concept resultant that is maximally associated with "my vacation" and which is also closest is the triad 6-14-16, namely "sports activities," "modern," and "interesting food." In this case the correlation of the resultant with the target "my vacation" is of 1.0, which means that the angle between the vectors is equal to zero or that the resultant lies on top of the vector "my vacation." Also, the distance from the end of the resultant to the target concept is only 83.97 units. In this case no figure will be presented to illustrate the solution since it would be

TABLE 5

Selected Three Concept Message Solutions

AUTOMATIC MESSAGE GENERATOR---THREE PAIR MESSAGE SOLUTION
START CONCEPT 17
TARGET CONCEPT 19
LENGTH OF TARGET CONCEPT VECTOR 216.538

/CONCEPT	//RES. LNTH	//SCLR PROD	//////COR. COEF	//THETA	//RES:TG// RT AND LNTH	//TG TO RT ANG	PT DIST	//TG TO RES/
1- 2- 6	351.489	74968.737	.984	10.20	1.623	213.118	38.332	143.58
1- 3- 9	462.154	97826.349	.978	12.17	2.134	211.675	45.637	254.60
1- 3- 8	426.938	89698.381	.970	14.01	1.972	210.097	52.423	223.09
1- 6-10	328.650	68827.705	.967	14.73	1.518	209.425	55.044	131.32
1- 7- 9	433.153	92044.561	.981	11.03	2.000	212.499	41.630	224.55
1- 7-13	393.904	84675.720	.978	12.08	1.847	211.740	45.332	193.55
1- 7-15	370.821	79431.688	.989	8.42	1.712	214.205	31.702	159.79
1- 9-13	487.748	102309.667	.969	14.37	2.252	209.759	53.759	283.14
2- 3-10	496.237	104124.465	.969	14.30	2.292	209.828	53.488	291.36
2- 6- 7	337.231	72407.715	.992	7.45	1.557	214.712	28.063	125.69
2- 6-13	388.341	82672.822	.983	10.54	1.793	212.887	39.598	179.87
2- 8- 9	364.798	77466.311	.981	11.30	1.685	212.337	42.446	158.26
2- 9-13	472.681	101804.940	.995	5.60	2.133	215.505	21.134	258.04
3- 4-10	479.939	100996.009	.972	13.64	2.216	210.431	51.065	274.30
3- 5-10	455.750	96056.566	.973	13.26	2.105	210.766	49.665	249.97
3- 5-10	456.306	94056.823	.952	17.84	2.107	206.127	66.338	258.83
3- 9-12	532.406	113504.092	.985	10.09	2.459	213.191	37.927	321.46
3-10-14	488.842	100799.666	.952	17.78	2.258	206.201	66.106	290.27
3-10-16	472.120	98043.383	.959	16.46	2.180	207.666	61.348	271.48
4- 6-11	294.839	62187.004	.974	13.08	1.362	210.918	49.014	97.19
4- 6-13	384.216	79542.366	.956	17.05	1.774	207.025	63.478	188.22
4- 6-15	344.365	74298.334	.996	4.88	1.590	215.755	18.407	129.92
4- 9-13	461.166	98734.484	.989	8.61	2.130	214.097	32.422	249.19
5- 9-13	436.998	93797.041	.991	7.59	2.018	214.640	28.612	224.19
6- 8-15	283.494	61232.923	.997	4.06	1.309	215.994	15.344	69.22
6-10-12	308.386	65615.974	.983	10.70	1.424	212.772	40.209	103.72
6-10-14	332.812	69814.206	.969	14.36	1.537	209.770	53.714	134.26
6-12-16	286.310	60859.947	.982	10.99	1.322	212.567	41.283	84.51
6-13-16	358.441	76591.740	.987	9.32	1.655	213.680	35.066	148.95
6-14-16	300.463	65058.179	1.000	.61	1.388	216.526	2.303	83.97
6-15-16	338.747	71347.708	.970	14.11	1.569	210.302	52.800	140.08
7- 9-13	475.908	99808.596	.969	14.41	2.198	209.722	53.902	271.59
7- 9-15	444.627	94564.564	.982	10.83	2.053	212.683	40.678	235.48
7- 9-15	395.105	85518.752	1.000	1.67	1.825	216.446	6.328	178.77
7-11-13	363.153	75084.394	.955	17.29	1.677	206.757	64.347	169.12
7-11-15	331.400	69840.362	.973	13.28	1.530	210.744	49.759	130.51
7-13-14	386.691	80908.194	.966	14.93	1.786	209.227	55.793	186.03
7-13-15	414.277	87195.723	.972	13.59	1.913	210.477	50.875	210.05
8- 9-10	363.322	76135.256	.968	14.59	1.678	209.553	54.556	163.16
8-11-13	289.093	60944.872	.974	13.20	1.335	210.814	49.459	92.59
9-10-11	391.372	83184.523	.982	11.02	1.807	212.546	41.389	183.55
9-11-14	378.523	81134.780	.990	7.91	1.748	214.473	29.803	166.73
9-13-15	493.353	104829.670	.981	11.10	2.278	212.484	41.706	283.95

cumbersome to represent it. The reader, however, is by now familiar enough with the technique so that it is possible to understand the geometric solution with the aid of the numerical figures alone. What the message generator has done in this case is to perform the vector summation among the three vectors, by first taking two and then adding the resultant of the first two to the third vector.

Our three concept solution indicates that one may draw a message like: "Israel is a modern country, where all sports activities can be practiced by the tourist, and where interesting food is served at the end of an active day." A message like this can potentially change the attitude of the receiver audience towards accepting Israel as the place for vacationing. As we have seen above, Israel is associated with religion and other cult activities that do not necessarily appeal to the sector of the market from which we drew our sample. Consequently, by delivering messages that endorse concepts that appeal to our audience we can literally change the mental image that the receiving audience has of Israel.

CONCLUSION

The present paper has attempted to demonstrate the utility of metric multidimensional scaling and the automatic generation of messages for the tourism industry. We have used the case of Israel as a working example, and we have described step-by-step the extraction of maximally efficient messages in order to produce attitude change in a sector of the tourism market for Israel. The theory underlying the use of Galileo and the automatic generation of messages postulates that attitudes influence behaviors; and hence, if attitudes can be changed, concomitant changes in behavior will be realized.

In this study we have found that Israel and the concept of "my vacation" are quite far from each other. That is, in a multidimensional space representation a sample of professors and their spouses have indicated that Israel is not in their vacation plans. Furthermore, through these numerical representations we have found that our sample's idea of a vacation is most clearly related to good beaches, scenery, good climate, safety, and the possibility for them to speak in their own language. Israel, on the other hand, was found to be associated most closely with the idea of an interesting culture, historical and archeological sites, religious sites,

local ceremonies and festivals, deluxe accommodations, and interesting food.

We have concluded that the set of concepts that define Israel for our audience are not compatible with the attributes that define their idea of a vacation for themselves and that consequently, a new image of Israel needs to be created for the section of the market represented by our sample.

In order to create such a new image, we have relied on the automatic message generator option available in the program Galileo to produce one, two, and three concept message solutions. In the first case we found that by associating Israel with safety, we would achieve some movement of the concept "Israel" towards the target "my vacation." We found that if we want to use two concepts in the promotion of Israel, the best ones would be "scenery" and "sports activities." Finally, we found that when three concepts are utilized in advertising Israel for tourism purposes, our best route is to endorse the ideas of "sports activities," "modern," and "interesting food."

The different message solutions for one, two, and three concepts do not necessarily include the same concepts since the geometrical solution is different in each case. In other words, if we were to pull the concept Israel towards "my vacation," we could do it by taking different concepts as a base according to each solution.

The resources available in terms of media mix and frequency of repetition of messages would be a criterion for selecting one, two, or three concept solutions. A better criterion however should be to endorse those concepts that can realistically fulfill the expectations of our audience or market. We should not promise something we cannot provide. So, those aspects that can in fact be made available to tourists should be the ones to endorse. We should not, however, overload our audience with complex messages, and that is why we decided to stop the extraction of message solutions at the number of three concepts.

The reader should be cautioned that we have not used a representative sample of the market of professionals, neither of professors and spouses. We have, however, illustrated the use of an innovative set of methodological tools.

One more limitation of this study is that we have not attempted to tap the importance of different media in reaching our audience with the messages we proposed. In fact, a study like ours should

include an analysis of different media to determine the sources of information that our sector of the market utilizes for deciding about vacations. Those media most often attended to for vacation information could have been recommended as the best for achieving our promotional goals towards Israel.

Anyone who attempts to utilize the techniques demonstrated here should be warned that one data collection effort is not enough, and that the repeated evaluation of our message strategies cannot be substituted. Concepts do move in the space of the collectivity that composes our marketing samples, and their relative position should be constantly monitored. This is not to say that the measurement technique suggested here is unreliable. On the contrary, because it is reliable we assume that changes in its configuration are meaningful.

One last word should be said to the creative talent that has traditionally produced advertising copy: "Don't worry, your genius will never be replaced by a computer; you will always have the last say of what goes in the media, but now you have a great aid to facilitate your work in achieving the results you want."

REFERENCES

BARNETT, G.A., SEROTA, D.B., & TAYLOR, J.A. Campaign communication and attitude change: A multidimensional analysis. *Human Communication Research*, Spring 1976, 2(3).

DANES, J., & WOELFEL, J. *An alternative to the traditional scaling paradigm in Mass Communication*. Unpublished manuscript, Department of Communication, Michigan State University, 1975.

DAVIS, H.F., & SNIDER, A.D. *Introduction to vector analysis*. Boston: Allyn and Bacon, 1975.

EINSTEIN, A. *Relativity: The special and general theory*. New York: Crown, 1961.

TAYLOR, J., FARACE, R.V., & MONGE, P.R. *Communication and the development of change among educational practitioners*. Unpublished manuscript, Michigan State University and California State University, 1976.

TORGERSON, S. *Theory and methods of scaling*. New York: Wiley, 1958.

WOELFEL, J. *Procedures for the precise measurement of cultural processes*. Unpublished manuscript, Michigan State University, 1973.

WOELFEL, J. *Foundations of cognitive theory*. Unpublished manuscript, Department of Communication, Michigan State University, 1976.

WOELFEL, J., SEROTA, K., HOLMES, R., MARLIER, J., DANES, J., FINK, E., GILLHAM, J., SALTIEL, J., & BARNETT, G. *Program Galileo, version 3.9–A program of metric multidimensional scaling*. Michigan State University, 1976.

ABSTRACT TRANSLATIONS

L'ECHELONNAGE METRIQUE MULTIDIMENSIONNEL ET LA GENERATION AUTOMATIQUE DE MESSAGES APPLIQUES A L' INDUSTRIE TOURISTIQUE LE CAS D' ISRAEL

Cet article explique l' emploi de l' analyse par échelonnage métrique multidimensionnel pour déterminer quels messages pourraient être utilisés pour développer le tourisme dans une région donnée. Nous prenons ici le cas d' Israel en exemple pour démontrer ces techniques. Nous avons interviewé trente professeurs et leurs épouses pour obtenir des estimations proportionnelles des différences entre 16 concepts associés aux concepts centraux "Israel" et "mes vacances". Nous avons analysé les résultats selon le programme métrique GALILEO (marque déposée) et obtenu unprofil de ces concepts dans un espace multidimensionnel, ce profil étant à l' échelle proportionnelle. De plus, a l'aide de l' algorithme "Générateur Automatique de Messages" (M.D.), nous avons formulé des messages pour rapprocher le concept "mes vacances" du concept "Israel". Techniques et résultats sont présentés de manière à être applicables par les personnes chargées de la génération des messages dans l' industrie touristique. Cet article démontre que l' emploi de ces techniques pourrait faciliter l' evaluation et le changement de l' état d' esprit des individua en ce qui concerne leurs préférences de vacances.

ESCALAMIENTO METRICO MULTIDIMENSIONAL Y GENERACION AUTOMATICA DE MENSAJES APLICADOS A LA INDUSTRIA DEL TURISMO: EL CASO DE ISRAEL

Este trabajo muestra como utilizar el escalamiento métrico multidimensional para establecer mensajes que pudieran mejorar el turismo en alguna región determinada. Con el objecto de ilustrar estas técnicas, se analizó como ejemplo el caso de Israel. Treinta profesores con sus respectivas esposas fueron entrevistados para poder obtener diferencias de estimaciones de razón constante entre 16 conceptos asociados con los conceptos centrales de "Israel" y "mi vacación". Se analizaron datos usando el programa métrico GALILEO (T.M.), el cual suministró una configuración de escala de razón constante, en un espacio multidimensional. Mas aún, mediante el uso de un algoritom llamado Generador Automatico de Mensajes (T.M.), se formularon mensajes que pudieran acercar "mi vación" hacia "Israel". Las técnicas y los resultados se presentan de tal manera que resulten relevantes para aquéllas personas encargadas de generar mensajes dentro de la industria del turismo. En este trabajo se argumenta que el uso de estas técnicas, puede facilitar la tarea de valuar y cambiar las actitudes de los individuos con respecto a sus preferencias vacacionales.