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CONSUMER EVALUATION OF MARKETING IN JAPAN

by

Takeshi Shimizu

Research Task and Hypothesis

The purpose of this paper is to investigate how consumers of Japan evaluate marketing practices and institutions. Consumers exhibit both affirmative or negative, supporting or critical, attitudes to distribution, advertising, selling and other marketing practices as well as institutions of marketing. Individual consumers are much divergent in evaluation. By what factors can the diversity of evaluation be explained? This is our research task in this paper. The basic approach is first to gather consumers of relatively homogeneous attitudes respectively into several groups, and then explain their attitudes by the result of discrimination of such groups.[1)]

The research hypotheses of this study are as follows.

Basic Hypothesis—Attitudes of consumers to marketing are functions of their personal attributes.

Corollary I—According to the basic attitudes to marketing several consumer groups with significant differences are formed.

Corollary II—The basic attitudes of consumer groups each are explained by the personal attributes of the members of respective groups.

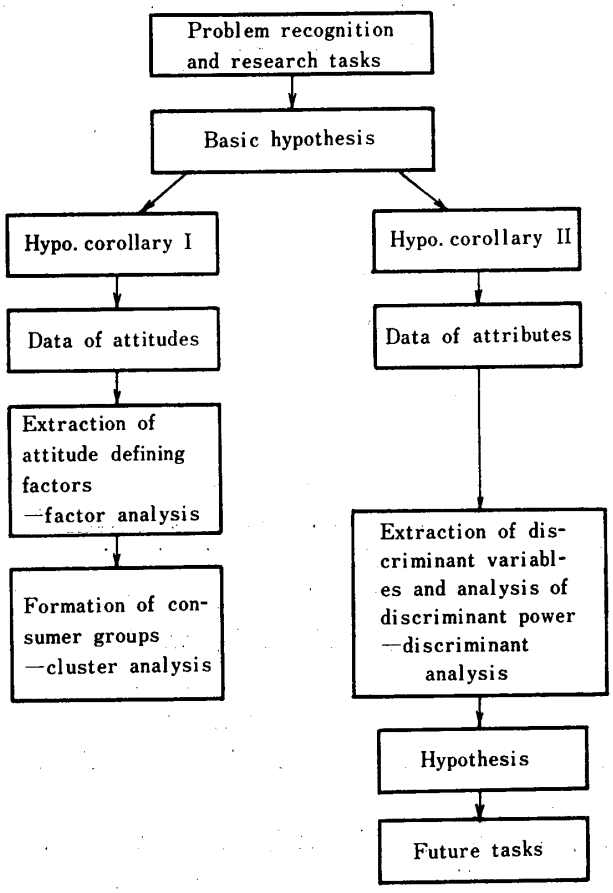
The flow of analysis of these hypotheses is shown in Chart 1.

Formation of Consumer Groups

In this section it is intended, as a preparatory step to further analysis, to collect homogeneous consumers into a group, and thus to form some groups on the ground of their attitudes to marketing—basic attitude groups—and then

1) As researches of this kind we have Thomas R. Hustad & Edgar A. Pessemier, "Will the Real Consumer-Activist Stand up," *JMR*, August 1973, Kenneth J. Roering, "An Evaluation of Marketing Practices," *Journal of Business Research*, May 1976, Gary M. Griksheut & Kent L. Granzen, "Who are the Consumerist?" *Journal of Business Research*, Jan. 1978.

Chart 1 Flow of Analysis



confirm existence of significant differences among these groups. For this purpose we prepared 34 question items of evaluation corresponding to the areas of marketing for finding out consumers' basic attitudes, and on these items collected data comprising 533 samples.[2] The items (see Chart 2) were extracted from the following 5 broad areas: evaluation of makers' marketing practices (item Nos. 1, 2, 3, 4, 8, 13, 14, 16, 18, 20, 21, 24, 28, 31, 32 and 34), evaluation of distributors' practices (Nos. 6, 7, 11, 12, 19, 22, 26, 27 and 30), social responsibility of firms (Nos. 5, 10, 23 and 29), that of consumers (Nos. 9, 15 and 17) and that of government (No. 33).

However, there was intense mutual resemblance among the evaluation items themselves, and hence possibility that many items with high correlation were

2) Collection of data were worked on the residents of Megro-ku, Tokyo, in October 1978—18 to 65 years old and both sexes—by the member students of Takeshi Shimizu Seminar of Keio University. The question took the form of semantic differential method and quantification was made by a 5-point method.

involved. In addition it was very difficult to judge comprehensive evaluation of individual consumers regarding as many as 34 item. So, in order to summarize 34 items into a small number of mutually independent basic factors we used a factor analysis. The result is shown in Chart 2.

On the base of the values and signs of loadings, we will try interpretation of 8 factors. Firstly Factor I has the largest proportion of total variance and its loadings are minus and high values all with respect No. 1 amusement in TV commercials, No. 6 morality of Vending machines, No. 8 effect on children of TV advertisement, and No. 16 need of advertising. Hence this may be said a factor of immorality of marketing.

As to Factor II, its loadings are plus and high for variables No. 3 performance of new products, No. 5 firms' consideration on public nuisances, No. 14 after-service, No. 20 development of proper goods, No. 21 quality of famous makers' goods, No. 23 favor to overseas advance and No. 33 government's consumer protection. In view of these contents this is regarded as a factor showing high appreciation of firms' efforts.

Chart 2. Factor Loading

Items No.	Evaluation Items	I	II	III	IV	V	VI	VII	VIII	Communality
1	Amusement in TV commercials	-.52	.13	-.01	.22	.15	-.28	-.05	-.07	.46
2	Favor to direct mail selling	.14	.07	.10	.06	-.01	-.06	-.19	-.56	.40
3	Performance of new products	-.04	.49	-.10	.36	.11	.14	.01	.05	.43
4	Favor to salesmen	-.00	.14	.01	-.11	-.60	.23	-.21	-.13	.51
5	Firm's consideration on public nuisances	.02	.65	-.15	-.05	-.03	.06	.03	-.05	.46
6	Morality of vending machines	-.70	.01	-.08	-.19	.06	.00	-.08	.03	.56
7	Improvement of shopmen's quality	-.02	.36	-.03	.32	-.38	-.20	-.14	.02	.45
8	Favorable effect on children of TV advertisement	-.59	.02	.09	.02	-.06	.08	-.12	-.22	.44
9	Need of presenting consumers' complaints	.01	.04	.64	.15	-.06	.13	.03	.19	.49
10	Non-relation between inflation and firm's activities	-.12	.12	-.18	-.61	.01	-.03	-.08	-.15	.46
11	Consumers' benefits by development of supermarkets	.14	.15	.20	.11	.12	.70	-.06	-.07	.62
12	Fairness of profits of trading companies	-.12	.27	-.35	-.36	-.19	.00	-.24	-.08	.45
13	Trustfulness of advertised goods	-.08	.41	-.07	.46	.22	-.09	-.15	-.04	.48
14	Degree of after-service	-.04	.64	.00	-.02	-.02	-.06	.14	-.07	.45
15	Need of consumer movements	-.05	-.04	.69	.13	.04	.12	.06	.11	.53
16	Need of advertising	-.48	.08	.09	-.35	.32	.05	-.05	-.31	.58
17	Need of consumers' self-awakening	.07	.05	.59	-.22	.10	-.13	.05	.07	.45
18	Information-supply function of advertising	-.25	.28	.23	-.02	.53	.05	-.08	-.22	.55

Items No.	Evaluation Items	I	II	III	IV	V	VII	VI	VIII	Communality
19	Trust on bargain sale	-.23	-.02	-.19	.14	.06	.05	-.35	-.21	.29
20	Effort of developing proper goods	-.15	.60	-.05	-.00	.06	.04	-.04	.03	.40
21	Quality of goods of famous makers	.14	.56	.13	.05	.17	.03	-.14	-.10	.42
22	Assortment of goods of specialty stores	-.04	.15	.35	.05	.03	-.07	-.11	-.05	.18
23	Favor to overseas advance	.02	.58	.21	-.06	-.09	-.01	.13	.02	.41
24	Reliability of mail order selling	-.08	-.03	.02	-.07	-.05	.00	-.77	-.02	.61
25	Fairness of distribution margins	-.10	.11	-.46	-.03	-.07	-.10	-.38	-.18	.43
26	Humanly contact with near-by shops	-.26	-.22	-.25	-.13	-.12	.58	.09	.08	.57
27	Information-supply function of newspaper folders	-.05	.24	.16	.04	.51	.32	-.14	-.10	.48
28	Favor to planned obsolescence	-.32	.16	-.28	.28	-.11	.10	.04	-.37	.46
29	Favor to public-nuisance makers	-.17	.07	-.21	-.21	-.10	.02	.11	-.54	.44
30	Favor to by-riding profiting of merchants	-.32	.00	-.12	-.17	.00	.10	.06	-.55	.47
31	Trustfulness of advertisement	-.08	.02	-.22	-.03	.17	.00	-.30	-.57	.51
32	Non-relation between advertising costs and prices	-.04	.09	-.12	-.04	.30	.05	-.19	-.58	.50
33	Government's effort of consumer protection	-.08	.58	-.12	-.03	.00	-.08	-.19	-.12	.43
34	Adequacy of package	-.24	.04	-.03	.18	-.09	-.06	.09	-.59	.47
	Eigenvalue	4.55	3.25	2.09	1.40	1.26	1.22	1.13	1.10	
	Proportion of total variance %	13	9	6	4	3	3	3	3	
	Cummulative %	13	22	28	32	35	38	41	44	

As to Factor III loadings are plus and high for all No. 9 need of complaint presentation, No. 15 need of consumer movements and No. 17 need of consumers' self-awakening, and so this is a factor affirming the need of consumer movements. Next Factor IV has the largest minus loading for No. 10 non-relation between inflation and business practices, and so is conceived to be a factor concerning firms' responsibility.

Factor V shows correlation with No. 4 favor to salesmen, No. 27 information-supply function of advertising and No. 27 that of folders. So this is interpreted to be a factor of usefulness for shopping of communication activities of sellers' side. This factor works favorably on advertising practices but unfavorably on salesmen. Factor VI may be named utility of retailing in view of No. 11 benefits of supermarkets and No. 26 humanly contact with near-by shops.

Factor VII has the largest plus correlation with No. 24 reliability of mail order selling, and furthermore in view of No. 19 trust on bargain sale and No. 25 fairness of distribution margins, this factor represents distrust on distribution.

Lastly as to Factor VIII loadings are all minus and high for No. 2 favor to direct mail sale, No. 29 favor to public-nuisance firms, No. 30 by-riding profiting,

No. 31 trustfulness of advertising, No. 32 non-relation between advertising costs and prices and No. 34 adequacy of package, and so this may be interpreted as a factor critical to sale-promotion practices.

By the result of this factor analysis it became possible to summarize about 44% of individual attitudes to the prepared 34 evaluation items by only 8 factors. This means that 34 items of individual attitudes were integrated and composed into 8 basic-attitude factors. Thus the next step necessary was to judge the basic attitudes of individual consumers using the attitude-defining factors thus obtained to form a small number of groups, each group having homogeneous basic attitudes. This is nothing but to classify individual consumers according to factor score.

For this classification we employed the technique of cluster analysis. For the input data of this analysis we used the factor score by samples of Factors I, II, III, V and VI in descending order of contribution from among the 8 factors, excluding Factor IV whose interpretation is a little difficult. Therefore the task of analysis was to classify 533 consumer samples plotled in five-dimensional space into several groups composed of relatively homogeneous samples.

As the result of this cluster analysis the following 4 clusters were built. The number of samples and the proportion in composition of each cluster are shown in Chart 3 and the average factor score in Chart 4. On judging the character of clusters by respective factor score the following names may be given. For Cluster I marketing practices are never immoral; it highly appreciates firms' effort; it gives affirmative evaluation to all the marketing-relevant areas including the usefulness of communication activities and the utility of retailing; nevertheless it takes that the need of consumer movements should be fully recognized. By these features this cluster is named the marketing-affirmative group in the below.

Chart 3. Number of Samples and Proportion of Composition

Cluster	Number	Proportion
I	134	25.1(%)
II	153	28.7
III	123	23.1
IV	123	23.1
	533	100.0

Cluster II, alike with Cluster I, is favorable to the morality of marketing. But evaluation of the firm effort is lowest, and again low are that of the usefulness of communication activities and of the utility of retailing. The need of consumer movements is affirmed. So this is called the firms' effort-critical group.

Cluster III gives some degree of appreciation to the factors of morality of marketing, firms' effort, usefulness of communication activities and utility of

Chart 4. Average Factor Score

Cluster \ Factor	I. Immorality of marketing	II. Appreciation, of Firms effort	III. Need of consumer movements	V. Usefulness of communication activities	VI. Utility of retailing
I	−0.61	0.55	0.47	0.09	0.14
II	−0.32	−0.37	0.33	−0.17	−0.21
III	−0.18	0.13	−1.13	0.09	0.15
IV	0.88	0.27	0.21	−0.11	−0.05

retailing, and strongly denies the need of consumer movements. So this is the consumer movement-indifferent group.

Cluster IV strongly approves the immorality of marketing and is very critical to the aspect of morality. Again it is somewhat critical to the usefulness of communication activities and the utility of retailing. It appreciates firms' effort and does not show high concern to consumer movements. So this is named the morality-critical group.

By the above analysis 533 consumer samples were apportioned to some one of 4 clusters, and thus a basic axis of further analysis was founded. It was necessary, however, to confirm whether these 4 homogeneous-consumer groups, classified by factor score are really different in the evaluation of marketing. It means also confirmation of the effectiveness of grouping by means of cluster analysis. Chart 5 exhibits the average rating score of 34 evaluation items separated into 4 groups.

Chart 5. Average Rating Score of Evaluation Items by Groups

Items No.	Evaluation Items	Total	Marketing-affirmative group	Firm effort-critical group	Consumer movement-indifferent group	Morality-critical group	*F* ratio
1	Amusement in TV commercial	3.06	3.38	3.10	3.10	2.61	21.7*
2	Favor to direct mail selling	2.45	2.51	2.46	2.33	2.51	0.1
3	Performance of new products	3.25	3.55	3.09	3.23	3.13	12.0*
4	Favor to salesmen	1.75	1.90	1.60	1.83	1.68	3.9*
5	Firm's consideration on public nuisances	2.61	2.89	2.33	2.80	2.48	10.4*
6	Morality of vending machines	2.55	3.00	2.56	2.77	1.83	32.6*
7	Improvement of shopmen's quality	2.58	2.69	2.59	2.61	2.41	2.1
8	Favorable effect on children of TV advertisement	2.78	3.07	2.83	2.86	2.34	19.5*
9	Need of presenting consumers' complaints	4.57	4.84	4.71	4.04	4.65	39.6*
10	Non-relation between inflation and firm's activities	2.88	2.87	2.80	3.09	2.79	2.4
11	Consumers' benefits by development of supermarkets	3.51	3.66	3.45	3.33	3.58	2.7*

Items No.	Evaluation Items	Total	Marketing-affirmative group	Firm effort-critical group	Consumer movement-indifferent group	Morality-critical group	*F* ratio
12	Fairness of profits of trading companies	1.97	2.08	1.70	2.45	1.72	18.8*
13	Trustfulness of advertised goods	2.84	2.97	2.81	2.89	2.66	3.6*
14	Degree of after-service	2.79	3.21	2.61	2.84	2.53	13.1*
15	Need of consumer movements	4.25	4.54	4.41	2.61	4.38	37.7*
16	Need of advertising	3.58	3.94	3.54	3.54	3.28	11.9*
17	Need of consumers' self-awakening	4.35	4.55	4.53	3.78	4.49	33.9*
18	Information-supply function of advertising	3.84	4.10	3.84	3.66	3.73	6.9*
19	Trust on bargain sale	1.81	1.73	1.83	2.11	1.54	11.9*
20	Effort of developing proper goods	3.44	3.81	3.24	3.49	3.24	14.4*
21	Quality of goods of famous makers	3.37	3.54	3.25	3.37	3.35	3.6*
22	Assortment of goods of specialty stores	3.36	3.52	3.48	3.04	3.37	9.6*
23	Favor to overseas advance	3.19	3.58	3.03	3.09	3.07	12.5*
24	Reliability of mail order selling	2.46	2.45	2.48	2.59	2.33	1.7
25	Fairness of distribution margins	1.45	1.37	1.30	1.89	1.27	26.4*
26	Humanly contact with near-by shops	3.92	3.86	4.04	3.57	4.17	11.9*
27	Information-supply function of newspaper folders	3.77	3.96	3.73	3.72	3.65	2.9*
28	Favor to planned obsolescence	1.85	1.91	1.76	2.24	1.49	15.0*
29	Favor to public-nuisance makers	1.96	1.90	1.94	2.23	1.78	4.9*
30	Favor to by-riding profiting of merchants	2.36	2.52	2.23	2.59	2.10	5.9*
31	Trustfulness of advertisement	2.08	1.90	2.06	2.35	2.03	5.8*
32	Non-relation between advertising costs and prices	2.43	2.35	2.41	2.56	2.42	1.1
33	Government's effort of consumer protection	2.59	2.84	2.31	2.91	2.37	13.8*
34	Adequacy of package	2.11	2.19	2.09	2.26	1.90	3.0*

* Significant at least at 5% level.

First, to look whether there exist significant differences of average rating score among the 4 groups, the result of the *F* test shows that 28 ones of 34 items have significant differences at least at 5% level.

Next, to observe *F* ratio value in order to pick out those items making relatively great contribution to the differences among the 4 clusters, these are No. 9, Nos. 15, 17, 6, 25, 1, 8, 12, 28, 20, 33, 14, 23 and 3. It draws our attention that these correspond with items with high correlation with Factors I, II and III. That is to say, Nos. 9, 15, 17, 25 and 12 are items with high correlation with

Factor III, Nos. 6, 1, 8 and 28 with Factor I, and remaining items of Nos. 20, 14, 33, 23 and 3 all with Factor II. This tells that such items groups as have relatively great importance in the formation of mutually heterogeneous groups conform with the item groups of the principal factors used in group formation.

Further, to look whether there exist significant differences of factor score, the result of F test shows all factors except Factor V are significantly different at 5% level.

Thus consumer classification by cluster analysis produced consumer groups with differences of basic attitudes to marketing, and so it may be said that presence of significant differences among consumer groups, namely Corollary I, was confirmed.

Extraction of Discriminating Variables

In this section we enter examination of Hypothesis Corollary II. Here is studied by what personal attributes of consumers their basic attitudes to marketing can be discriminated.

In this study personal attributes are assumed to consist of three dimensions and 27 attribute items as below.

Life style dimension (18 items including values, habits of living, contact with mass communication media, etc.).

Demographic dimension (4 items of school career, years in marriage, ages and family members).

Dimension of social institution evaluation (5 items of education, nature protection administration, social welfare, medical care and political).

In examining Corollary II, as the first step, 533 samples were divided at random into 433 and 100 ones. This division was, as will be explained later, for the aim of testing reliability of discriminant analysis. We name the former (433) the *analysis samples* and the latter (100) the *validation samples*. In this Section the 433 analysis samples alone are used.

The first step for the purpose of extracting those variables (items) that express differences of personal attributes among consumer groups was to calculate averages for 37 attribute items each with respect to 4 consumer groups each borne by the cluster analysis, and find out variables with significant differences among groups by means of the F test.

By this test, as the beginning F values in Chart 6 show, as regards 16 variables of 27, significant differences at 5% level were recognized. However, these 27 attribute items are not statistically independent but have appreciable correlation. Therefore it is necessary to extract such variables that render the best discrimination among groups by analizing simultaneously over all variables taking correlation among variables into account.

For this analysis we conducted a step-wise discriminant analysis by BMD 07M Program.

Chart 6. Classification Functions by Groups (27 variables)

Items No.	Evaluation Items	Marketing-affirmative group	Firm effort-critical group	Consumer movement-indifferent group	Morality-critical group	Beginning *F*-ratio	Order of introduction	Final *F*-ratio
1	Preference to holiday out-going	−.036	.175	−.093	−.088	3.1*	8	1.3
2	Degree of economy	.034	.126	−.245	.053	4.5*	11	1.6
3	Degree of following tradition	−.319	.119	.142	.029	1.6	13	2.8*
4	Parent-child linkage	.224	−.138	−.039	−.012	3.2*	14	1.4
5	Degree of interest in consumer movements	.010	.114	−.104	−.048	2.2	22	0.6
6	Japanese-fashion	.038	−.072	−.030	.081	1.5	26	0.3
7	Favor to music	−.075	.095	−.183	.140	1.6	16	1.4
8	Television (week-day)	.110	−.038	−.023	−.038	0.8	27	0.1
9	Television (holiday)	−.022	.143	−.190	.008	1.4	15	0.8
10	Radio	.203	−.090	−.029	−.061	1.7	17	1.3
11	Intercourse with friends	−.070	.056	−.107	.108	0.9	21	0.6
12	Sensitivity to new fashion	.026	.068	−.000	−.111	2.1	25	0.3
13	Interest in shopping information	.077	−.075	.112	−.095	1.2	18	0.7
14	Preference best-class goods	.136	.058	−.315	.106	3.0*	9	2.8*
15	Weight on performance of goods	.054	−.067	−.158	.188	7.3*	1	1.3
16	Respecting public morals	−.052	.150	−.315	.181	5.4*	5	3.1*
17	Social intercourse	.082	.003	.130	−.217	2.2	19	1.3
18	Variety of taste	.258	−.176	.058	−.098	2.8*	6	2.2
19	Education	−.049	−.043	.278	−.173	5.6*	7	2.1
20	Nature protection administration	−.124	−.074	.183	.034	3.8*	20	0.7
21	Social welfare	−.103	−.184	.269	.064	5.4*	2	1.4
22	Medical care	−.011	−.106	.163	−.019	4.0*	23	0.6
23	Political system	.170	.097	−.028	−.263	3.1*	10	2.0
24	Number of family members	−.312	.090	−.083	.284	5.3*	4	4.3*
25	School career (years)	−.289	−.080	.369	.020	5.7*	3	4.1*
26	Years in marriage	.355	−.233	.004	−.069	4.1*	12	1.2
27	Age	−.176	.032	−.015	.152	3.8*	24	0.3

* Significant at least at 5% level.

Chart 6 shows the coefficients of classification functions regarding each one of consumer groups and relevant data. Since all coefficients are standardized and correlation is taken into account, coefficients show the relative influence of each variable on the probability that each sample is classified to each group. By the *F* test these discriminant functions are significant at 5% level. This tells that these functions can significantly discriminate 4 groups, and hence there are significant differences among groups.

In the below we extract variables that discriminate groups on the ground of the discriminant functions. First we will clarify such variables as contribute to discrimination for all 4 groups considering, not each individual variable, but simultaneously all variables and eliminating correlation. This is indicated by the partial F values at the final step of the step-wise discriminant analysis. To look the final F values on Chart 6, Nos. 24 family members, 25 school career, 16 respect of public morals, 14 preference to best-class goods, 3 following tradition, 18 variety of taste, 19 education systems and 23 political systems all have a high F value. Among these variables Nos. 24 and 25 are significant at 1% level, Nos. 3, 14 and 16 at 5% level, and Nos. 3, 18 and 19 at 10%. Looking at 5% level at least 5 variables are making more important contribution to this discrimination compared with other variables.

On another hand the above-mentioned variables having discriminating power over all the 4 groups each do not always power to discriminate some pair of groups. And possibly variables with discriminating power may change according to the pairs each. Such pairs number 6 cases for 4 groups. To pick up, for example, variables that discriminate between the marketing-affirmative group and any other group, these are shown by the differences of discriminant coefficients between the two groups concerned. First to look the pair of the marketing-affirmative group and the firm-effort-critical group, in the former group following tradition is lower, the variety of taste is wider and the marriage years are longer than in the latter. Next to compare the marketing-affirmative group with the consumer movement-indifferent group, the tradition-following is lower, the favor to best-class goods is higher and the school career is longer in the former. Lastly the marketing-affirmative group is smaller in the family members, longer in the marriage years and af more affirmative to the political systems compared with the morality-critical group.

Next, the profils of consumer groups each are presented by the magnitude of respective discriminant coefficients.[3] This means that there is high probability that consumers having the following profils are classified to corresponding groups.

Marketing-affirmative group—years in marriage are long, school career is low and family members are small; indifferent to customary affairs but respectful of parent-child linkage; hours of radio-hearing are long and taste extends widely.

Firm effort-critical group—years in marriage are short, discontent with social welfare systems; inclination for holiday out-going; but taste is limited.

Consumer movement-indifferent group—school career is long; indifferent to public morals, economical use of things, and purchasing best-class; not fond of music; not discontent with education systems, social welfare,

3) W. Massy, "Discriminant Analysis of Audience Character," *JAR*, March 1965, pp. 42–44.

medical care systems and nature protection administration,

Morality-critical group—age is high, low in social intercourse nature. and discontent with education and political systems; esteem of performance of goods rather than design, and respect of public morals.

It must be noted, however, that in the foregoing analysis all 27 variables were introduced without applying a rule of stopping in order to know the entire structure, and as the result the obtained discriminant coefficients are affected by 27 variables although the entire structure was obtained.

That is to say, on one hand there are those variables for which notwithstanding a high beginning F value and introduction into the step-wise discriminant analysis in relatively early order, the final F value after ending 27 steps remarkably declines almost losing discriminating power, on another hand there are those variables which, contrastively notwithstanging a low beginning F value and relatively later introduction, show a relatively high F value at the final step and so can be regarded as important discriminating variables. An example of the former is No. 15 (performance of goods), which has a beginning F value of 7.3 (the highest) and is significant at 5% level. For this reason it entered at the first step. Nevertheless at step 5 by the introduction of No. 16 (respecting public morals) its interim F value decreased to 4.5 due to correlation, and by introduction of No. 14 (preference to best-class goods) to 3.0, by introduction of No. 2 (degree of economy) to 2.0, and lastly to 1.3, explanatory power being lost. On another hand for an example of the latter No. 3 (tradition following) had a beginning F value of 1.6, insignificant, and so its introduction was at order 13, rather late. However, by the introduction of No. 4 (parent-child linkage) its interim value rose to 2.45 and finally to 2.80, making a variable significant at 5% level. This tells that in extracting a few significant discriminating variables the stopping rule must be adequately settled beforehand.

Thus, after above observation, we conducted a step-wise discriminant analysis setting the rule of inclusion and exclusion of variables at a significance level of 1%, which stopped at step 6. The variables introduced were, as shown in Chart 7, No. 15 weight on performance, No. 16 public morals, No. 18 variety of taste,

Chart 7. Classification Functions (6 variables)

Items No.	Evaluation Items	Marketing-affirmative group	Firms effort-critical group	Consumer movement-indifferent group	Morality-critical group
15	Performance of goods	.061	−.029	−.289	.325
16	Public morals	−.007	.098	−.331	.233
18	Variety of taste	.379	−.337	.140	−.143
21	Social welfare	−.364	−.519	.981	.126
24	Number of family members	−.329	.097	−.015	.358
25	School Career	−.441	−.039	.549	.128

No. 21 social welfare No. 24 number of family members and No. 25 school career, and the discriminant functions composed of these 6 variables were significant at 1% level. In the below examination is continued about these functions.

Testing the Discriminant Function

In the preceding Section 6 variables that significantly discriminate among groups were extracted. And highly significant was the result of the F test to examine the fitness of the discriminant function composed of these variables. However, it must be remembered that even though in case the number of samples is large the significance level may be high, sometimes actual discriminating power is not so high.[4] So a next problem is to test to what extent the discriminant function composed of 6 attribute variables can actually explain basic attitudes of consumers.

The test of the discriminant functions has a following meaning speaking in connection with marketing theory building.

First, the discriminant functions composed of 6 variables obtained through the foregoing process are a hypothesis inductively and statistically extracted from 400 individual cases, and are a kind of general hypothesis. That is to say, the inductive and statistic hypothesis is transformed to a general proposition that discriminant functions composed of 6 variables define the groups of consumers' attitudes to marketing. Next, when the values of 6 variables of each sample are given, as an intial condition, the group to which a sample is classified is deductively derived, as a specific proposition, from the discriminant functions. It is a specific hypothesis deducted from a general hypothesis.

If this general hypothesis is to be confirmed, testing of the validity of this specific hypothesis must be conducted. In the case of this study, the group to

Chart 8. Classification Matrix (433 samples, 6 variable)

Actual \ Predicted	Mark. eff. (%)	Firms' eff. crit. (%)	Cons. move. ind. (%)	Moral. crit. (%)	Hit rate by groups (%)	Hit rate by chance (%)
Marketing affirmative group	41.0	14.1	22.3	22.3	41.0	25.1
Firms' effort-critical group	24.1	29.4	22.8	23.5	29.4	28.7
Consumer movement-critical group	18.6	13.0	57.7	10.5	57.7	23.1
Morality-critical group	22.7	16.2	19.5	41.4	41.4	23.1

(Total hit rate 41.5%)

4) D. Morrison, "On the Interpretation of Discriminant Analysis," *JMR*, May 1969, p. 158.

which each sample is attached is already settled at the stage of the cluster analysis, needless of an empirical research of the specific hypothesis. Therefore, testing is conducted about the conformity between the already established result and the deductively derived result, and accordingly the validity of the general hypothesis, i.e. the discriminant functions, is judged.

However, here even if there is unconformity between the empirical result and the deductively-derived specific hypothesis with respect to some individual samples, the general hypothesis cannot be immediately rejected. Judgement of rejection or confirmation is based on statistical judgement.

In a discriminant analysis this validity can be known by the percentage correctly classified by discriminant functions obtained. Chart 8 shows the result of classification of 433 samples by means of the discriminant functions composed of 6 variables. The percent correctly classified of 433 samples by 6 variables is 41.5%. The result of the F test of the discriminant functions is significant at 1% level as mentioned already. The problem is how these "hit rate" should be judged.

Usually appreciation of the hit rate is made on maximum chance criterion, i.e. the comparison with the largest one among "hit rates by chance." For example, the samples actually belonging to the marketing-affirmative group count 102, that is, 25.1% of total 433. This means that, even if the discriminant functions of 6 variables have no discriminatory power, by apportioning all 433 samples to the firm effort-critical group at least a hit rate of 28.7% is secured by chance. Therefore if the discriminant functions are to be effective, the hit rate must be larger than any hit rate by chance. To look this criterion, the hit rate of six variables, 41.5%, may be said to have discriminatory power satisfactorily.

Next to observe the hit rates by groups, the consumer movement-indifferent group is highest at 57.7% and the firm effort-critical group is lowest at 29.4%. Yet the rates of all groups are nearly equal to or, satisfactorily higher than respective chance rates, telling presence of discriminating power for each group as well as all 433 samples. Thus the discriminant functions of 6 variables seem to be successful in discriminating groups.

However, it has been pointed out that if hit rate is sought by applying discriminant functions on the same samples as those used in computing the discriminant function itself, hit rates are biased upward showing results above the actual explaining power.[5] So for examining actual explanatory power such upward bias of hit rates must be eliminated. And as a method for this purpose cross-validation method is advocated.[6] By this method, in order to test what degree of explanatory power a model has, discrimination is exercised on fresh samples (validation samples) different from those used in computing discriminant

5) R. Frank, W. Massy & D. Morrison, "Bias in Multiple Discriminant Analysis," *JMR*, August 1965, p. 253.

6) *Ibid.*, p. 254.

function, because discriminant functions obtained through discriminant analysis are those calculated so as to have maximum fitness to the data used.

So we made discrimination on new 100 validation samples using the discriminant coefficients estimated on the 433 analysis samples. By the result total hit rate by 6 variables decreased from 41.5% to 37.0%. Yet this rate is still satisfactorily higher than the largest chance hit rate. As to the hit rates by groups, they all declined: the marketing-affirmative group 40.0%, firm effort-critical group 43.5%, consumer movement-indifferent group 43.5% and morality-critical group 39.1%. Excepting the firm effort-critical group, for the other three groups the rates are satisfactorily higher than respective chance rates. This tells that again by the validation test by new samples our hypothesis extracted inductively and statistically from data, namely the discriminant functions composed of 6 variables, are not rejected.

To conclude the results of foregoing analysis as new hypotheses, for further refinement and validation, these are as follows:

Hypothesis 1 — Consumers' attitudes to marketing is condensed into 8 factors, namely morality of marketing, appreciation of firms' effort, need of consumer movements, firms' responsibility, usefulness of communication activities, utility of retailing, distrust on distribution and criticisms to sales-promotion activities.

Hypothesis 2 — According to their attitudes to marketing consumers are classified into 4 groups of marketing-affirmative, firm effort-critical, consumer movement-critical and morality-critical, respectively having particular profils.

Hypothesis 3 — Evaluation of marketing by the consumer groups are defined by 6 variables of consumers' attributes, that is, performance of goods, public morals, variety of taste, social welfare systems number of family members and school career. By testing the validity of the discriminant functions composed of these 6 variables using validation samples, it has been confirmed that the 6 variables significantly discriminate the 4 groups.

Summary and Remaining Tasks

This study was intended to explore by what factors consumer attitudes to marketing are defined. As its first step a factor analysis and a cluster analysis were performed for formation of homogeneous-consumer groups. The 4 groups thus obtained were made the basic axis consistently used for this analysis. Following these preparatory steps, by a discriminant analysis extraction of significant discriminant variables and testing of discriminatory power were conducted. It was nothing but extraction of inductively derived hypotheses and testing of their validity.

As remaining tasks after this study we can mention analytical techniques here used. Since the multivariate analysis method is based on correlation analysis,

the results cannot immedicately be connected with causal relations. Yet we think exploring attempts to grasp synthetically the entire picture of this unknown field is a necessary task at the present stage of this research field.

Next, as a matter of this study itself, problems about selection of variables and testing of validity must be mentioned. The variables of consumers' attitudes and attributes were selected in reference with the results of many researches, both home and abroad, yet it must be confirmed anew that input variables command results of analysis. Further it may be desirable to repeat the split sample method used for validation and to attempt comparison with the results of other testing methods of validation.