

The Effect of TV Advertising on Consumers' Price Sensitivity to New Entry Products

[The empirical research whose objects are food items sold in the supermarket]

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1. Introduction

So far the main domain of the researches about the TV advertising effect has been to directly measure the effect on the product sale. However, the important marketing variables which influence consumers' purchasing are not only the advertisement but also the price reduction. The effects of these two variables seem to be interdependent. So it's important to discern the effects of them, and to understand the interrelation of them.¹⁾

The purpose of this article is to measure the effects of TV advertisements at the time of consumers' purchasing with the price reduction, by examining the interrelation of these two variables. Concretely, we are going to measure the impacts of TV advertisements on consumers' price sensitivities.

TV advertising has two dimensions of the effect, one of which is the quantity and the other is the advertising content. Most researchers have examined the advertising effects on consumers from the view point of the quantity dimension. GRP

1) Reference 1, p. 119

(Gross Rating Points) is usually used as a typical variable of advertising quantity. Therefore, very few researchers have empirically referred to the dimension of the advertising content as the important factors of the advertising impact on consumers.²⁾

It is reasonable that we think advertising contents have considerable influence on the consumer behavior. Such a situation is symbolized by the fact that many copywriters have a severe competition with each other in producing effective advertisements. If we measure the effects by using only advertising quantity, we couldn't measure correct advertising effects as the result of thinking of all advertising contents as same.

Therefore, we have decided to examine the advertising effect with priority to the impact that advertising contents have on the consumer price sensitivity.

The objects are defined to new entry products. Because the effects of TV advertising on the consumer price sensitivities seem to be quite different between new entry products and established brands. Later we will refer to this matter again.

Talking about the main data used in this article, we use daily scanner data in a large size supermarket in Kanto District to measure the consumers' price sensitivities and, as the data as to the advertising quantity, GRP for two months at the point of new brands' entering and the results of the questionnaires with commercial films.

2. Review

As there are few researches that have examined the advertising effect on the consumers' price sensitivity concerning to new entries, we include the researches concerning established brands in this review.

(1) The advertising effect with the dimension of the quantity

Some theses have supported the view that the increase of advertising quantity lowers the consumers' price sensitivity. Other theses have supported the opposite view.³⁾

Such cases are shown in Table 1. Almost half are the former, and the other half are the latter. Such cases seem to be caused because the analyses in Table 1 have chosen relatively few products as their objects. For example, Krishnamurthi et al. (1985) used only one frequently purchased brand as their object. Sawyer et al. (1979) used only syrup products. It is guessed that following two reasons exist

2) Ibid., p. 121

See reference 2 and 3 as the literature that investigated the effects of advertising contents on consumers' attitudes to the brand.

3) Reference 3, pp. 73-74

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Table 1 The Effect of Increasing of Advertising Quantity on the Consumers' Price Sensitivity

	Product		Advertisement	Result
	Involvement	New or established	Informative or non-informative	consumers' price sensitivity
1. Krishnamurthi et al. (1985)	low	established	non-informative	down
2. Sawyer et al. (1979)	low	established	informative	down
3. Farris et al. (1979)		established		down
4. Roberts (1980)				down
5. Moran (1978)				down
6. Lambin (1976)				down
7. Wittink (1977)	low	established		up
8. Eskin & Baron (1977)	low	new	informative	up
9. Eskin (1975)	low	new	informative	up
10. Nelson (1970, 1974)			informative	up
11. Chamberlain (1962)			informative	up

Note : Blanks in the table mean Not Available.

(From reference 4, p. 74)

for relatively few products. One is that the researchers couldn't get enough data since the scanner data had not been available for them yet. The other is that most of them made use of the design of experiments by using a few objects.

Such a relatively few numbers of their objects would produce the situation that results are various in Table 1. Ueda (1986) supports this view by analyzing relatively many products with scanner data and GRP though it didn't include new entries. That research showed that the effect of the advertising quantity would be various depending on the kind of products.

As to new entry products, we can see the researches of Eskin (1975) and Eskin & Baron (1977) in Table 1. These both results support that the increase of the advertising quantity would enhance the consumers' price sensitivity.

(2) The advertising effect with the dimension of the contents

We have seldom found the researches that directly measured the effects of advertising contents on the consumers' price sensitivity.⁴⁾

Generally, it is said that the advertising which communicates the product price and product attributes etc. enhances consumers' price sensitivity. On the contrary, it is said that the advertising which communicates the good product image, that is the image type advertising, mainly lowers consumers' price sensitivity. This is thought to be owing to the following reasons. The image type advertising is usually used in the case that there are just small differences of qualities among products. Such a type advertising mainly aims at enhancing consumers' product brand image,

4) Reference 1, p. 121

and producing the product differentiation by giving consumers good feelings and by giving relieves and sympathy with famous persons in commercial films. As the result of that, consumers' price sensitivity is thought to be becomes low.

On the contrary, the non-image type advertising is supposed to enhance consumers' price sensitivity owing to calling consumers' comparing product attributes among products.⁵⁾

3. Framework and Procedure

In this article, we don't use established brands as our objects but new entry products. So it needs to understand the differences between them.

Basically, the clear difference between new entry products and established brands is the accumulated knowledge quantity with respect to the product. Owing to the difference, consumers' processing of advertising information is quite different between them. Concretely speaking, as to established brands, new added advertising information about them is thought to have small impacts on consumers' price sensitivity because they have already established brand images and new added information becomes relatively small comparison with accumulated knowledge. On the contrary, in the case of new entry products, new added advertising information is thought to have relatively large impacts on consumers' price sensitivity because they have only small established brand images or no brand images and, as the result of that, consumers are relatively apt to be influenced by new added information. Therefore, it is necessary to distinguish from new entry products to established brands.

3.1 Framework

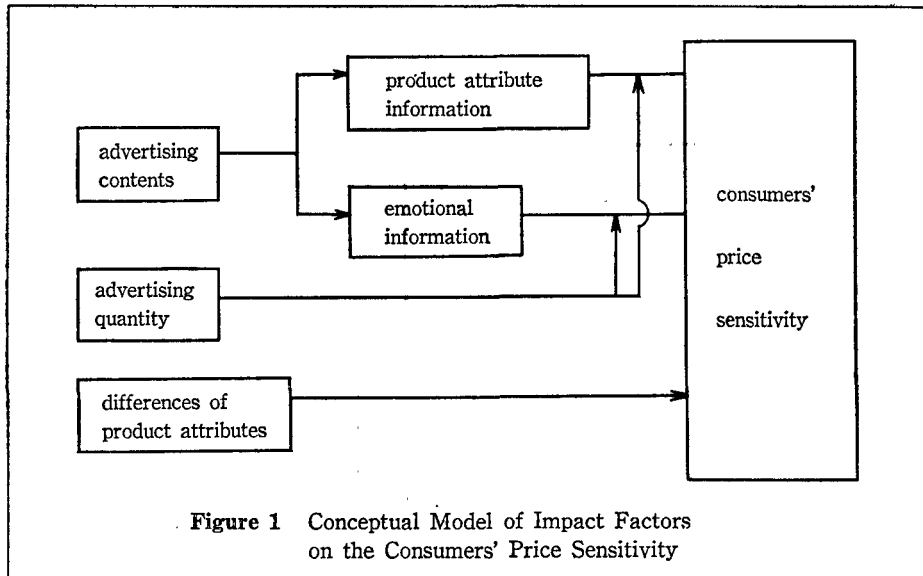
We think the flow-chart of the simplified conceptual model, which shows how the advertising influences the consumers' price sensitivity. See Figure 1. This is considerably simplified in order to make an analysis easy.

In Figure 1, the dependent variable which is consumers' price sensitivity is situated in the right side, and main independent variables which are considered to influence consumers' price sensitivity are in the left side. We will explain the independent variables, that is, the advertising content & quantity, and the differences of product attributes in the following.

(1) The advertising content & quantity

In Figure 1, the advertising quantity is described to give impact indirectly on the consumers' price sensitivity by intervening the influencing flow from the advertising content to the consumers' price sensitivity. This means that the components of

5) Reference 4, p.77



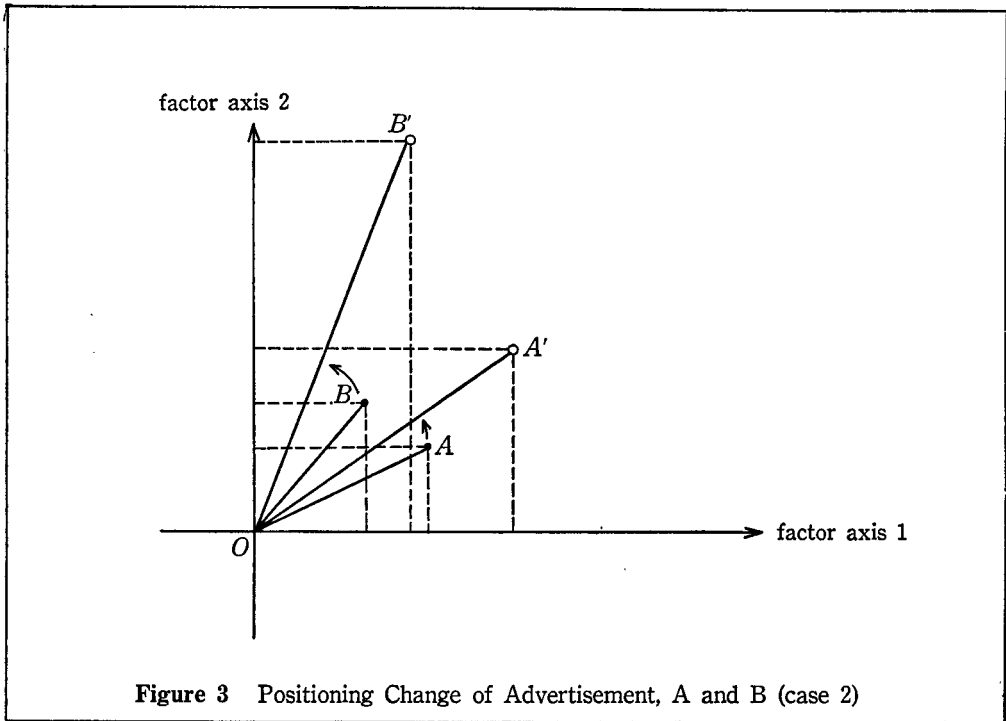
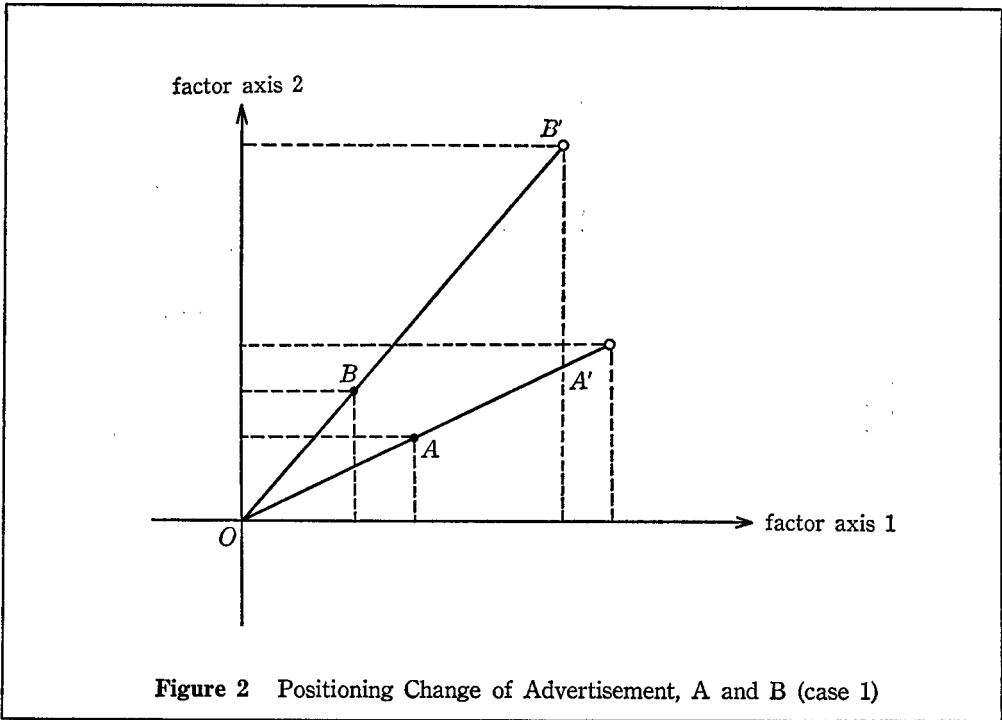
the advertising content decide the direction of increase or decrease of consumers' price sensitivity, and that the advertising quantity amplifies the strength of the direction impact. In other words, we assume that the advertising impact on the consumers' price sensitivity is basically decided by the product of the advertising content and the advertising quantity.

So far the advertising content has often been divided into the informative content and non-informative content. And their degrees of influence have been examined respectively. However, the advertising content isn't so simple. In order to get the more correct advertising effects, it is necessary to decompose the advertising content into some important components, and to measure each impact on the consumers' price sensitivity respectively.⁶⁾

We can divide the information which the advertising content gives to consumers into the product attributive information and the emotional information. They correspond to the Informative parts and Non-informative parts of the advertising respectively. However, both of them are able to be decomposed into more detailed components. For example, Mitchell (1986b) divided advertising content into the verbal components and the visual components, and what is more, he divided the visual components, which correspond to the emotional information, into "no photograph", "positively evaluated photograph", "neutrally evaluated photograph", and "negatively evaluated photograph". With this classification he examined the difference of their effects on the consumers' attitude to the advertisements.⁷⁾

6) Reference 2, p. 189

7) Reference 3, pp.14-18



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In our research, we are going to get component factors of the emotional information and the product attributive information of the advertising contents, respectively by using the factor analysis. Then, after computing the factor score of each advertisement, we plot the positions of those advertisements in the space composed by the factor axes. This positioning is based on one unit of advertising quantity. So the positioning is to change depending upon each number of advertising quantity units. (Probably the change is to diminish successively to the convergence point.)⁸⁾

In other word, we assume that consumers' impression toward the advertisement changes depending upon the advertising quantity.

We can see this situation in Figure 2 (case 1) and 3 (case 2). In order to simplify, we consider the case of two factor axes and two advertisements, A and B. In the case 1, the advertising quantity has impact on the both axes with the same rate. According to the number of the advertising quantity units, A moves to A', and B moves to B'. As we can see in this figure, A and B are respectively on the extension line of the segment OA and OB.

In the case 2, the advertising quantity has impact on the both axes with the different rates. In other words, one advertisement content consists of various components, some of which are sensitive to the advertising quantity and others of which aren't so sensitive. We think that the case 2 is more plausible than the case 1. In this Figure 3, the factor axis 2 is more sensitive to the advertising quantity than the axis 1. So we can see such movement about A and B in Figure 3. A' and B' are not on the extension line of the segment OA and OB respectively.

However, though we will explain in detail later, with respect to the product attribute factors, we are to have one problem when the advertisement change its position on the factor axes according to its advertising quantity units. For instance, we suppose we have a factor, "the degree of ease to catch the product name". In the case that an advertisement takes negative position on the factor axis, it is unreasonable that "the difficulty to catch its name" is amplified according to the units of advertising quantity. Therefore, we have to design for product attributive factor scores not to take negative positions.

We propose the following hypotheses based on the above statement.

H1: The variables which are the products of (advertisement content component factor scores) and (advertising quantity units) have significant impact statistically on the consumers' price sensitivity.

H2: The impact of the advertising quantity on the advertising content component

8) These data used for the factor analysis, were gathered as the result of the samples' answers after showing them one unit of each advertisement. Therefore, it assumes that these data are the results of one unit of advertising quantity.

factor axes is diminishing according to the increase of its unit number.

(2) Differences of product attributes

There are some variables in regard to the differences of product attributes. These variables are necessary for the reason that the basic size of consumers' price sensitivity, that is to say, price elasticity is various depending upon the kind of the product (category). Ueda (1986) supports this situation. Therefore, these variables are used to get rid of the difference due to the kind of the products. These variables are as follows.

- (i) The stock inclination of the product category
- (ii) The purchase frequency of the product category
- (iii) Whether the new entry item is just made up with a small variation of an established brand

Of course, it is impossible to get rid of all the differences due to the kind of the products by using only these variables. But we think such variables will play a important role to do so.

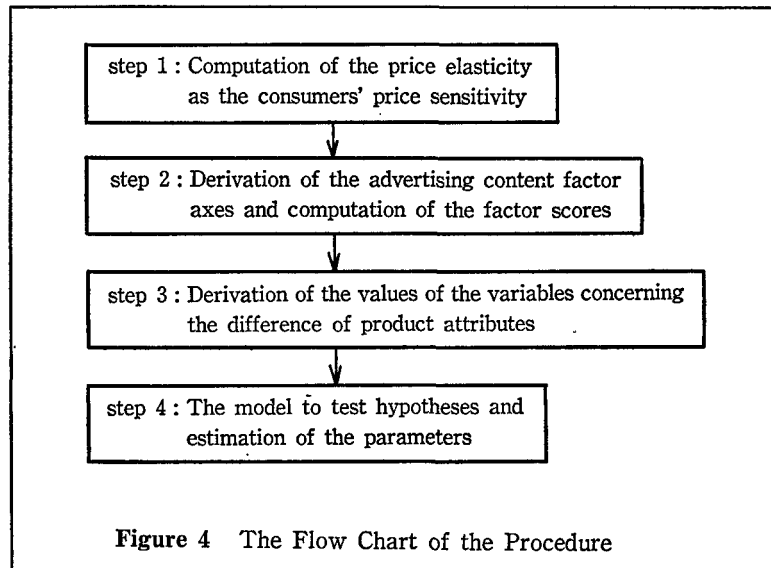
As to (i), the product with the high stock inclination, which is apt to be bought and kept, is supposed to be more price sensitive comparing to the product with the low stock inclination. So we propose the following hypothesis.

H3: The product with the high stock inclination has higher consumers' price sensitivity than the product with the low stock inclination.

As to (ii), the highly frequently purchased product, that is, the product whose purchasing interval is short, is apt to have lower risk and be easier to try for most consumers comparing to the non-frequently purchased product. Besides it, consumers frequently visit the section where the highly frequently purchased products are displayed, and they have much knowledge about the product categories, so they have chance to see new entry products often and easily. Therefore, such new entry products are apt to be included in consumers' evoked set. As the result of that, they are apt to be more price sensitive in the case of price reduction for consumers. We propose the following hypothesis.

H4: The consumers' price sensitivity is high as to the frequently purchased product categories.

Concerning (iii), in the case of that the new entry product is only a variation of an established brand with a small change, and that it succeeds to the name, consumers have more possibility to be aware of the product than other new entry



products because consumers are influenced by the established brand image. Therefore, such a product has inclination to be included in the evoked set and to be price-sensitive.

So we propose the following hypothesis.

H5: In the case that the new entry product is made up with a small change of an established brand, the consumers' price sensitivity of the product is high.

So far we have proposed 5 hypotheses in this paragraph. Next we refer to the procedure to test these hypotheses.

3.2 Procedure

The procedure consists of 4 steps, whose flow-chart is shown in Figure 4. The explanation of each step is as follows.

(step 1) Computation of the price elasticity as the consumers' price sensitivity

We consider the price elasticity as the consumers' price sensitivity concerning the product. This is based on the reason that the price elasticity is basically the measurement showing the percentage change of the product sales per one percent change of the product price. The price elasticity of each product is computed by the following model.

$$\ln US_u = A_i + \alpha_i \ln P_u + \sum_{j=1}^n \beta_{ij} \ln P_j + \varepsilon_u \quad <1>$$

where: US = sales volume/1000 persons;

i =object product item;
 t =period (daily);
 p =price;
 A =constant term;
 j =rival product item ($j=1, 2, \dots, n. i \neq j$);
 ε =error term;
 \ln =natural logarithm;
 α, β =parameter

The regression coefficient α becomes the price elasticity of the product item i . In the model <1>, the prices of the rival product items are included in order to get rid of the impact on the product item i . And we use the sales volume per 1000 persons in order to remove the influence of the difference of the customers number visiting the store due to a day of the week.

(step 2) Derivation of the advertising content factor axes and computation of the factor scores

In this step, we gather information by questionnaires with showing samples the commercial films (we call CF in the following sentence) of the new entry products. The questionnaires consist of the emotional questions how samples feel and the product attributive questions how well samples can be informed of the product attributes. We use the semantic differential method. Then we do the factor analysis on the results of the emotional questions and the products attributive questions respectively. We also compute the factor scores of all CF.

The emotional questions were referred to Abe (1985). (See Table 3 and 4)

(step 3) Derivation of the values of the variables concerning the difference of product attributes

We use the preceding three variables. (See 3.1 (2)) With respect to (i) and (ii), we use questionnaires for housekeepers.

As to (i), we ask them about their purchase inclination of every object item in the case that they have still stock in their house and that they have a chance of the price reduction. We also use the semantic differential method. Then we use the average per every item as a value of the variable.

As to (ii), we also use questionnaires for housekeepers and ask them about their purchase interval of each product item. We use the average as a value of the variable. (See Appendix "Inquiry of the stock inclination and the purchase interval for housekeepers")

With respect to (iii), we use a dummy variable in the model. The value deserves 1 in the case that the new entry item is only a variation of an established brand and

The Effect of TV Advertising on Consumers' Price Sensitivity to New Entry Products has a almost same name. Otherwise, it deserves 0.

(step 4) The model

The model formulation is as follows.

$$PE_i = A + \sum_{j=1}^m a_j \cdot (G_i^{p_j} \cdot AAF_{ji}) + \sum_{k=1}^n b_k \cdot (G_i^{r_k} \cdot AEF_{ki}) + cST_i + dFR_i + eD_i + \varepsilon_i \quad <2>$$

where: PE = price elasticity of a product (usually its value is negative, so we multiply it by (-1) and transform it into positive value.);

AAF = product attributive factor scores concerning an advertising content, factors $j=1, \dots, m$;

AEF = emotional factor scores concerning an advertising content, factors $k=1, \dots, n$;

G = advertising quantity of a product. Actually we use GRP in this analysis;

ST = housekeepers' stock inclination;

FR = housekeepers' purchase interval of a product;

D = dummy variable. Just small variation of an establish brand $\rightarrow D=1$, otherwise $\rightarrow D=0$;

i = an objective product item;

A = constant term;

a, b, c, d, e, p, r = parameter

In the formulation $<2>$, the advertising quantity has different impacts on the advertising content factor axes. However, when we transform p_i and r_k into p and r respectively, the impacts are to be equal respectively for emotional factor axes and product attributive factor axes. Moreover, in the case of $p=r$, the impacts of the advertising quantity are to be equal for all factor axes.

Then we do the nonlinear regression as to the model $<2>$ and estimate the parameters.

4. Empirical analysis of foods items

Testing the validity of the model, we used only food items as objects in this study. The reasons are as follows.

- a) Food items have a relatively short term purchase interval compared with other products.
- b) There are a lot of new entry products in food items compared with other products.
- c) Foods have the attribute concerning to the taste, therefore we have to distinguish foods from other products like miscellaneous goods.

Table 2 Value

Brand Name	Price Sensitivity ¹⁾	Product Attributive Factors ^{2), 3)}				Emotional Factors ³⁾			Cumulative GRP ⁴⁾	Stock Inclination ⁵⁾	Purchase Interval ⁶⁾	Partial Improvement of Established Product ⁷⁾
		Product Contents	Promotion	Brand Name & Package	Refinement	Familiarity	Uniqueness					
Brand A	0.135	0.388	0.452	0.458	1.349	-0.350	-1.208	1315	4.087	3.591	0	
Brand B	17.297a	0.672	0.500	0.126	0.505	-0.863	-1.720	677	3.522	2.957	0	
Brand C	2.939	0.327	1.007	0.545	-1.426	-1.256	-0.535	489	3.727	3.864	0	
Brand D	12.117a	0.279	0.441	0.108	-1.209	0.618	-1.600	159	4.158	3.895	0	
Brand E	34.644a	0.618	0.511	0.683	-0.351	1.002	0.992	1364	3.522	2.957	0	
Brand F	3.915	0.655	0.452	0.539	0.586	-2.087	1.555	1550	3.727	3.864	0	
Brand G	34.910a	0.685	0.453	0.494	0.923	-0.472	0.676	1760	3.227	3.682	0	
Brand H	7.884a	0.167	0.388	0.399	-1.575	-0.255	-0.435	13760	3.708	3.917	1	
Brand I	11.253b	0.503	0.402	0.630	-0.990	0.189	0.769	7954	3.708	3.917	0	
Brand J	2.503 a	0.654	0.820	0.509	-0.013	0.573	-0.073	5628	2.609	1.957	1	
Brand K	7.678 a	0.690	0.423	0.480	0.925	0.865	-1.057	3443	3.087	3.913	0	
Brand L	4.541 a	0.469	0.437	0.613	-0.069	0.892	0.306	38508	3.619	3.583	1	
Brand M	16.385 a	0.651	0.424	0.460	1.134	-0.730	0.176	1615	3.500	3.421	0	
Brand N	3.985 a	0.448	0.397	0.718	1.262	1.962	0.526	2780	3.045	2.955	0	
Brand O	14.456 a	0.293	0.391	0.736	-1.054	-0.088	1.628	2886	3.045	2.955	0	

Notes: (1) The price sensitivity is got by the price elasticity multiplied (-1).

a indicates significance at 0.1. b indicates significance at 0.5.

(2) As to these factors, the mean value is modified to 0.5 and the standard deviation 1/6.

(3) The data of product attributive factors and emotional factors are factor scores estimated through the factor analysis.

(4) The cumulative GRP are total of the GRP for two months, that is, our concerned period and the GRP before this period of two months.

(5) The cumulative GRP data of the brand J and L are the total value since 1981, which were available for us.

(6) The data of stock inclination indicate that the less figures mean the higher stock inclination.

(7) The data of purchase interval indicate that the less figures mean the higher purchase frequency.

(8) Dummy variable. It deserves 1 if it is made up by partial improvement of an established brand, and deserves 0 otherwise.

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We estimated the parameters and tested the validity of the model according to analytical steps indicated in the previous chapter.

(step 1) Computation of the price elasticity as the consumers' price sensitivity

In calculating price elasticities, the daily data were gathered during about two months since the supermarket had begun to sell the items.

According to the model <1> indicated in previous chapter, price elasticities of 15 foods were calculated respectively, but the data of other rival foods were not available, so price elasticities were calculated without excluding effects of the rival foods to the concerned food. The results are indicated in Table 2. In this table, most of foods are statistically significant at 1%. Although there are 3 foods that were not statistically significant 5%, we included the elasticities of these 3 foods in order to avoid the shortage of data as dependent variables for the following analysis.

(step 2) Derivation of the advertising content factor axes and computation of the factor scores

We used the result data of questionnaires whose sample were 79 undergraduate students of both sexes for deriving factor axes. In this inquiry, we gathered 79 undergraduate students in one room, and first we showed them 15 commercial films continuously at one time. Then after they saw twice by one commercial film, we requested them to respond to the questionnaire. We used the mean values of 79 samples as the data of the factor analysis. We executed the factor analysis separately based on the product attributive data and the emotional data of the advertising contents. After the varimax rotation of the factor axes, we interpreted the meanings of the each factor on the factor loadings which showed over 0.7 points. Table 3 and 4 show the factor loadings rotated.

On Table 3, we interpreted the factors concerning to the product attributive information. The high factor loadings as to the factor 1 were about the items which communicated the information of product contents such as taste, ingredients, and advantage of the product. Therefore we regarded the factor 1 as the product content axis. As to the factor 2, the high factor loading was about the item which communicated the promotional information such as a premium to the consumer. Therefore we regarded the factor 2 as the promotion axis. The high factor loadings as to the factor 3 were about the items which communicated information of the brand name and package. Therefore we regarded the factor 3 as the brand name and package axis.

Next, we interpreted the factors concerning to the emotional information on Table 4. The high factor loadings on the factor 1 were about the items such as seriousness of the advertisement, comfortable music, stationariness, color, intellect, freshness, beauty, artificiality. Therefore we thought it the factor showing the degree

Table 3 The Factor Loading of Product Attributive Factors after Normal Varimax Rotation

	Factor 1	Factor 2	Factor 3
watched the price well.....not well	0.0823	0.2797	-0.0111
heard the price well.....not well	0.1564	0.1007	0.1816
watched the manufacturer's name well.....not well	0.5721	0.0010	0.2047
heard the manufacturer's name well.....not well	0.5168	0.1365	0.0249
watched the brand name well.....not well	0.0157	0.0411	0.8635
heard the brand name well.....not well	-0.3346	0.1002	0.7377
not watched the product merit well.....watched well	-0.8596	-0.0191	-0.0633
heard the product merit well.....not well	0.8358	0.2070	-0.1777
watched the promotional information well.....not well	-0.0454	0.9757	0.0502
heard the promotional information well.....not well	-0.0512	0.9943	0.0862
watched the emphasis of the taste well.....not well	0.9739	-0.2383	0.0119
heard the emphasis of the taste well.....not well	0.9701	-0.2247	-0.0420
watched the explanation of ingredients well.....not well	-0.8685	-0.1801	0.1610
heard the explanation of ingredients well.....not well	-0.8078	-0.1277	0.2692
watched the package design well.....not well	0.0066	-0.1020	0.8240
Contribution (%)	36.5088	15.1261	14.6013
Cumulative Contribution (%)	36.5088	51.6349	66.2362

Table 4 The Factor Loading of Emotional Factors after Normal Varimax Rotation

	Factor 1	Factor 2	Factor 3
loud color.....plain	0.8683	0.0364	-0.1205
offensive music.....comfortable	0.9498	-0.0387	-0.1594
easy content.....serious	0.9656	0.2150	0.1125
pleasant atmosphere.....grave	0.6503	0.7302	0.1219
traditional.....fresh	-0.9157	-0.1067	-0.1879
cute.....not cute	-0.2321	0.7564	0.1762
dynamic.....static	0.9549	-0.0752	0.2152
natural.....artificial	-0.8304	0.4943	0.1325
gloomy.....light	-0.6475	-0.6843	0.1053
homy.....strained	-0.1745	0.8984	-0.1328
healthy.....unhealthy	0.0331	0.8085	-0.0028
manly.....feminine	0.6471	-0.1166	0.3920
real.....dreamy	0.3945	0.3694	-0.2076
intellectual.....not intellectual	-0.9706	-0.0090	0.1877
cold.....warm	0.0460	-0.9038	-0.0455
unique.....not unique	0.1817	-0.0250	0.8460
funny.....not funny	-0.0192	0.4464	0.8279
beautiful.....not beautiful	-0.9122	0.1901	0.1563
elaborate.....not elaborate	-0.2742	-0.1886	0.8692
Contribution (%)	44.2910	24.1232	13.9026
Cumulative contribution (%)	44.2910	68.4142	82.3168

of refinement. The high factor loadings as to the factor 2 were about the items which showed the familiarity such as warmth, relaxation, health, pleasant atmosphere. So we interpreted this as the familiarity factor, the factor 3, the high factor loadings were about the items which showed the uniqueness of the commercial films such as uniqueness, funniness, and elaboration. Therefore we interpreted the factor 3 as the uniqueness factor.

The summary of the above factor interpretation are as follows.

Product attributive factors

- a) Product content axis
- b) Promotion axis
- c) Brand name and package axis

Emotional factors

- a) Refinement axis
- b) Familiarity axis
- c) Uniqueness axis

Figure 5 and 6 show the relative position of each product item based on the estimated factor scores respectively. The product attributive factor scores were modified to have the mean value 0.5 and the standard deviation 1/6, and the familiarity factor scores and the uniqueness factor scores of the emotional factors are modified by multiplying (-1) respectively.

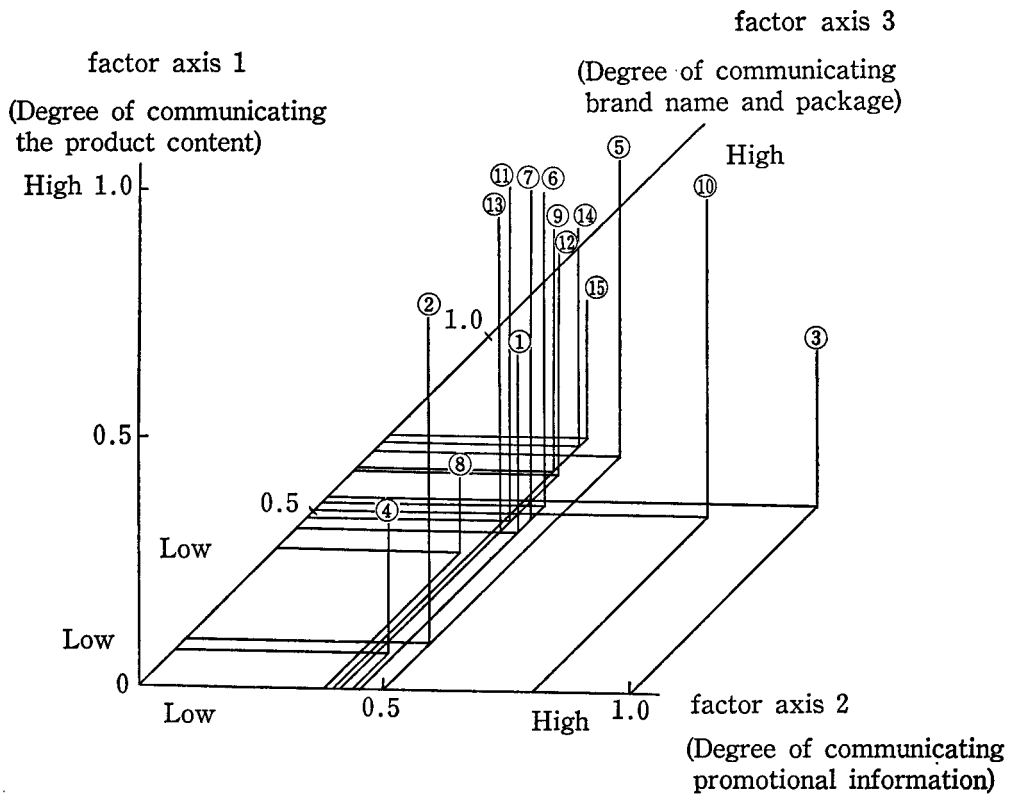
(step 3) Derivation of the values of the variables concerning the difference of product attributes

The data of "the stock inclination" and of "the purchase frequency" of the product categories are gathered through the questionnaires for the housekeeper samples. As to gathering data, we got about 30 valid questionnaires out of 60 questionnaires delivered to housekeepers. Table 2 shows these data. In this table, the stock inclination of product categories means that smaller figures indicate higher stock inclination, and the purchase interval means that smaller figures indicate higher purchase frequency.

If the so called new entry product is made up from the partial improvement of the established product which keep the same brand name and is hardly for consumers to tell it from the established brand, we give it 1 as a dummy variable, and otherwise 0. Table 2 indicates these data.

(step 4) Estimation of the parameters in each model and test of the hypotheses

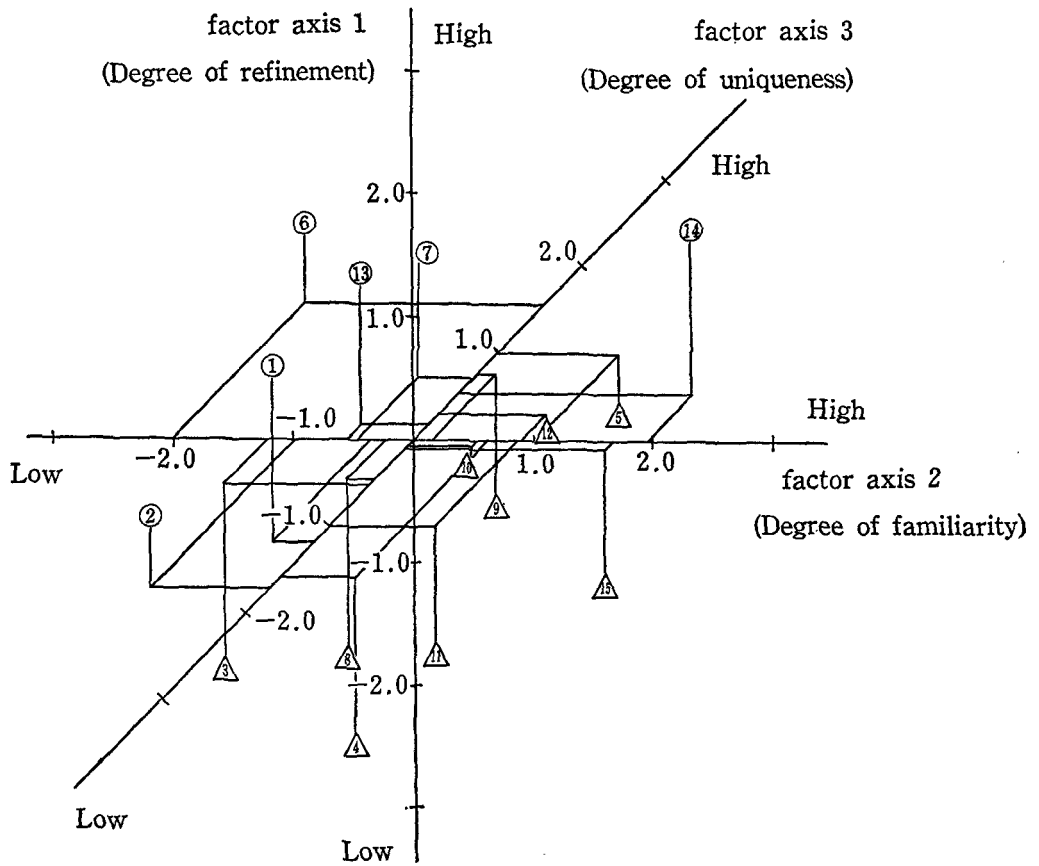
We estimated the parameters in the model formulation 2 described in previous chapter by using the data acquired through the step 1 to 3, and the cumulated GRP. Before estimating the parameters, AAFs (product attributive factors) and AEFs (emotional factors) were adjusted about their signs so that the positive sign of figures



- | | |
|------------|-------------|
| 1. Brand A | 9. Brand I |
| 2. Brand B | 10. Brand J |
| 3. Brand C | 11. Brand K |
| 4. Brand D | 12. Brand L |
| 5. Brand E | 13. Brand M |
| 6. Brand F | 14. Brand N |
| 7. Brand G | 15. Brand O |
| 8. Brand H | |

Figure 5 Product Positioning by the Product Attributive Factor Scores

The Effect of TV Advertising on Consumers' Price Sensitivity to New Entry Products



- | | |
|------------|-------------|
| 1. Brand A | 9. Brand I |
| 2. Brand B | 10. Brand J |
| 3. Brand C | 11. Brand K |
| 4. Brand D | 12. Brand L |
| 5. Brand E | 13. Brand M |
| 6. Brand F | 14. Brand N |
| 7. Brand G | 15. Brand O |
| 8. Brand H | |

Figure 6 Product Positioning by the Emotional Factor Scores

meant the positive meaning of the factor to interpret these factors easily. In addition, AAFs were transformed to have the mean value 0.5, positive sign of all figures, and the standard deviation 1/6. These reasons are as follows.

If the signs of AAFs are negative, these points become smaller with the increase of advertising quantity. It means that the more quantity of the advertisement increase, the less information of the product attributes becomes. This is due to the relative positioning with the mean 0 through the factor analysis. Therefore we made the signs of all figures positive. Then we gave near 0 point to the score which meant less product attribute information, and near 1 point to the score which meant more product attribute information. Due to this transformation, CF (commercial film) which has less product attribute information is given less impact with respect to the positioning through the increase of the advertisements quantity. On the contrary, CF which has more product attribute informations is given more impact through the increase of advertisement quantity.

We proposed the 3 cases to examine in the previous chapter. They are classified depending upon the way of influence of the cumulated GRP on the advertising content. They are as follows.

1. The case that GRP have equal impact on all of the advertising contents factors, namely, $p=r$ in the previous equation <2>.
2. The case that GRP have equal impact on the product attributive factors and the emotional factors separately, where p and r are supposed to be different each other.
3. The case that GRP have different impact on 6 advertising content factors respectively, namely, all of p_1, p_2, p_3 and r_1, r_2, r_3 are supposed to be different.

Thus on the order of 1, 2, 3, the condition becomes looser. However the parameters to estimate increase according to this order. To our regret, we could not examine the case 3 for lack of the degrees of freedom. Only 15 product items were available for us. Therefore we tried to estimate the parameters on case 1 and 2.⁹⁾

We executed t-test for each estimated parameter using the null hypothesis "the parameter=0". Unfortunately all of the parameters of both cases were not significant at 5%. This result seemed to be due to the shortage of the degrees of freedom. Then we estimated the parameters based on different two situations. The one is the situation removed two variables from the model equation for each case, the other is the situation four variables. Such removed variables were the smallest t-statistic variables. But also these estimated parameters were not the significant at 5%.

On the above discussion, all of our hypotheses built in the previous chapter were not supported statistically in this analysis.

On the other hand, we tried to estimate the parameters by using the GRP only

9) We used TSP, a software package of statistical analysis.

for the concerned term, that is to say, two months since the product had begun to be sold in the store, but the result was still worse.

Consequently, although we could not verify the effect of each variable on the dependent variable, it is thought to be significant to examine the variables which had the stable signs through each case. Table 5 shows each sign of the parameter for each case and the R squares. The case which had the highest R squares (0.693) is the case 2 with all variables, which has the different impact of the cumulative GRP on between the product attributive factors and the emotional factors. This result means that the case that the relative impact of cumulative GRP on the advertising content is different between the product attributive factors and the emotional factors has the higher explanatory power of the model than other cases.

On Table 5, the parameters which had the stable signs are about the variables such as "product contents", "promotion", "brand name and package", "refinement", "familiarity", and "stock inclination". Next we discuss such variables which had stable signs.

(i) Product Contents

The parameters of the product contents factors had positive(+) signs in all of the cases. This means that the CF which can communicate more product attributive information will make the consumers more price-sensitive. Generally the consumer can appreciate the relationship between the price of the product and the other product attributes easily once the consumer well understood the product through comprehending the product attribute information. In addition to it, the consumer is apt to purchase the product with the some price reduction due to the easy comparison with the rival product items. Therefore the positive sign of the parameter seems to be reasonable.

(ii) Promotion

All signs of the parameters of the promotion variable were negative in every model. Generally speaking, the sign of the promotion variable parameter is thought to be negative, because the promotional information like premium information substantially means the price reduction even if the price does not change. Therefore the promotional information will be thought to promote the consumer to purchase the product without depending on the price. Thus the sign of the parameter is reasonably accepted.

(iii) Brand Name and Package

All signs of the parameters of the brand name and package variables were positive. The more brand name and package information is included in the CF, the more easily the consumer who watched the CF evokes the product at the point of

Table 5 Positive or Negative of the Parameter of Each Model Case

Variable	CASE 1: The equal effect on each factor axes		CASE 2: The different effect on the two kinds of factor axes		The case with GRP for the only concerned period	
	All variables	2 variables are removed	All variables	2 variables are removed	All variables	2 variables are removed
Product Contents ¹⁾	+	+	+	+	+	+
Promotion ¹⁾	-	-	-	-	-	-
Brand name & Package ¹⁾	+	+	+	+	+	-
Refinement ¹⁾	-	-	-	-	-	+
Familiarity ¹⁾	+	+	+	+	+	+
Uniqueness	-	-	-	-	+	+
Stock Inclination ¹⁾	-	-	-	-	+	+
Purchase Interval	+	+	+	+	-	-
Partial Improvement of an Established Brand	+	+	+	+	-	-
The Effect of Advertising Quantity on the Factor Axes ²⁾	-	-	-	-	+	+
The Effect of Advertising Quantity of the Emotional Factor Axes						
R ²	0.568	0.567	0.693	0.540	0.392	0.572
						0

Notes: (1) The parameter sign has the stable direction for the variable.

(2) In case 1, this effect is about the parameter of all factors. In other cases, this about the parameter of the product attributive factors.

(3) In blanks, the variables are removed.

purchase. So the consumer will buy the product item with the price reduction. Therefore the sign of the parameters seems to be reasonable.

(iv) Refinement

All signs of the parameters of the refinement variables were negative. The refinement is the representative factor as to the non-informative advertisements or the imaginary advertisements generally. The higher the refinement of the CF is, the better image the consumer has to the product item. This better image is thought to make the consumers' price sensitivity dull. Therefore this sign seems to be reasonable.

(v) Familiarity

All signs of the parameters of the familiarity variable have were positive. The consumer is apt to evoke the product when she or he calls to mind the product category because the familiarity in the CF attract the consumer to the product. The familiarity is thought to promote the consumer's price sensitivity more and more as the price reduction. So we accepted the validity of this sign of the parameters.

(vi) Stock Inclination

All signs of the parameters of the stock inclination were negative. We have to interpret this sign of parameter oppositely because this variable shows that the smaller value means the higher stock inclination. According to this interpretation, the sign means that the higher stock inclination leads the higher price sensitivity. The products which have the high stock inclination will relatively attract the consumer to purchase with the price reduction. Therefore the sign (-) is thought to be valid.

We have discussed the validity of the signs of parameter on each variable although the previous hypotheses were not verified. As the results of that, these signs were not inconsistent with our intuition. So we have had the possibility that the model itself still has the validity in spite of no significant variables of the model. Such a model including not only the effects of the advertising quantity but also the effects of the contents should be examined sufficiently owing to its usefulness.

5. Conclusion

We have analyzed the relation between the consumers' price sensitivity and the advertising contents and quantity in this article. However, regrettably we couldn't verify the hypotheses we had derived. In order to compensate for it, we added one analysis by examining whether each coefficient of variables is positive or

negative. The result of this analysis suggests that there are two kinds of component factors of the advertising content even in one advertisement. One of them increases consumers' price sensitivity, and the other decreases. Therefore, the manufacturers should examine their new products positioning on the component factor axes of the advertising content according to their pricing policy or non-pricing competition policy. Explaining both policies concretely, the former means the intention to arrive at the sales goal with price control like frequent price reduction and the latter means with non-price competition. After all, this analysis has the implication to the decision of the advertising content in association with the price policy of new products.

However, we have the following task. In order to make a better proposition for the decision of the advertising content, we should hold more degrees of freedom of the variables to estimate parameters and build a more refined model, and test those hypotheses again.

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[Appendix]

Questionnaire as to Product Stock Inclination and Purchase Interval

(Part of the Questionnaire)

April, 1987

(Abbreviation)

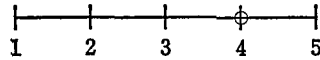
Please answer following two questions for every product. First question is concerning whether you will buy the product with price reduction even if you have the stock in your

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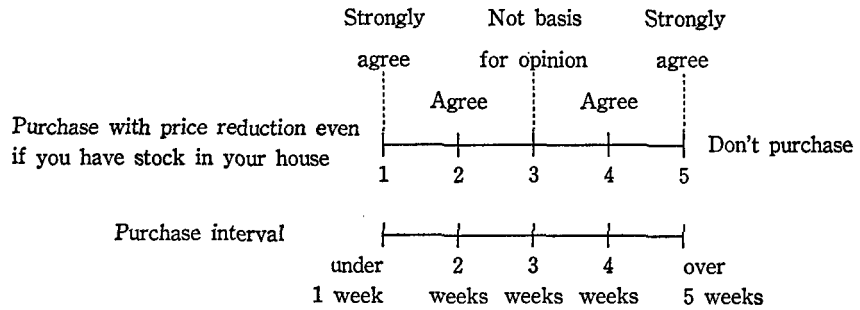
house or not. Second question is about your purchase interval.

Please check the point with \bigcirc as you feel. Don't answer about the product that you usually don't buy.

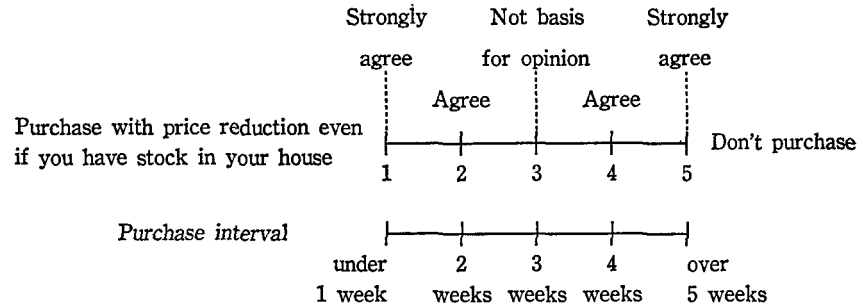
[Example]



(1) Ice cream



(2) Candy



(3) Sliced Cheeze

