AN EMPIRICAL STUDY OF BRAND LOYALTY IN JAPAN

By KOICHI TANOUCHI*

1. Items Selected

We selected for our study ten items which were frequently purchased and whose quality was not easy to evaluate objectively by consumers. Those two characteristics which the ten items for our study have in common make these items adequate as the objects of a study in brand loyalty.

Ten items are:

- 1) super seasoning (Main component is monosodium glutamate.)
- 2) curry powder
- 3) powdered soup
- 4) instant pudding
- 5) instant coffee
- 6) instant noodle
- 7) beer
- 8) detergent
- 9) cleanser (for vegetable and dish)
- 10) dentifrice.

2. Measurement

In this study, we use two definitions of brand loyalty. We measure two kinds of brand loyalty and compare them. Brand loyalty type A (BLA) is measured by the following way.

BLA= maximum number of continuous purchases of one brand (a year)

total number of purchases (a year)

As a nominater, only 'maximum number of continuous purchases of "one" brand' is taken. For instance, if there are three brands, A,B, and C in one product line and observed purchases are seven in one-year period and they are distributed among three brands like ABBBCAB, the nominater is 3, because number of continuous purchases of B is maximum of three brands and it is three. BLA is 3/7=0.428. It must be understood, therefore, that BLA for one consumer is about brand A and BLA for another consumer can be about B, and so on.

Brand loyalty type B (BLB) is measured by dividing a year into two six-month period

^{*} Professor $(Ky\bar{o}ju)$ of Marketing.

and comparing the most frequently purchased brand in each period. If the most frequently purchased brand in both periods are the same, the existence of brand loyalty is assumed. If the brands are not the same, no existence of brand loyalty is assumed. Brand loyalty type B can only take values of either 1 or 0.

The time of research was between April of 1966 and March of 1967.

What relations these two types of brand loyalty have? Both BLA and BLB only concentrate on measuring the degree of continuity of purchases of one brand by taking a brand which shows the maximum number of continuous purchases. Both brand loyalties represent consumer purchase behavior about a product line and not about a specific brand.

BLA measures a brand loyalty as a ratio and BLB as 1 or zero. In this respect, BLA gives us more room for further analysis.

Both BLA and BLB measure brand loyalty through one year, but BLB divides a year into two six-month periods. BLB is, therefore, more sensitive to changes of buyer brand selection in a year.

To check an existence of significant relation between BLA and BLB, we did chi-square test. We did the test for ten items. Take super seasoning as an example. We made a cross-table of BLA and BLB (Table 2-1).

BLB	~0.40	0.41~0.60	0.61~0.80	0.81~1.0	
1	29	36	42	80	
0	0 25		14	6	

TABLE 2-1. SUPER SEASONING

n=258, degree of freedom=3, chi-square=34.38, level of significance=1%

We divided BLA into four classes. In this kind of test, it is very important to be careful that the number of samples in each cell must not be too small. This is the reason why we divided BLA into four classes. From the test, it became clear that a significant relation existed between BLA and BLB. If a person is high in BLA, he is probable of being high in BLB, too.

The following table is the results of chi-square test for seven items.

TABLE 2-2

Items	n	Degree of Freedom	Chi-Square	Level of Significance
Super Seasoning	258	3	34.38	* * *
Curry Powder	348	3	79.83 .	* * *
Beer	264	2	44.65	* * *
Instant Noodle	385	3	31.59	* * *
Detergent	316	3.	54.68	* * *
Cleanser	314	3	78.52	* * *
Dentifrice	401	3	67.59	* * *

*** : 1%, ** : 5%, * : 10%

For all the items, null hypothesis was rejected at 1% significance level, that is, both brand loyalties are related. Since samples are few for powdered soup, instant coffee and instant pudding, we didn't do chi-square test for these items.

Next, we computed correlation coefficients between four classes of BLA and BLB. The results are shown in Table 2-3.

Items	n	Correlation Coefficients	Level of Significance
Super Seasoning	258	.340	* * *
Curry Powder	348	.471	* * *
Powdered Soup	74	.185	
Instant Pudding	74	.463	* * *
Instant Coffee	104	.401	* * *
Beer	264	.375	* * *
Instant Noodle	385	.265	* * *
Detergent	316	.401	* * *
Cleanser	314	.472	* * *
Dentifrice	401	.395	* * *

TABLE 2-3

Only powdered soup shows a low correlation and not significant at 10% level by t-test. All other items are significant at 1% level. Although correlation coefficients are not very high, this can be interpreted as being caused by the fact that BLB takes only two values, 1 or zero. We believe that it is more practical to focus attention to the fact that except about powdered soup, two types of brand loyalty have positive correlations about all the items at 1% level.

3. Brand Loyalty and Family Characteristics

What makes consumers high and low in BLA? Also high and low in BLB? Since both loyalties are measured by family units, we will take family characteristics instead of individual ones and see relations between family characteristics and the brand loyalties. We use eight demographic and economic characteristics. These are shown in Table 3-1.

Groups Family Characteristics	1	2	3	4
Life Cycle	No Child	With Child Under 9 Yrs Old	With Child Between 10~15 Yrs Old	With Child Between 16~19 Yrs Old
Occupation of Family Head	Manager Professional	Clerical	Commerce, Service	Laborer
Monthly Income	¥30,000 and Under	₩ 3~40,000	₹ 4~50,000	¥ 50,000 and Over
Number of Families	4 and Under	5 and Over		
Age of Family Head	39 and Under	40~49	50 and Over	
Education Level of Family Head	College Graduate	High School Graduate	Middle School Graduate	
Age of Wife of Family Head	29 and Under	30~39	40~49	50 and Over
Education Level of Wife	College Grad.	High School Grad.	Middle School Grad.	

TABLE 3-1

8

To check relations between BLA and family characteristics, two cross-tables, Table 3-2 and 3-3, are made for the purpose of a chi-square test and an analysis of variance. Take curry powder as an example.

BLA BLA	0.0~0.40	0.41~0.60	0.61~0.80	0.81~1.0
No Child	5	6	2	8
Families with Child of Nine and Under Nine Years Old	17	34	51	56
Families with Child Between 10-15 Years Old	10	12	13	29
Families with Child Between 16-19 Years Old	14	20	28	64

TABLE 3-2

n=369, d.o.f.=9, chi-square=15.58

TABLE 3-3

BLA	0.0~0.20	0.21~0.40	0.41~0.60	0.61~0.80	0.81~1.0
No Child	2	3	6	2	8
Families with Child of Nine and Under Nine Years Old	3	14	34	51	56
Families with Child Between 10-15 Years Old	2	8	12	13	29
Families with Child Between 16-19 Years Old	4	10	20	28	64

n=369, first d.o.f.=3, F=5.425

Both Table 3-2 and 3-3 are made from the same data. Since samples in a cell must be in substantive number for a chi-square test, we made number of cells less, and number of samples in cells larger. Table 3-2 is for a chi-square test and Table 3-3 for an analysis of variance.

A chi-square test is done for checking if a frequency distribution of BLA is connected with stages of life cycle. An analysis of variance is done to check if differences of BLA among stages of life cycle are statistically significant. Findings from the chi-square test and analysis of variance are shown in Table 3-4. In this table, a row shows chi-square test, analysis of variance for each item, and a column shows d.o.f., results of chi-square test or F-test, level of significance for each family characteristic. About an analysis of variance, only first d.o.f. is shown. This is because if first d.o.f. is constant, the distribution converges into chi-square distribution as the second d.o.f. becomes larger.

As the result of our analysis, we can conclude the followings.

- 1) super seasoning: no relation with family characteristics.
- 2) curry powder: a relation between ages of wife and BLA exists.
- 3) beer: a relation between occupations of family head and BLA exists.
- 4) instant noodle: relations between several family characteristics and BLA exist. An occupation of family head has a relation with how unloyal a family is. Family with less than five members is more unloyal than the family with members of five or more. The younger the age of family head is, the more unloyal to brands a family is. In

1976]

$\overline{\ }$	Life Cycle	Occupation	Monthly Income	Number of Families	Age of Family	Education Level of	Age of Wife of	Education Level of
Items					Head	Family Head	Family Head	Wife
Super Sea- soning	9 7.57 3 0.1236	9 6.37 3 1.8489	9 14.55 3 6.4274*	3 6.85 1 3.1070*	6 3.93 2 2.00	6 6.17 2 1.102	9 7.87 3 4.77	6 4.08 2 0.964
Curry Powder	9 15.58 * 3 5.4252	9 5.89 3 3.5338	9 3.30 3 1.1438	3 7.19 * 1 1.0702	6 8.53 2 3.573	6 4.29 2 2.073	9 14.45 3 8.804 **	6 5.72 2 2.51
Beer	6 6.09 3 4.9968	6 15.11 ** 3 4.6835	6 2.23 3 1.2984	2 0.23 1 0.2974	4 3.98 2 2.174	4 8.38 * 2 1.931	6 2.94 3 0.82	4 8.54 * 2 1.99
Instant Noodle	9 11.63 3 5.6066	9 19.00 ** 3 7.9470**	9 11.26 3 4.006	3 3.96 1 4.2365**	6 10.68 * 2 6.9321**	6 3.64 2 1.632	9 12.44 3 11.997 ***	6 6.94 2 0.073
Deter- gent	9 8.95 3 1.2320	9 12.99 3 10.0133 **	9 6.39 3 2.5487	3 7.32 * 1 0.0327	6 1.61 2 0.299.	6 12.63 ** 2 9.729 ***	9 21.47 ** 3 10.7826**	6 2.58 2 3.29
Cleanser	9 3.59 3 0.991	9 11.96 3 3.742	9 8.95 3 2.803	3 3.53 1 2.6079	6 3.63 2 1.789	6 6.77 2 1.877	9 10.10 3 6.3025*	6 10.35 2 2.49
Denti- frice	9 16.78 * 3 15.326 ***	9 19.21 ** 3 5.4681	9 18.82 ** 3 1.679	3 6.18 1 6.185 **	6 16.43 ** 2 16.46 ***	6 4.61 2 0.646	9 24.81 *** 3 23.15 ***	6 2.29 2 1.663

TABLE 3-4

the same token, the younger the age of wife is, the more unloyal a family is.

- 5) detergent: relations with several family characteristics exist. Occupation and level of education have relations with the degree of BLA. Families with wives of age between 30-39 years old have higher brand loyalty.
- 6) cleanser: no relation with family characteristics exists.
- 7) dentifrice: a very much difference by family characteristics exists. Families with no child and with child of nine and under nine years old have lower brand loyalty. Families whose heads are non-laborer have higher BLA compared with laborer families. The older the family head's age is, the higher the BLA is. The same thing can be said about wife.

About BLB, we did chi-square test as we did about BLA. Take as an example, a relation between BLB of beer and occupations of family head. The results are shown in Table 3-5.

We can conclude from Table 3-5, no relation exists between occupations of family

[June

head and BLB about beer.

Similar analysis is shown in Table 3-6.

From Table 3-6, we can say that significant relations at 5% level between BLB and

Occupation BLB of Family Head	1	0
Manager, Professional	21	3
Clerical	69	13
Commerce, Service	57	21
Laborer	67	13

TABLE 3-5

n=264, d.o.f.=	, chi-square= 4.77
----------------	----------------------

Items	n	Life Cycle	Occupa-	Monthly	Number	Age of	Education	Age of	Education
			tion	Income	of	Family	Level of	Wife of	Level of
					Families	Head	Family	Family	Wife
							Head	Head	
		3 (d.o.f.)	3	3	1	2	2	3	2
Super	0-0	2.40 (chi-	0.10	• • • •					
Seasoning	258	square)	0.13	3.08	2.59	2.56	4.96	4.03	1.29
-		- level of					site site.		
		significance							
Curry	240	3	3	3		2	2	3	2
Powder	348	0.51	3.00	2.15	3.70	3.54	4.00	4.57	1.57
<u> </u>									
D	244	3	3	3	1	2	2	3	2
Beer	204	1.50	4.77	0.75	0.97	0.35	0.59	1.19	0.13
Instant		3	3	4	1	2	2	3	2
Noodle	385	3.31	6.74	3.41	1.22	6.39	2.17	0.63	2.53
						**		-	
		3	3	3	1	2	2	3	2
Detergent	316	2.82	0.36	2.26	0.25	1.38	2.85	0.60	0.41
<u> </u>			_		_			-	
		3	3	3	1	2	2	3	2
Cleanser	314	3.22	0.01	3.51	0.17	5.76	0.57	6.22	1.92
		_		_		<u> </u>		_	
		3	3	3	1	2	2	3	2
Dentifrice	401	6.42	0.66	1.88	0.82	2.20	0.89	3.22	2.97
		+		—		I —	-	-	-

TABLE 3-6

family characteristics exist only about super seasoning and instant noodle. About super seasoning, when an education level of family head is middle school graduate, a probability of BLB being 1 is higher. About instant noodle, when the age of family head is forties, the chance of BLB being 0 is higher. So long as BLB is concerned, no other relation with family characteristics can be found.

1976]

So far, we have analyzed relations between family characteristics and BLA and BLB. From these analyses, it can be said that BLA can catch more sensitively the relations between a brand loyalty and family characteristics than BLB can. But neither BLA nor BLB could catch any general relation with any of the family characteristics. The relations differ from a product line to a product line. If we dare to point out not too strong relations between family characteristics and BLA and BLB, they are relations between occupations of family head and age of wife, and BLA and BLB. These relations are relatively conspicuous about dentifrice and instant noodle.

4. Loyalty Proness

Considering the number of samples, we picked super seasoning, curry powder, beer, instant noodle, detergent, cleanser, and dentifrice out of ten items for the analysis of loyalty proness. Number of analyses is 21, because combinations of two out of seven is

BLA of Beer BLA of Super Seasoning	0.0 ~0.60	0.61~0.80	0.81~1.0
0.0 ~0.40	7	13	15
0.41~0.60	8	8	24
0.61~0.80	5	13	23
0.81~1.0	13	14	35

TABLE 4-1

		I ABLI	3 4-2			
	Curry powder	Beer]	Instant Noodl	e Detergent	Cleanser	Dentifrice
	206	178	223	211	204	231
Super Seasoning	9	6	9	9	9	9
	12.62	5.18	16.38*	4.72	17.15**	16.77**
		237	307	255	237	291
C	urry Powder	6	9	9	9	9
		5.82	29.51***	13.35	9.40	8.87
			274	218	204	261
		Beer	6	6	6	6
			15.93**	1.93	6.93	10.82*
				276	261	342
		In	stant noodle	9	9	9
				6.10	6.83	15.17*
					238	286
				Detergent	9	9
					23.66***	15.57*
						281
					Cleanser	9
						26.43

TABLE 4-2

n=178, d.o.f.=6, chi-square=5.18

Three numbers in each cell are number of samples, d.o.f., and chi-square, in that order.

12

1976]

$$_{7}C_{2} = \frac{7!}{2!(7-2)!} = 21$$

We first take BLA. About a combination of super seasoning and beer, we made a cross-table (Table 4-1), and did a chi-square test.

The results show that BLA of super seasoning has no relation with that of beer.

We made similar analyses for 21 combinations of 7 items. The results are shown in Table 4-2.

Combinations which was significant at less than 5% level were:

- 1) curry powder and instant noodle
- 2) detergent and cleanser
- 3) cleanser and dentifrice
- 4) super seasoning and cleanser
- 5) beer and instant noodle.

In the case of BLB, we could recognize only two combinations of significance by the analyses of the similar nature. The results are shown in Table 4-3.

		111001				
	Curry Powder	Beer I	nstant Noodle	Detergent	Cleanser	Dentifrice
	195	138	201	194	194	217
Super Seasoning	1.60	0.01	0.33	0.56	2.53	1.95
	·	186	283	235	227	279
C	urry Powder	0.77	0.01	0.52	4.90**	0.29
			212	168	165	209
		Beer	0.27	1.02	0.86	1.74
				252	249	319
Instant Noodle 1			1.54	0.45	1.95	
					228	273
				Detergent	3.20	0.39
						273
					Cleanser	6.23**

TABLE 4-3

Two numbers in each cell are number of samples and chi-square. D.o.f. is 1 for all.

The two combinations are:

- 1) curry powder and cleanser
- 2) cleanser and dentifrice.

Both combinations mean that families which showed different choice between first six-month period and last six-month period also made different choice about cleanser. Also about the combination of cleanser and dentifrice, the same thing can be said.

About BLA, we did a correlation analysis in addition to the chi-square test. If we

take a combination of super seasoning and beer as an example as before, data for the analysis is classified as Table 4-4.

As the result of the analysis, we get a correlation coefficient of 0.019 and not significant even at 10% level. This means that there is no correlation between super seasoning and beer about BLA.

Total results of analyses are shown in Table 4-5.

BLA of Beer BLA of Super Seasoning	0.0 ~0.20	0.21~0.40	0.41~0.60	0.61~0.80	0.81~1.0
0.0 ~0.20	0	0	1	4	. 5
0.21~0.40	0	1	5	9	10
0.41~0.60	1	2	5	8	24
0.61~0.80	0	2	3	13	23
0.81~1.0	1	3	9	14	35

TABLE 4-4

$n=178, \gamma$	r = 0.019
-----------------	-----------

	Curry Powder	Beer 1	instant Noodle	Detergent	Cleanser	Dentifrice
Super Seasoning	206 .037 .532	178 .019 .253	223 .208 3.136***	211 .100 1.444	204 .126 1.793*	231 .206 3.151***
С	urry Powder	237 .007 .116	307 .290 5.203***	255 .146 2.342**	237 .082 1.251	291 .127 2.171**
		Beer	274 .079 1.306	218 .051 .756	204 .138 1.963**	261 .019 .309
	Instant Noodle			276 .008 .134	261 .090 1.45	342 .156 2.905
				Detergent	238 .231 3.603***	286 .137 2.318**
					Cleaner	281 .205 3.459

TABLE 4-5

Three numbers in each cell are numbers of samples, correlation coefficient, and value of t.

Correlation coefficients are not high but it is important to note that all the coefficients are positive and 10 combinations are significantly correlated at 5% level. This proves somewhat the existence of loyalty proness which was not detected in Cunningham's analysis. (R.M. Cunningham, "Brand Loyalty—What, Where, How Much?", Harvard Business Review, Vol. 34, No. 1, pp. 116-128)