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Can Organically Produced Foods Attract South Korean Consumers?

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Abstract

Differences in perception of organic and conventional foods matter to food suppliers and retailers. Using survey data collected from 1,100 female residents of seven urban centers in Korea this study applies the logit technique to identify consumer and household characteristics that influence the perception differences regarding six attributes. Results indicate the importance of household income with regard to organic food preference and the opposite effect of education. Perceptions also differed across locations, while the effects of other characteristics varied in case of the six attributes. Food marketers must account for income, education and location of consumers to plan sales strategies.

Can Organically Produced Foods Attract South Korean Consumers?

Introduction

The organic agriculture and the organic food industry are becoming a rapidly growing segment of the most developed agricultural economies around the world (Bourn and Prescott, 2002; Giannakas, 2002) and the currently available supply seems to be inadequate to meet the expanding demand. The similarity of organic food with the conventional product line is one of the reasons behind the increasing acceptance of organic food (Worner and Meier-Ploeger, 1999). According to the Korea Organics Association, the present Korean organic food market is worth \$1 billion (New Zealand Ministry of Foreign and Trade, 2009). For Korean agriculture, which shows a declining trend in its contribution to the GDP, the organic food production offers an opportunity to diversify and produce foods sold at a premium. To develop a strategy for organic production and marketing it is important to know how Korean consumers perceive organically produced foods when compared to the conventionally produced foods. Organic foods replace rather than augment conventional foods in a diet.

The wholesomeness of food is important to Korean consumers. Koreans derive energy from carbohydrate, protein and fat in almost ideal proportions (Son, 2003) suggesting they are aware of the link between diet and health. Therefore, the knowledge of Korean consumers' perception of the health aspect of organic foods is highly useful in planning future marketing strategy. However, healthiness of food is not the only attribute that distinguishes one product from another. Other attributes that commonly affect a purchase decision include price and appearance, while the changing consumer lifestyle may emphasize saving time when shopping for food and cooking it.

This study examines the consumer perceptions about organic foods with regard to six selected attributes as compared to conventional products. The selected food attributes are the

price, healthiness, taste, storability, ease of cooking and appearance. The most important factors affecting consumer organic purchase decisions are freshness, healthfulness, flavor, nutrition, and food safety (Groff et al., 1993). Davies et al. (1995) reported that price inhibits the purchase of organic foods. Generally many organic plant foods sell at a premium to compensate for the yield reduction after the switch to organic production methods (Bonti-Ankomah and Yiridoe, 2006). Schifferstein and Ophius (1998) suggest that organic food buyers tend to be health conscious and the motives for buying the organic foods are ascribed to health concerns and taste (Davies et al., 1995). Lin et al. (1996) identified the shelflife as an attribute shoppers consider in their purchasing decisions, while the importance of the ease of cooking results from the time allocation preferences of consumers. Appearance plays an important role in fresh produce purchase decisions (Misra et al., 1991) and has long been used to attract buyers of fresh produce. The specific objective of the empirical analysis is to identify the relative odds of socio-economic and demographic characteristics, regional differences, and respondents' opinions and views regarding the general attributes of food factors that influence perceptions of South Korean primary food shoppers and preparers that organic foods' attributes are superior as compared to the conventional foods.

Data collection and description

The study uses survey data collected in seven urban centers of the Republic of Korea in September 2007. The survey, implemented by a commercial market research company, involved 1,100 women. Females are the typical organic food purchaser (Davies et al., 1995) and the survey scope is limited to Korean urban women. The interviewed females with the primary responsibility for food purchase and preparation compare organic and conventional foods with respect to the selected attributes. They also shared demographic and socio-economic information. In addition, some questions probed for views and opinions about various aspects of

food consumption. The empirical estimation uses 727 observations after the deletion of incomplete responses.

Respondents selected a 'yes' or 'no' response to a question whether the organically produced foods are preferred in comparison to conventional foods in terms of the six attributes. Overall, respondents showed distinctly different perception of each attribute. Organic foods are perceived to be more expensive than conventional foods by 94% of respondents. Indeed, in some surveyed urban centers all respondents perceived organic foods as more expensive than conventional foods. The organic food production generally disallows the use of synthetic chemicals resulting in defects from the feeding pests or diseases. Production costs of organic foods tend to be higher than conventional foods due to the relatively lower yields and the inability to control pest yield reduction with the permitted substances. The price premium on organic foods compensates farmers for added expense and rewards them for supplying such distinct foods.

Among surveyed respondents 89% perceived organic foods as healthier than conventional foods. Davies et al. (1995) reported that the motives for buying organic foods can be ascribed to health reasons, while Bourn and Prescott (2002) reported that the possible presence of pesticide residues are important in the decision to purchase organic products. The perception of organic foods being healthier than conventional foods reflects Korean consumers' concerns of, among others, the use of synthetic chemicals in a conventional production process.

About two-thirds of the respondents (70%) perceived organic foods as better tasting than conventional foods. This result is a surprise because there is little consensus that organic produce tastes better than non-organic produce. Davies et al. (1995) suggest that the perception of improved taste in organic vegetables and fruits (most commonly consumed organic products) is likely due to the use of varieties, which yield less but produce more flavorful fruits or vegetables.

Respondents perceive the remaining three attributes quite differently and less than a half indicate the superiority of organic over conventional foods. Organic foods have a better appearance than conventional foods according to 37% of respondents. Schifferstein and Ophius (1998) suggest that organic food buyers are willing to accept less attractive appearance when purchasing organic as compared to conventional products, but Ott (1990) reported that consumers are unwilling to allow imperfect appearance.

Only 38% of respondents believe that organic foods are easier to cook than conventional foods. There is no evidence that this is the case, but consumer believes have to be considered by food marketers in their efforts to entice them to purchase their food products. The traditional Korean methods of food preparation and meal composition, which differ from those used in western societies may allow for creative marketing and promotion of foods using such perceived differences. American consumers accept more preparation time when purchasing organic as compared to conventional products (Schifferstein and Ophius, 1998).

Almost two out of five respondents (41%) express the opinion that organic foods store better than conventional foods. Such opinions are likely based on fragmentary observation because organic foods have not been marketed long enough to allow consumers accumulate lot of experience with this regard. Moreover, few consumers have knowledge adequate to isolate various environmental influences from the production technique on storability. More likely, postharvest handling may follow strict protocol protecting and preserving quality of organic produce, which withstands the handling under household conditions better than conventional produce. From practical standpoint, however, it is still worthwhile to learn the profile of consumers, who believe that organic foods store better than conventional foods.

Table 1 shows summary statistics of respondent and household characteristics. The socioeconomic characteristics include the monthly household income. Respondents could initially choose among eight income categories, but the response summary suggests that the lowest and the highest income include very few observations and should be combined. Ultimately, the reported income is classified in five categories. Education of the respondents likely affects food perceptions. Specifically, respondents with a high educational attainment may be better informed and may choose foods differently than respondents with less formal education. The average respondent reports more than 13 year of formal education.

The average respondent is 41 years old (Table 1). Age often influences food choices for multiple reasons, but in case of organic foods Jolly (1991) indicates that older consumers are more likely to buy organic products than younger ones. Also, older people showed more concern about their health (Bittencourt et al., 2002) and the perceived wholesomeness of organic foods may motivate the purchase. The average urban household included 1.2 children no older than 18 years. It appears that a number of households consist of two generations because the average household included 2.6 adults. It is not unusual for Korean households to include an aging parent of one of the spouses or for a grown up child to continue to live with her parents. About 42% of respondents are homemakers (Table 1). Homemakers allocate time differently than working women, may shop for food more frequently and for a longer period of time and, as a result, observe and experience difference between organic and conventional foods.

Location may influence consumer attitudes alone (for example, Moon et al., 2002). Seoul is the largest urban area in Korea, while urban residents represent more than 80% of the total Korean population. The high concentration of population in Seoul makes this area crucial for food marketers and suppliers. Therefore, the comparisons regarding the location effect on organic and conventional food perceptions focus on differences between Seoul and other

surveyed urban centers. In total, the surveyed residents from outside Seoul metropolitan area account for about 53% of respondents (Table 1).

Opinions of respondents about how important for them that food should have the right appearance ('rapp') or that food should be inexpensive ('inexp') may matter when considering the purchase of organic versus conventional products. The degree of importance of certain attributes of food for the respondents, while preparing meals may also matter. An attribute that is increasingly relevant for urban consumers in Korea is the speed of cooking. The average level of attached importance to fast cooking (cookf) is 4.2 on a seven-step scale (Table 1). The importance to store food without refrigeration (refless) was similarly important (average rank 4.2), while the importance of food keeping well in the refrigerator (refg) is more important than the without refrigeration (average rank 4.8). Additional opinion variables measure the degree of agreement with the aims of new agricultural and food technology development. In particular, to ease the cooking (easck) is ranked high in importance (4.9), lower the cost of food (costred) is ranked higher (5.2), but the aim of new technologies to reduce the amount of fertilizer (fertred) and pesticide (pestred) used in production receives the highest ranking (5.7, respectively; Table 1). Finally, the willingness to pay for the foods developed with sweeter taste (swtast) is also included as a predictor variable as a measure of taste influence on perception of differences between conventional and organic foods.

Empirical model specification

A logit technique suits the estimation of the empirical model. The response variables are binary and assume values of 1 or 0 and refer to the perception of a specific attribute differentiating organic from conventional foods. The parameter estimates are interpreted in terms of the relative changes in the odds of an event occurring. The dependent variable accounted for

the decision to agree that a specific attribute was more likely an organic food feature rather than a conventional food feature.

The empirical equation limited to the socio-economic and demographic variables is

$$Y = b_0 + b_1 \text{ income} + b_2 \text{ age} + b_3 \text{ educ} + b_4 \text{ occp} + b_5 \text{ adult} + b_6 \text{ childno} + b_7 \text{ Inchon} + b_8 \text{ Daejeon} + b_9 \text{ Daegu} + b_{10} \text{ Ulsan} + b_{11} \text{ Busan} + b_{12} \text{ Kwangju},$$

where Y is the decision to agree that an attribute is more likely the feature of organic rather than conventional food and other variables are defined in Table 1. In addition, several opinion variables, viewed relevant to a specific attribute, are included in each equation. The opinion variables are: for the response variable ‘expensive,’ the opinion on how important is for a respondent that the food be inexpensive (‘inexp’) and the degree of agreement with the aim of new agricultural and food technology to lower the cost of food (‘costred’); for response variable ‘healthy,’ the degree of agreement with the aim of new agricultural and food technology to reduce the amount of fertilizer (‘fertred’) and pesticide (‘pestred’) used in production; for response variable ‘taste,’ the willingness to pay for the foods developed with sweeter taste (‘swtast’); for response variable ‘storability,’ the views about the degree of importance that food stores without refrigeration (‘refless’) and keeps well in the refrigerator (‘refg’); for response variable ‘ease of cooking,’ the views about the degree of importance of food to cook fast (‘cookf’) and the degree of agreement with the aim of new agricultural and food technology to ease cooking (‘easck’); and, for response variable ‘appearance,’ the opinion on how important is that the food should have the right appearance (‘rapp’).

The relationship is linear between the logit and the predictor variables. The logit technique estimates a parameter that is the log of odds of an event occurring, $\frac{\pi}{1-\pi}$, where π is the probability of $Y=1$ and $1-\pi$ is the probability of $Y=0$, respectively (Mendenhall and Sincich,

1996). The antilog of an estimate (e^{β_i}) is the odds ratio and its value greater than one implies that the event (perception that organic foods are better than conventional foods with respect to one of the six selected attributes) is more likely to happen and odds ratio of less than one means that the event is less likely to happen.

Estimation results

All equations are estimated using the maximum likelihood method. The chi-square values of the likelihood ratio test for the global null hypothesis indicate probabilities in each specified equation to be highly significant (Table 2). Table 2 shows the estimates, chi-square values and odd ratios for all six equations. The results interpret the log of odds and odds ratios.

Organic foods are more expensive than conventional foods

The results show that respondents from households reporting high income are more likely to perceive the organically produced foods more expensive than conventionally produced foods, than those from households with less income. The households in the higher income categories tend to purchase more and diverse organic products than those in the lower income categories and, therefore, are more aware of price difference. In general, organic foods sell at a premium. Davies et al. (1995) reported that consumers in the lower income groups are the least frequent purchasers of organic produce, although Fotopoulos and Krystallis (2002) suggest that higher household income may not indicate larger organic food purchases, but indicate that the lower income groups are more entrenched buyers. Respondents who are homemakers are more likely to consider organic food more expensive than those reporting other occupations. Homemakers likely spend more time shopping than females who work part or full time and may simply be better informed.

An increase in the number of adults in a household lowers the chances of a respondent considering organic foods more expensive than conventional foods. It is plausible that a larger number of adults implies that the issue of organic foods as free of synthetic pesticide residue is less urgent and the distinction between organic and conventional food less important.

Respondents, who consider it important that new agricultural and food technologies should focus on lowering the cost of food, are less likely to consider the organic produce as more expensive than conventional foods. Respondents from households located in Busan urban area are more likely to consider organic food more expensive than Seoul residents. Seoul residents observe and learn new trends faster than residents of other cities because Seoul is the capital. The weight of Seoul on dictating consumer preferences and shopping attitudes cannot be underestimated because they represent over twenty percentage of the total population in the country.

Organic foods are healthier than conventional foods

Respondents from households classified in the low income categories are less likely to consider organic foods as healthier than conventional foods than those falling into high income categories. Although no a priori expectations were formed regarding the effect of income on the perception of healthiness of organic foods, it appears that respondents from households reporting less income are less likely to consume organic foods. Homemakers are more likely than those with other occupations to view organic foods as healthier in comparison to conventional foods. It is likely that homemakers focus on wholesomeness of foods and are knowledgeable about the differences between organic and conventional foods. Respondents, who consider it important that new agricultural and food technologies should focus on the reduction of the amount of pesticide used in the production, are less likely to consider the organic produce healthier than conventional foods. Residents from households located in Daegu and Busan are more likely to consider organic foods as healthier than conventionally produced foods, in comparison to

residents of Seoul. The differences in health perception of various foods across urban centers are useful in developing local promotion programs.

Organic foods are tastier than conventional foods

Respondents willing to pay more for foods that taste sweeter are more likely to consider organic foods as tastier than the conventional foods than respondents less willing to pay a premium and than respondents who have not decided about their willingness to pay a premium. Respondents residing in Inchon, Daejeon, Daegu and Busan are less likely, while Kwangju residents are more likely to perceive organic foods tastier than conventional foods in comparison to Seoul residents. Taste has a powerful purchase influence and may be used to shape promotional efforts despite the inconclusive (Davies et al., 1995) or contradictory reports about organic food taste (Bonti-Ankomah and Yiridoe, 2006).

Organic foods store better than conventional foods

Food storage is commonly important to distributors, but a substantial amount of food is wasted due to poor handling in households. Societies value thrift and efforts to reduce food waste are real. An increase in the number of children in households and an increase in the level of education attainment of the respondent reduce the chances of respondents considering organic foods storing better than conventional foods. Education allows a respondent to critically assess an easily observable feature such as changes in storage and, in general, there is no evidence that organic foods store better than conventional foods. Respondents from Inchon, Daejeon and Busan are less likely to perceive organic foods as storing better than conventional foods in comparison to Seoul residents.

Organic foods are easier to cook than conventional foods

An increase in the amount of formal education received by the respondent reduces the odds of considering that the organic foods are easier to cook than conventional foods. More

education implies more knowledge and ability to critically assess possible differences between organic and conventional foods. The ease of cooking can be associated with the genetic makeup of a vegetable or fruit, but there is no evidence that organic production technique makes any difference in this respect. The ability to observe differences in cooking are likely stimulated by the preferences for time allocation associated with many highly educated individuals having a job. If organic foods cook easier Korean working females would likely quickly take advantage of such feature. The effect of education is supported by the effect of explicit preference for fast cooking foods. Specifically, respondents who prefer fast cooking foods are less likely to perceive organic foods as easier to cook than conventional foods. Therefore, the argument that organic foods “save time” may be difficult to use in encouraging their purchase among Korean women. Respondents who agree that the new agricultural and food technologies should focus on how to make the cooking easy are more likely to hold the opinion that the organic foods are easier to cook than conventional foods. Respondents from households located in Incheon, Daejeon, Ulsan, Busan and Kwangju are less likely to consider organic foods as easier to cook than conventional foods in comparison to respondents from Seoul. This is an interesting result because Seoul residents likely purchase organic foods more often than residents of other urban centers. It is possible that Seoul respondents may focus in their purchases on fresh organic produce that is eaten raw.

Organic foods have better appearance than conventional foods

The effect of education shows again as an important and relevant consumer characteristic in perceiving differences between organic and conventional foods. The higher the reported level of educational attainment, the less likely a respondent views organic foods as having a better appearance than conventional foods. The appearance is most important for the sales of fresh produce and the use of pesticides for prevention and control of insects and diseases allows

producing cosmetically perfect fruits and vegetables. The use of synthetic chemicals is banned in organic production, therefore, the unblemished appearance cannot be guaranteed. Respondents residing in Incheon, Daejeon, Ulsan, Busan and Kwangju have lower odds to perceive organic foods having a better appearance than conventional foods as compared to residents of Seoul. Respondents from households with higher income are more likely than respondents from households with less income to consider organic foods better looking than conventional foods. The association between income and appearance is not unusual when analyzing a visual attribute. High income households appear to have strong preferences for external attributes of a product across cultures.

Conclusions

This study examined factors influencing the perception of differences between organic and conventional foods among the surveyed Korean women residing in seven major urban areas of the country. The differences included six attributes. Among the six attributes, price of organic foods was perceived to be higher than that of conventional foods by an overwhelming majority of respondents and in some urban areas all survey participants viewed such foods as more expensive. Similar perception is associated with the healthiness of organic vs. conventional foods, where in one urban center all respondents perceive organic food as healthier. Such widely held views determine the emphasis of marketing efforts and promotion because although the perception of healthiness encourages purchases, the perception of high price may tamper the demand.

For organic food suppliers and retailers the effect of income is important. Income proves influential in determining the perception of organic foods as healthy, expensive and having better appearance than conventional foods. The set of food attributes allows the segmentation of high income buyers as a group that cares about health, can afford expensive food products and

believes as a group that organic foods have nice appearance. The link between income category and the three attributes suggests that organic foods may represent a purchase that provides the buyer with utility extending beyond food consumption and reflect self-perception of a special category of buyers.

Education modifies the income effect. It seems that a high level of educational attainment assures a broad knowledge and enables a consumer to critically assess differences between the organic and conventional foods. Respondent's education lowers the odds of perceiving organic foods as storing better, cooking easier or looking nicer than conventional foods. The first two attributes in particular require some observation and analysis of the observed phenomenon. Therefore, educated consumer is unlikely to accept a promotional message unless its content can be well supported by verifiable research. A sophisticated consumer of urban Korea is increasingly well educated and able to discern how realistic are statements accompanying organic food marketing.

Location offers a separate challenge to organic food suppliers and retailers. Results show clear regional differences across the six urban centers as compared to Seoul. Busan residents appear particularly savvy and differently than Seoul residents perceive each attribute. Busan residents are more likely than Seoul residents to view organic foods as more expansive or healthy, but less likely to view such foods as better storing, cooking, tasting or looking than conventional foods. Busan area residents are particularly likely sensitive to any messages about the superiority of organic foods and marketers must be acutely aware of this sensitivity. Kwangju residents in turn, differ from the Seoul residents in their positive perception of organic foods taste (in contrast to all other urban areas), but like those from Busan, are more skeptical of easier cooking or better appearance of organic rather than conventional foods. Residents of other urban

areas were more likely to perceive food differences in a way similar to Busan residents, except for the residents of Daegu who often did not differ in their perceptions from Seoul residents.

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Table 1. Descriptive Statistics of Variables Included in the Empirical Specification

Variable name	Description and units of measurement	Mean or share ^a	Std dev.
<i>Food attributes</i>			
Expensive	=1 organic food viewed as expensive, 0 otherwise	0.9381018	0.2411365
Healthiness	=1 organic food viewed as healthy, 0 otherwise	0.8913343	0.3114336
Taste	=1 organic foods taste better, 0 otherwise	0.6987620	0.4591117
Storability	=1 organic foods store longer, 0 otherwise	0.4140303	0.4928929
Ease of cooking	=1 organic foods easier to prepare, 0 otherwise	0.3768913	0.4849410
Appearance	=1 organic foods have better appearance, 0 otherwise	0.3700138	0.4831404
<i>Socio-economic factors</i>			
Income ^b	Category of monthly household income	3.3590096	1.2282816
Educ	Respondent's education in years	13.1746905	2.1687787
<i>Demographic factors</i>			
Age	Respondent's age in years	41.1746905	8.1800347
Adult	Number 19 years or older in the household	2.5639615	0.9096784
Childno	Number of children in the household (18 years or younger)	1.2022008	0.9543842
Occp	Respondent's occupation =1 homemaker, 0 otherwise	0.4154058	0.4931311
Inchon ^c	=1 household located in Inchon, 0 otherwise	0.0962861	0.2951863
Daejeon ^c	=1 household located in Daejeon, 0 otherwise	0.0784044	0.2689920
Daegu ^c	=1 household located in Daegu, 0 otherwise	0.0921596	0.2894502
Ulsan ^c	=1 household located in Ulsan, 0 otherwise	0.0536451	0.2254712
Busan ^c	=1 household located in Busan, 0 otherwise	0.1292985	0.3357610

Table 1. Continued.

Variable name	Units of measurement	Mean or share ^a	Std dev.
Kwangju ^c	=1 household located in Kwangju, 0 otherwise	0.0852820	0.2794931
Inexp	1= not important; ...; 7= very important	5.6485356	1.2187037
<i>Opinion variables</i>			
Costred	1= strongly disagree; ...; 7= strongly agree	5.2486188	1.3123778
Fertred	1= strongly disagree; ...; 7= strongly agree	5.5662983	1.2763503
Pestred	1= strongly disagree; ...; 7= strongly agree	5.6969697	1.2076385
Swtast	1=yes, 0 otherwise	0.3709677	0.4834539
Refless	1= not important; ...; 7= very important	4.1883657	1.5941912
Refg	1= not important; ...; 7= very important	4.8482759	1.5401219
Cookf	1= not important; ...; 7= very important	4.2262069	1.5832785
Easck	1= strongly disagree; ...; 7= strongly agree	4.9181692	1.4870609
Rapp	1= not important; ...; 7= very important	6.0486787	1.0229240

^a Share in case of a binary variable.

^b 1=<\$2300 ; 2=From \$2300 to \$2899; 3=From \$2900 to \$3499 ; 4=From \$3500 to \$4499;
5=>\$4500

^c Seoul is the benchmark for measuring the effects of location.

Table 2. Estimation Results and Calculated Odds Ratios for the Perception of Six Organic Food Attributes

Variable name	Parameter estimate	Wald Chi-Square	Odds ratio
----- Expense -----			
Intercept	3.6073	3.2803	-
Income ^a	0.3537	6.1329	1.424
Educ	0.0375	0.1890	1.038
Age	-0.0022	0.0087	0.998
Occp ^a	1.2388	8.9118	3.451
Adult ^a	-0.5790	7.2753	0.560
Childno	-0.3088	0.1473	0.734
Daejeon	1.7105	2.7041	5.532
Daegu	1.6084	2.3980	4.995
Ulsan	0.4022	0.3693	1.495
Busan ^a	1.7445	5.1144	5.723
Inexp	0.1891	1.9600	1.208
Costred ^a	-0.4089	7.3027	0.664
Chi-square value	46.2257	Probability value	<0.0001
----- Healthiness -----			
Intercept	3.0099	1.0893	-
Income ^a	0.2454	5.1259	1.278
Educ	0.0853	1.7411	1.089
Age	-0.0097	0.2659	0.990

Table 2. (continued)

Variable name	Parameter estimate	Wald Chi-Square	Odds ratio
Occp ^a	0.7717	7.6993	2.163
Adult	-0.0839	0.2311	0.919
Childno	-0.1348	0.7230	0.874
Inchon	0.2081	0.2526	1.231
Daejeon	0.5438	1.3588	1.723
Daegu ^b	1.6583	4.9534	5.250
Ulsan	0.9028	1.9977	2.467
Busan ^a	1.9834	10.1568	7.267
Fertred	-0.0922	0.2673	0.912
Pestred ^c	-0.3618	3.3293	0.696
Chi-square value	49.5960	Probability value	<0.0001
----- Taste -----			
Intercept	2.2658	4.3163	-
Income	0.0491	0.3274	1.050
Educ	-0.0634	1.5446	0.939
Age	0.0049	0.1229	1.005
Occp	0.2245	1.2691	1.252
Adult	0.1827	1.7418	1.200
Childno	0.0200	0.0277	1.020
Inchon ^a	-1.3675	21.2709	0.255
Daejeon ^a	-1.5708	22.4024	0.208

Table 2. (continued)

Variable name	Parameter estimate	Wald Chi-Square	Odds ratio
Daegu ^b	-0.7502	5.0054	0.472
Ulsan	-0.3083	0.4151	0.735
Busan ^c	-0.5071	2.8568	0.602
Kwangju ^b	0.8892	3.6862	2.433
Swast ^a	-0.3635	7.2790	0.695
Chi-square value	77.3048	Probability value	<0.0001
----- Storability -----			
Intercept	0.8676	0.9651	-
Income	0.0536	0.5531	1.055
Educ ^b	-0.0842	3.9482	0.919
Age	0.00399	0.1154	1.004
Occp	0.0825	0.2463	1.086
Adult	-0.1465	1.6033	0.864
Childno ^b	-0.2031	3.8478	0.816
Inchon ^a	-1.6718	21.1365	0.188
Daejeon ^a	-1.7263	18.5281	0.178
Daegu ^b	0.0450	0.0249	1.046
Ulsan	-0.1455	0.1769	0.865
Busan ^c	-0.4909	3.6674	0.612
Kwangju	0.2648	0.8481	1.303
Refless	0.0131	0.0425	1.013

Table 2. (continued)

Variable name	Parameter estimate	Wald Chi-Square	Odds ratio
Refg	0.0730	1.1855	1.076
Chi-square value	70.3421	Probability value	<0.0001
----- Ease of cooking -----			
Intercept	0.4123	0.1879	-
Income	0.0259	0.1129	1.026
Educ ^c	-0.0848	3.6707	0.919
Age	0.00137	0.0119	1.001
Occp	0.0631	0.1229	1.065
Adult	-0.1588	1.6331	0.853
Childno	-0.0880	0.6281	0.916
Inchon ^a	-1.9800	24.3050	0.138
Daejeon ^a	-3.9064	14.7458	0.020
Daegu	-0.2626	0.8244	0.769
Ulsan ^a	-1.1331	7.0553	0.322
Busan ^a	-0.9222	11.3459	0.398
Kwangju ^b	-0.6760	5.0644	0.509
Cookf ^c	-0.1120	3.8001	0.894
Easck ^a	0.3111	23.0838	1.365
Chi-square value	140.6452	Probability value	<0.0001
----- Appearance -----			
Intercept	2.8067	7.7399	-

Table 2. (continued)

Variable name	Parameter estimate	Wald Chi-Square	Odds ratio
Income ^c	0.1369	3.3843	1.147
Educ ^a	-0.1324	9.2312	0.876
Age	-0.0131	1.1826	0.987
Occp	0.1065	0.3873	1.112
Adult	0.00174	0.0002	1.002
Childno	-0.00611	0.0033	0.994
Inchon ^a	-1.6730	22.7906	0.188
Daejeon ^a	-2.3817	23.9589	0.092
Daegu	-0.2352	0.6920	0.790
Ulsan ^b	-0.8410	4.8966	0.431
Busan ^b	-0.5986	5.3489	0.550
Kwangju ^a	-1.0814	11.3429	0.339
Rapp ^b	-0.1755	4.6091	0.839
Chi-square value	80.8834	Probability value	<0.0001

^a Significant at the $\alpha = .01$

^b Significant at the $\alpha = .05$

^c Significant at the $\alpha = .10$