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Societal Context and Its Impact on Demand for New Products: the case of grapefruit in South Korea

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Abstract

The average grapefruit consumers in South Korea first consumed the fruit within the past four years. Marketing growth and development have led to increased imports of grapefruit in South Korea. This study investigated factors influencing grapefruit consumption experiences and consumption patterns after initial consumption, focusing on social context, and further divided by physical and social context. Survey results showed that approximately 80% of consumers have consumed fresh grapefruit. Physical contexts such as living area and accessibility of fresh grapefruit were important for consumption experiences, but social facilitation such as having family and peers who like grapefruit were significantly related to repeated consumption. The popularity of grapefruit (boom) influenced not only grapefruit consumption experiences but repeated and returned consumption. Taking prescription medication was a barrier for trying grapefruit, and health conscious consumers were more likely to have stopped consuming grapefruit, which may raise a potential issue of grapefruit-medication interactions in the South Korean market in the future, as has happened in the U.S. and Japan.

Keywords

Social Context, New Products, Grapefruit, South Korea

1. Introduction

Industry and researchers have been interested in investigating market response toward new products. Consumer behavior toward new products, in particular food, may vary depending on individuals' characteristics, attitudes to food consumption and social contexts. When new products are marketed, some consumers may immediately try them, while some others may wait until the product gets popular and they are familiar with the food. Fisher and Price (1992) described social behavior for new products between superordinate and subordinate groups. Subordinates imitate superordinates' behavior, while superordinates maintain their social distance from subordinates through subsequent innovations. Consumption of new products and early adoption behavior are typical ways to distinguish the behavior of superordinates from subordinates.

Food consumption is influenced by social facilitation (Clendennen et al., 1994; De Castro & Brewer, 1991) defined as the presence of other people altering individual behavior (Zajonc, 1965). Along with marketing, customer reviews and peer group recommendations or opinions may influence consumer interest in the food (Fortin & Yazbeck, 2015). Consumers may easily try or accept a new food when their friends, neighbors or co-workers consume or recommend it, or when they have seen positive information on a TV show, or famous stars consuming the products (IOM, 2005). Birch (1999) stated that social factors can influence food preferences and also reduce neophobia. Along with these factors, individuals' attitudes about food, in particular internal attributes after consumption, will play a key role in repeated consumption (McCluskey et al., 2007) and acceptance of the food (Kim et al., 2015b).

Recent trade statistics in South Korea have signaled a change in the South Korean grapefruit market. Imports from the United States, South Africa and Israel in 2014 more than doubled

compared to 2013. Industries are actively developing products related to grapefruit such as beverages, desserts, alcoholic beverages, food etc. South Korea initially imported grapefruit in 1988. However, a misinterpreted lab test on grapefruit for Alar, a chemical with a potential for causing cancer was released to the media in 1989. Even though the mistake was discovered, consumer concerns about Alar decreased grapefruit consumption and imports between 1998 and 2006. Some generations are already familiar with grapefruit, while young people may consider grapefruit to be an exotic fruit. Attitudes toward grapefruit tastes are divided between those who favor it and those who don't due to the bitter taste. Mattes (1994) and Stein et al. (2003) found that familiarity and health-related information increased consumers acceptance of a bitter beverage. A gap of grapefruit exposure between generations may influences consumers' familiarity and acceptance of the bitter taste.

U.S. shipments to South Korea accounted for 2% of total U.S. grapefruit exports in 2007 but accounted for 6% in 2013. The importance of South Korean markets is increasing as shipments to Japan, which is the largest importer of U.S. grapefruit, continually decrease. Also, the recent implementation of KORUS FTA is expected to increase the ability of U.S. grapefruit and grapefruit juice to compete in the South Korean market. Due to the potential for growth, the Florida citrus industry conducted promotional activities for three consecutive years as a part of a market access program (MAP) of the United States Department of Agriculture (USDA). The current marketing program focuses on informing the public of grapefruit's benefits (e.g., vitamins and calories) and the attributes of Florida grapefruit. However, there is currently a lack of research identifying factors that are important to South Korean consumers when it comes to this fruit that is relatively new to their market. Also, some opposition protests to imported food (U.S. beef in 2008 and open rice

market in 2006 and 2014) reveal that consumers in South Korea seem very sensitive to imported agricultural products.

In this study, we aim to identify factors influencing fresh grapefruit consumption and factors influencing consumer segmentations after initial trial. We developed a survey to understand Korean consumers' attitudes toward food consumption related to trends, health, ethnocentrism, and social context, as well as Korean consumers' attitudes toward grapefruit attributes by consumer segments. Participants who have consumed fresh grapefruit were asked to identify their fresh grapefruit consumption patterns following their initial trial, i) loyal consumers: I have continually consumed fresh grapefruit from that time, ii) lapsed consumers: I consumed fresh grapefruit for a while, but I stopped consuming for some reason, iii) returned consumers: I did not consume fresh grapefruit regularly right after trial, but I started to consume it sometime later, and iv) non-consumers: I have never consumed fresh grapefruit after trial. Consumers' initial responses and consumption changes are signals that can help us understand future trends. The outcomes identifying consumer profiles (socio-economics), tendency to consume/purchase food (health, ethnocentrism, and societal trends), social context and attitudes toward grapefruit by consumer segments may help to develop successful marketing strategies for fresh grapefruit. In addition, the results may be useful for providing a general understanding of consumers' food consumption attitudes in South Korea and provide ideas to other commodity groups interested in the market.

2. Model

Assuming grapefruit as a new fruit in the South Korean market, an individual's first trial may depend on their personal characteristics, social context and attitude toward food consumption. If an individual has consumed the new product, his/her consumption patterns may also depend on his/her attitude to the product, in particular internal attributes of the products along with the previous factors.

[Figure 1]

Using the latent variables, the probability of fresh grapefruit consumption experiences, Eq. (1), and consumer segments after initial consumption of fresh grapefruit, Eq. (2), can be expressed by logistic functions with an assumption of generalized extreme value (GEV) distribution for the random component¹. A model for a binary selection is expressed in Eq. (1) where Y_i^* is the latent variable measuring the propensity to consume fresh grapefruit, Y_i is a dichotomous variable of consumption experience (1 indicates that a respondent has consumed fresh grapefruit and 0 indicates otherwise), X is a matrix of explanatory variables, β are estimated parameters of corresponding covariates and ε_i is residually assumed following GEV distribution. The indicator function, I , has the value of 1 if the latent variable is greater than or equal to zero and has the value of 0 if the latent variable is less than zero. Under the GEV distribution assumption, the probability that i th consumer has consumed fresh grapefruit consumption is expressed as a logistic function.

$$Y_i^* = X\beta + \varepsilon_i, Y_i = I(Y_i^* \geq 0)$$

$$P(Y_i = 1 | X) = P(Y_i^* \geq 0) = P(X\beta + \varepsilon \geq 0) = P(\varepsilon \leq X\beta) = \frac{e^{x'\beta}}{1 + e^{x'\beta}} \quad (1)$$

¹ Two-step approaches may be considered as alternative models to correct sample selection bias. In the second stage, our dependent variables follow multinomial responses. Heckman (1979)'s approach including an inverse Mill's ratio (hazard ratio) in the second stage has not proven to be a practical solution in the case of a random utility framework due to the complexity of the hazard ratio for each outcome including a base outcome.

The model with multiple outcomes can be expressed by random utility theory. Let U_{ij} be the utility level when i th individual selects j th among J alternatives. Therefore, each individual will choose an alternative that provides the maximum utility ($U_{ij} > U_{ik}, \forall j \neq k$). Using this concept, we express the model in Eq. (2) with consistent notation in binary cases. Note that the explanatory variable, Z , includes individuals' attitudes to the product. The latent variable, Y_{ij}^* , measures the rates of i th individual choosing a j th alternative. The observable variable, Y_{ij} , is 1 if i th individual chooses j th alternative. With an assumption of the error terms followed by generalized extreme value (GEV) distribution, the probability can be expressed by the multinomial logit model (McFadden, 1974).

$$\begin{aligned}
 Y_{ij}^* &= Z_i' \beta_j + \varepsilon_{ij}, Y_{ij} = I(Y_i = j) \\
 P(Y_{ij}) &= P(Y_{ij} \geq Y_{ik}, \forall j \neq k) = P(Z_i' \beta_j + \varepsilon_{ij} \geq Z_i' \beta_k + \varepsilon_{ik}, \forall j \neq k) \\
 &= P(Z_i' \beta_j - Z_i' \beta_k \geq \varepsilon_{ik} - \varepsilon_{ij}, \forall j \neq k) = \frac{e^{Z_i' \beta_j}}{\sum_k e^{Z_i' \beta_k}}
 \end{aligned} \tag{2}$$

3. Methodology

Survey Design

A questionnaire was designed to understand Korean consumer attitudes to food consumption, to understand consumers' social contexts and individuals' characteristics related to grapefruit consumption. The questionnaire consists of three sections: i) demographics such as gender, age, income and the highest level of completed education, and particular individual characteristics related to grapefruit consumption such as living area, taking prescription medication that interacts with grapefruit consumption, time of first consumption of grapefruit and having information about

grapefruit consumption, as summarized in Table 3; ii) questions about consumer attitudes toward food consumption focused on health, food trends and ethnocentrism, as summarized in Table 2, and social contexts related to grapefruit consumption, as summarized in Table 3; and iii) consumer attitudes toward grapefruit attitudes (taste preferences, convenience of eating, effect on weight control etc.), as summarized in Table 3.

We reviewed previous studies measuring attitudes about health, ethnocentrism and social trends (Granzine & Olsen, 1998; Kesić & Piri-Rajh, 2003; Kucukemiroglu, 1999; Rybina et al., 2010) and included statements describing attitudes related to food consumption or purchases from these studies (translated into Korean). Statements used in the survey can be found in Table 2.

Respondents were asked to indicate agreement/disagreement on seven-point Likert scales for the questions.

The social context of grapefruit consumption was categorized into geographical area, social facilitation, and awareness of popularity. Geographical area was measured with consumers' living areas, in particular whether they lived in the area of Seoul (capital city of South Korea) or not, and accessibility grapefruit for purchase. The social facilitation was measured to determine whether or not respondents have a family barrier to purchasing grapefruit and whether respondents have peers consuming grapefruit. All responses were originally measured using seven Likert scales of agreement/disagreement. However, we used dummy coding for agreement (=1 if the original selection was 5, 6, or 7 and =0 if otherwise), because we added a 'Don't know' option in the questions to avoid forcing answers.

Respondents were asked to identify whether they have consumed fresh grapefruit or not. If respondents had done so, a follow-up question asked when they consumed fresh grapefruit for the

first time (in years) and how their consumption pattern changed such that consumers could be divided into four segments: loyal consumers, lapsed consumers, returned consumers, and non-consumers. Respondents who have consumed grapefruit were then asked to indicate agreement/disagreement about internal factors (i.e. grapefruit attributes) on seven Likert scales.

Statistical Analysis

Descriptive analysis was used to provide general attitudes toward food consumption and grapefruit attributes by consumer segments based on initial responses regarding fresh grapefruit consumption. In addition, factor analysis was used to reduce dimensions of twelve statements asking about consumer attitudes toward health, ethnocentrism and societal trends. To identify the adequacy of factor analysis, a Kaiser-Meyer-Olkin measure of sampling adequacy (KMO-MSA) was conducted before performing factor analysis (Kaiser, 1970). The value of the KMO-MSA ranges between zero and one. As the value approaches 1, the data set is more correlated and it provides stronger support for factor analysis. Kaiser (1974) found that a value between 0.8 and 0.89 is meritoriously appropriate for factor analysis. After conducting factor analysis, a reliability analysis was conducted using Cronbach's alpha coefficients to test the internal consistency of each factor. A Cronbach's alpha statistic of 0.7 or higher is considered acceptable to measure correlation (Nunnally, 1978).

Analysis of variance ANOVA was used to test the mean differences of attitude variables among consumer segments. The ANOVA test is appropriate under satisfaction of the assumption of normal distribution and homogeneity of variance. Based on the test results of the Kolmogorov-Smirnov test, normality was rejected for all variables. As a nonparametric approach, the Kruskal-Wallis test was used. Due to the assumption of homogeneity of variance in the Kruskal-Wallis test,

the O'Brien's test was conducted (Maxwell & Delaney, 2004, p. 116). The null hypothesis of homogeneity of variance was not rejected with 5% significant levels. Note that 5% significant levels were used for all statistical tests.

We applied a binomial logit model for fresh grapefruit consumption experiences and a multinomial logit model for consumer segments after initial consumption of fresh grapefruit to identify consumer characteristics. After regression of each model, the marginal effect was calculated to compare the relative importance of the covariate on the probability. The Delta method was used for inference of marginal effects.

4. Results

Respondent profiles

An online survey was conducted in August and September 2014. Our target sample was consumers age 18+ and consumers who have purchased any fresh fruit and/or fruit products between September 2013 and August 2014. Of 2,720 participants, 1,410 completed the survey.

Approximately 87% of invalid participants were screened out because they did not meet the criteria of age or fruit purchases. Additionally, approximately 13% did not pass a questions designed to detect consumers who were not reading questions carefully (Jones et al., 2015).

Respondents were generally young, educated and high income and lived in urban areas, as shown in Table 1. Even though respondents' profiles do not represent the population, the sample likely represents fruit consumers (Lee & Shin, 2015). Based on Nielson home scan data, grapefruit juice

buyers were high income and highly educated in the United States (Florida Department of Citrus, 2014). Also, the target sample of the MAP is above middle income households.

Of the valid respondents, approximately 80% indicated that they have consumed fresh grapefruit. Those respondents were asked to indicate when they consumed fresh grapefruit for the first time, as well as whether or not they continued to consume. Of those who have consumed fresh grapefruit, approximately 30% were loyal consumers (continually consumed fresh grapefruit since the first time), approximately 17% were returned consumers (they did not consume fresh grapefruit regularly right after the first time, but they started to consume it sometime later), approximately 31% were lapsed consumers (they consumed fresh grapefruit for a while but stopped consuming it for some reason), and approximately 22% were non-consumers (they have never consumed fresh grapefruit after trial). These figures indicated that of respondents aged 18+, approximately 37% (sum of loyal and returned consumers) were current consumers and the rest were potential consumers.

[Table 1]

Factor analysis

Consumer attitudes about foods were measured with twelve statements. Factor analysis was conducted to identify related statements, i.e., explaining similar targets. The KMO-MSA value was 0.83, indicating that the data set is meritoriously appropriate for factor analysis. Based on the eigenvalue criteria greater than unity, three factors were selected. The three factors explain 54% of the total variation. Rotated factor loadings were sorted and grouped with higher loadings, as shown in Table 2. Higher loadings indicate higher correlations to the factor. The first factor is named “trend spotter” because four statements with high loadings describe consumers who are willing to

try foods that are ‘new’. The second factor is named “health spotter” because the statements address consumers’ behavior of trying to have natural foods and consumers’ strong beliefs about the relationship between food and health. The last factor, named “national interest spotter” describes consumers’ attitudes toward imported fruit purchases and concerns about the domestic fruit industry. The Cronbach’s alpha of the first two factors of innovation and health consciousness is 0.79 and 0.70, respectively, which is in the satisfactory range of 0.60 to 0.80 proposed in Malhotra (1993). The Cronbach’s alpha of the factor of domestic industry concerns is 0.58, which is slightly below satisfactory. However, Schmitt (1996) noted that a low reliability as low as .49 may not be a major impediment to use as long as a measure has other desirable properties such as meaningful content coverage.

[Table 2]

Attitude toward fresh grapefruit attributes

Consumer attitudes about fresh grapefruit were measured and compared by groups. Basic statistics and ANOVA test results are in Table 3. All Kruskal-Wallis statistics are statistically significant at 5% levels, indicating that averages by segments are significantly different, with the exception of the ‘Domestic’ variable. Average consumers have consumed fresh grapefruit for the first time within the last four years. Consumers who have a long history of fresh grapefruit experiences tend to be loyal consumers. Of consumers who have consumed fresh grapefruit, approximately 15% indicated that they consumed fresh grapefruit ten or more years ago. Information about grapefruit benefits was positively related to consumers’ grapefruit consumption. Approximately 68% of loyal consumers indicated that they have seen the information, while only 21% of non-consumers and 13%

of consumers without fresh grapefruit experiences indicated the same. Also, loyal consumers were relatively influenced by social trends and health conscious compared to other groups.

In general, loyal consumers had high average scores of external factors influencing grapefruit consumption followed by returned and lapsed consumers. The pair-wise tests indicated that respondents who have not consumed fresh grapefruit and who were non-consumers were mostly homogenous except for the variable of friends. Loyal consumers were at low risk of medication interactions, had no preference contradictions within their family, had easy access to grapefruit for purchasing, and considered the popularity of grapefruit.

Not surprisingly, average scores of grapefruit attributes were high for loyal consumers and were low for non-consumers. The average scores of lapsed and returned consumers were not statistically different. Average loyal consumers agreed that fresh grapefruit are nutritious, tasty, thirst quenching, and help one lose weight, while their attitudes toward value, size, eating convenience, price, and bitterness were relatively low.

[Table 3]

Estimated results of econometric model

Tables 4 and 5 include results of binomial and multinomial logit regressions. The likelihood ratio (LR) test results indicated that the covariates significantly explain the total variations. We will first look at the factors influencing consumption experience of fresh grapefruit in Table 4.

Demographics significantly explained consumers' fresh grapefruit experiences. Consumers who were female, educated and had high levels of household income were more likely to have consumption experience of fresh grapefruit. Consumers' ages were not significantly related to

grapefruit consumption experience. Consumers who have seen benefits of grapefruit consumption and do not take any prescription medication that interact with grapefruit consumption were more likely to have fresh grapefruit consumption experience. Consumers who were trend health spotters were more likely to have fresh grapefruit consumption experience, while concerns about domestic industry were not significantly related. Consumers who can purchase grapefruit easily and live in the Seoul-metropolitan area were more likely to have fresh grapefruit consumption experience, while the factors of preference contradiction with family members and having friends who consume grapefruit did not significantly explain fresh grapefruit consumption experience. Consumers who consider grapefruit to be popular were more likely to have fresh grapefruit experience. Marginal effects showed that the factor of seeing grapefruit information had the greatest influence on the probability followed by ease of purchase and gender. The predicted probability of consuming fresh grapefruit was approximately 13.4 percentage point higher for the respondents who had seen the benefits of grapefruit than for respondents who have not seen the information.

[Table 4]

Results of multinomial logit regression were shown in Table 5. The reference group is non-consumers who have never consumed fresh grapefruit after their first consumption. Therefore, all interpretation of the estimated parameters is relative to non-consumers. If an estimated parameter is positive and significant, the covariate is positively related to the relative probability of being loyal, returned or lapsed consumers rather than being non-consumers when other effects are the same. For example, the relative probability of being loyal consumers rather than being non-consumers is higher for educated consumers than for less educated consumers when other covariates are the same. Instead of relative probability, we will interpret the results focusing on marginal effects of

covariates across consumer groups to see the effect of covariates on actual probabilities. For dummy variables, the marginal effect indicates the differences of predicted probability when a covariate is unity and the covariate is zero given all other covariates are at mean. For continuous variables, the marginal effect indicates the change of predicted probabilities when a covariate increases one unit at the mean of the covariate. Standard errors of marginal effects were calculated using delta methods for statistical inferences.

Among measured demographics, consumers' gender, levels of education and income were significantly related to grapefruit consumption patterns. The marginal effect of being male on loyal consumers was positive, at 0.06, which indicates that the probability of being loyal consumers is on average about 6.0 percentage points higher for male respondents than for female respondents, controlling for other covariates. However, the marginal effect of being male on returned consumers was negative, at -0.058. The marginal effects of being educated and having high income on loyal consumers were positive, at 0.058 and 0.068, respectively.

The individual factor of not taking prescription medication significantly influenced grapefruit consumption experiences but did not significantly explain the characteristics of the consumer groups. The predicted probability of loyal consumers was higher by 20 percentage points and the predicted probability of lapsed consumers was lower by 8.1 percentage points for respondents who have seen information regarding the benefits of grapefruit consumption compared with respondents who have not seen the information. The number of years since first consumption of fresh grapefruit was positively related to the relative probabilities of loyal, returned and lapsed consumers compared to non-consumers. When the number of years increased, the marginal effect of loyal and returned consumers was positive, at 0.033 and 0.020, while the marginal effect of lapsed consumers is

negative, at -0.027. This indicates that the probability of respondents being loyal and returned consumers increased by 3.3 and 2.0 percentage points when the number of years increased and the probability of respondents being lapsed consumers decreased by 2.7 percentage points when the number of years increased.

The factor of interest in social trends positively related to the relative probability of respondents being loyal, returned and lapsed consumers compared to non-consumers. The probability of respondents being loyal consumers increased by 3.7 percentage points when the factor loadings of interest in social trends increased one unity at means. Similarly, the probability of respondents being lapsed consumers increased by 5.2 percentage points when the factor loadings of health increased one unity at means. Attitudes toward national interest did not significantly explain grapefruit consumption patterns.

Social context significantly explained grapefruit consumption patterns. The probability of respondents being loyal consumers was higher by 14.8 percentage points and the probability of respondents being lapsed consumers is lower by 11.4 percentage points when respondents do not have family members who dislike grapefruit. Similarly, when respondents have friends consuming grapefruit, the probability of respondents being loyal consumers is higher by 16.2 percentage points and the probability of respondents being lapsed consumers is lower by 19.5 percentage points.

Although geographical area significantly increased the probability of grapefruit consumption experiences, living in the Seoul-metropolitan area and being able to easily buy grapefruit did not significantly explain grapefruit consumption patterns after consuming grapefruit. The probability of respondents being returned consumers was on average about 6.8 percentage points lower for respondents living in the Seoul-metropolitan area than for respondents living out of the Seoul-

metropolitan area. Similarly, the probability of respondents being lapsed consumers was on average 6.8 percentage points higher for respondents living in the Seoul-metropolitan area than for respondents living out of the Seoul-metropolitan area. Awareness of grapefruit popularity positively related to the probability of respondents being loyal and returned consumers and negatively related to the probability of respondents being lapsed consumers. Interestingly, the probability of respondents being returned consumers was approximately 12.5 percentage points higher for respondents who were aware of grapefruit popularity than for respondents who were not aware of it. Similarly, the probability of respondents being lapsed consumers was 12.6 percentage points lower for respondents who were aware of grapefruit popularity.

Grapefruit (internal) attributes significantly explained the relative probabilities. In particular, taste, good-value for the money and reasonable price were positively related to the probability of being loyal, returned and lapsed consumers compared to non-consumers. In terms of marginal effect, the probability of being loyal consumers is 9.5, 4.4 and 3.2 percentage points higher when the evaluation of taste, good-value for the money and reasonable price increased one unity at mean of the covariates, while the increments of the factors decreased the probability of being returned consumers by 2.2, 2.9 and 3.1 percentage points.

[Table 5]

Discussion

On average, consumers who have consumed fresh grapefruit initially consumed fresh grapefruit within the last four years. This indicated that grapefruit was a relatively new product for average

consumers in South Korea and initial grapefruit consumption mostly took place after the resumption of active importation in 2006. As expected, loyal consumers had a relatively long history (approximately four years) compared to non-consumers (approximately two years). Also, consumption patterns after initial trial were significantly related to the first time they consumed fresh grapefruit. Consumers whose first consumption was earlier were more likely to be loyal and returned consumers, and less likely to be lapsed consumers.

Food consumption behaviors are influenced by environment, including both physical area and social context. From the study results, we found that the experience of new food consumption was influenced more by geographical area such as consumers' living areas and accessibility of the products than social facilitation. Even though South Korea is a geographically small country, the differences in culture, economy and information between central (i.e., Seoul-metropolitan area) and local areas are significant (Kim & Min, 2003). Also, grapefruit promotions by the Florida citrus industry mostly targeted the Seoul-metropolitan area. Therefore, consumers living in the Seoul-metropolitan area may have easy access to grapefruit. Also, the gap between the Seoul-metropolitan area and local areas influenced grapefruit consumption patterns. Marginal effects indicated that consumers living in the Seoul-metropolitan area were less likely to return to, but were more likely to stop, grapefruit consumption. This transition indicates that the grapefruit market in the Seoul-metropolitan area seems to be saturated and consumers living in local areas are interested in grapefruit consumption. Social facilitation was more closely related to repeated consumption of grapefruit than consumption experience. Consumers who have family members with no preference contradiction to grapefruit and who have friends consuming grapefruit were more likely to be loyal consumers. Also, the family factor was positive for returning grapefruit consumption and the effect of friends was positive to reduce the likelihood of lapsed consumption. In other words, if a

consumer has a family member or a peer who does like grapefruit, the consumer was more likely to continually consume grapefruit and vice versa. This outcome is consistent with previous studies by De Castro and Brewer (1991) and Clendennen et al. (1994).

Consumer age and prescribed medication are an important relationship that negatively influences grapefruit consumption in the U.S. (Kim et al., 2015a). Consumer age was significant to neither grapefruit consumption experience nor grapefruit consumption patterns in South Korea. Unlike the U.S. and Japan market, grapefruit consumers in South Korea are relatively young, with low rates of taking prescription medications that interact with grapefruit consumption. Concerns about grapefruit-medication interaction also decreased grapefruit consumption in Japan (Fukuda, 2013). Interestingly, the medication factor did not significantly explain consumption patterns, while consumers who didn't take prescription medication were more likely to have grapefruit consumption experience. This result indicates that consumers who took prescription medication may be aware of warnings about the grapefruit interaction effect, which builds a barrier to grapefruit consumption. However, once consumers have consumed grapefruit, the interaction effect seems less important than other factors. This result is consistent with Kim et al. (2015a) that indicated that grapefruit consumption changes by consumers taking prescription medication were significantly reflected by news coverage about grapefruit-medication interactions.

Current marketing programs by the Florida citrus industry are targeted to informing consumers about the internal attributes of grapefruit such as grapefruit's contents of vitamins and calories. Marketing studies have found a relationship between health information and consumer demand (Kinnucan et al., 1997; Boetel & Liu, 2003). Similarly, awareness of these benefits appears to successfully lead to not only initial grapefruit consumption experience but, also to keep consumers

in the grapefruit market. In particular, the benefits of low calories and vitamin C seem to fit the needs of consumers in South Korea well. Though the marginal effects, it can be shown that consumers who are aware of grapefruit benefits were more likely to be loyal and less likely to be lapsed consumers. The results supported Stein et al (2003), which concluded that health-related information may have greater effect on behavior than on hedonics.

Popularity reduced unfamiliarity and led consumers to try grapefruit, despite a lack of information about when/how the grapefruit boom started. Awareness of popularity increased not only grapefruit consumption experiences but also kept consumers in the market and brought returning consumers back to the market. Along with a diet boom known as the grapefruit diet, food industries and restaurants have developed various grapefruit drinks, desserts and flavored alcoholic beverages ex, grapefruit beer. The efforts trigger trend spotters who search for 'new' and are willing to experience new food. An issue is how long this boom will be and how the grapefruit industry maintains consumer interest.

Once a consumer consumed fresh grapefruit, his/her attitudes toward grapefruit attributes significantly influenced consumption patterns. In particular, taste and monetary value were positively related to grapefruit consumption. Although average consumers did not agree that grapefruit is not too bitter, average loyal consumers agreed that grapefruit tastes good. On average, loyal consumers experienced grapefruit consumption 3.8 years ago. This long time since initial experience may increase familiarity of grapefruit taste and then may increase acceptability of the bitter taste, as Stein et al (2003) found.

Understanding lapsed consumers is important to maintain or grow the market size. Due to its scope, this study may not fully discover lapsed consumers' behavior. However, the results indicated that

attitudes toward internal attributes of grapefruit were not strongly related to reasons for stopping grapefruit consumption. Instead, a distinguishable factor of lapsed consumers from other consumer groups was the health spotter factor. Consumer interests in health and safety can fuel an increased use of extrinsic quality cues (Grunert, 2006). The result indicated that lapsed consumers seem to no longer consider grapefruit as a food for maintaining their health. These consumers may have been exposed to any negative health effect of consuming grapefruit, such as grapefruit-medication interaction or issues related to acidity. Increasing health concerns about grapefruit consumption may diminish demand for grapefruit.

Conclusion

Although South Korea has imported grapefruit since 1988, misunderstanding about a lab test for Alar of grapefruit diminished demand for grapefruit for approximately 10 years. New imports of grapefruit, developments of products related to grapefruit, and marketing activities created a grapefruit boom in South Korea. However, a lack of information about the market and grapefruit consumers has limited the development of an efficient marketing program. With consideration of the gap of exposures to grapefruit between generations, this study focused on understanding factors influencing consumers' new food consumption experiences and consumption patterns after initial trials, with focus on social context, individual characteristics, consumer attitudes toward food consumption and attitudes about grapefruit attributes. A consumer survey was conducted and regression analysis was performed to identify factors.

Results show that on average, consumers in South Korea initially consumed fresh grapefruit within the last four years, which supports that grapefruit is relatively new in the market. Approximately 80%

indicated that they have ever consumed fresh grapefruit. Regression results indicated that physical context (living area and accessibility to purchase) influenced consumer new food experience, but social facilitation (family and peer favor grapefruit) significantly related to repeated consumption. Consumers who have seen positive information, were aware of the popularity of grapefruit and were trend spotters were more likely to have consumed grapefruit and were more likely to be repeated and returned consumers. Although taking prescription medication played a barrier for grapefruit trials, it did not impact repeated consumers. However, health spotters were more likely to be lapsed consumers, which may raise a potential issue of grapefruit-medication interaction in the South Korean market, as in the U.S. and Japan markets.

This study used two separate models to investigate likelihood of grapefruit consumption experience and likelihood of being loyal, return, lapsed and non-consumers due to the technical limitation of correcting selection bias to multinomial response outcomes. Therefore, in the second part, we only considered consumers who have ever consumed fresh grapefruit, which assumed no selection bias despite potential possibility.

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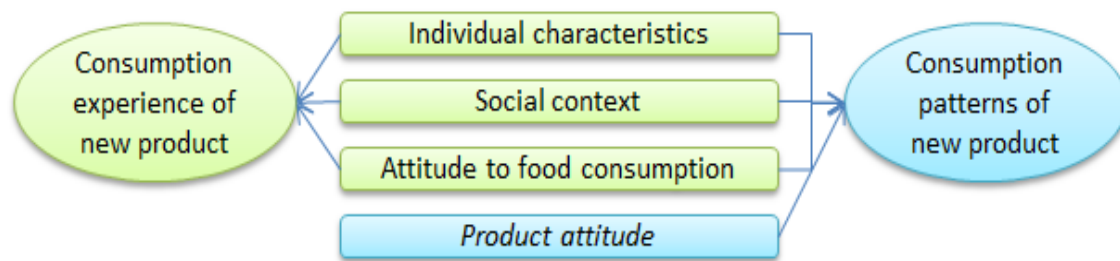


Figure 1. Conceptual model for new product consumption

Table 1. Respondents' profiles and consumer segments after initial tasting of fresh grapefruit

		Census	Total	Consumers	Consumers with fresh grapefruit			
		2010	respondents	without	experience			
		urban		fresh	Loyal	Returned	Lapsed	Non-
		Pop. age		grapefruit	consumer	consumer	consumer	consumer
		20+ ^{a)}		experience				
	N	3.5 mil	1,410	292	334	190	344	250
Gender	Female	51%	54%	39%	54%	67%	56%	58%
	Male	49%	46%	61%	46%	33%	44%	42%
Age	Average	38	39	38	40	38	40	36
Education	Less than college	65%	39%	50%	26%	37%	36%	49%
	College	35%	61%	50%	74%	63%	64%	51%
Household income	< 4.8mil won	60%	48%	63%	34%	42%	45%	58%
	4.8 mil+ won	40%	52%	37%	66%	58%	55%	42%
Living area	Seoul-metropolitan	63%	63%	54%	70%	60%	68%	56%

a) Source: Statistics Korea (<http://www.kosis.kr>)

Table 2. Rotated factor loadings of consumer attitudes toward food consumption

Statements	Trend	Health	National
	spotter	spotter	interest spotter
I think I am very fashion conscious.	0.75	0.11	0.11
If I see some information on TV or in magazines about good places to visit or stylish clothes, then I try to visit those places or wear those clothes.	0.67	0.17	0.05
I am an early adopter compared to my friends.	0.65	0.16	0.09
I always look for new foods and restaurants.	0.61	0.23	0.01
I prefer unprocessed, natural foods.	0.11	0.66	0.18
I try to eat healthy food even if the taste is bad.	0.19	0.61	0.09
I buy food that helps maintain my weight and appearance.	0.37	0.55	0.12
I believe that certain types of food help with or worsen my symptoms.	0.16	0.43	0.11
Eating imported food decreases the nation's agricultural competitiveness.	0.01	0.00	0.55
When I see news announcing domestic fruit sale decreases, I feel guilty.	0.19	0.08	0.54
My consumption behavior influences the nation's economy	0.11	0.27	0.43
I usually purchase fruits produced in Korea.	-0.06	0.26	0.41
Cronbach's alpha coefficient	0.79	0.70	0.58

Table 3. Results of Analysis of Variance

Variables	Descriptions	Consumer	Consumer w/ fresh GF experience				Kruskal-
		w/o fresh	Loyal	Lapsed	Returned	Non-	Wallis
		GF	consumer	consumer	consumer	consumer	Test (χ^2)
		experience					
Individual characteristics							
Years	When did you eat fresh grapefruit for the first	-	3.84 ^a	2.89 ^b	3.39 ^a	2.21 ^c	88.22 ^{**}
GF-info	I have seen any information about grapefruit	0.13 ^a	0.68 ^b	0.42 ^c	0.53 ^c	0.21 ^a	250.34 ^{**}
No-med	I do not take a medication which has	0.32 ^a	0.77 ^b	0.51 ^c	0.54 ^c	0.19 ^a	234.3 ^{**}
Factor loadings of attitudes to food consumption							
Trend	Trend spotter	-0.38 ^a	0.40 ^b	0.08 ^c	0.15 ^{bc}	-0.31 ^a	153.18 ^{**}
Health	Health spotter	-0.29 ^a	0.20 ^b	0.16 ^b	0.10 ^b	-0.23 ^a	93.79 ^{**}
National int.	National interest spotter	-0.09	0.00	0.04	0.08	0.00	9.23
Social context influencing grapefruit consumption (Dummy variable, =1 if yes)							
Easy to buy	It is easy to buy.	0.19 ^a	0.35 ^b	0.21 ^a	0.26 ^a	0.22 ^a	30.29 ^{**}
Family	I can purchase grapefruit because my family	0.35 ^a	0.61 ^b	0.50 ^{ab}	0.54 ^{ab}	0.45 ^{ab}	44.09 ^{**}
Friends	I have many friends who consume grapefruit.	0.56 ^a	0.68 ^{ab}	0.67 ^{ab}	0.67 ^{ab}	0.70 ^b	14.90 ^{**}
Popular	Grapefruit is popular.	0.05 ^a	0.11 ^b	0.06 ^{ab}	0.04 ^a	0.04 ^a	17.46 ^{**}
Grapefruit attributes (Likert scale, 1 is strongly disagree and 7 is strongly agree)							
Nutrition	Grapefruit is nutritious.	-	5.58 ^a	5.30 ^b	5.45 ^{ab}	4.80 ^c	86.29 ^{**}
Taste	Grapefruit is tasty.	-	5.46 ^a	4.63 ^b	4.66 ^b	3.61 ^c	240.10 ^{**}
Thirst	It quenches my thirst.	-	5.32 ^a	4.88 ^b	4.98 ^b	4.22 ^c	124.26 ^{**}
Weight	It helps me lose weight.	-	5.04 ^a	4.74 ^b	4.94 ^a	4.32 ^c	65.19 ^{**}
Good-value	It's a good value for the money.	-	4.99 ^a	4.43 ^b	4.38 ^b	3.91 ^c	117.89 ^{**}
Snack	It is a good size for a snack.	-	4.74 ^a	4.45 ^b	4.49 ^{ab}	4.46 ^b	13.08 ^{**}
Easy to eat	It is convenient to eat.	-	4.02 ^a	3.64 ^b	3.63 ^b	3.60 ^b	15.46 ^{**}
Good-price	The price is reasonable.	-	3.10 ^a	2.86 ^{bc}	2.62 ^b	2.94 ^{ac}	19.75 ^{**}
No-bitter	It is not too bitter.	-	3.04 ^a	2.87 ^{ab}	2.78 ^b	2.70 ^b	13.28 ^{**}

** indicates that Kruskal-Wallis statistics are significant at 5% levels.

a, b and c different superscripts in the same row indicate significant differences among groups at 5% level.

Table 4. Estimated results of logit model

	Consumer with GF experience		
	Coef.	Std. Err.	Marginal effect
Intercept	0.134	(0.296)	
Gender(male=1)	-0.542**	(0.163)	-0.068**
Age	0.002	(0.006)	0.000
Education (College+=1)	0.368**	(0.156)	0.047**
Income (4.8 mil+ won =1)	0.401**	(0.155)	0.050**
GF-info	1.167**	(0.201)	0.134**
No-med	0.329**	(0.155)	0.042**
Trend	0.414**	(0.094)	0.051**
Health	0.297**	(0.094)	0.037**
National int.	0.085	(0.105)	0.010
Family	0.052	(0.151)	0.006
Friends	0.374	(0.231)	0.043*
Living area (Seoul-metropolitan=1)	0.318**	(0.148)	0.040**
Easy to buy	0.810**	(0.178)	0.091**
Popular	0.312*	(0.175)	0.038*
N		1410	
Log-likelihood		-587.884	
LR test		262.65 (P<0.0001)	

**, * indicates that estimated parameters are statistically significant at 5% and 10% level, respectively.

Table 5. Estimated results of multinomial logit model (Reference group is non-consumer)

	Loyal consumer			Returned consumer			Lapsed consumer		
	Coef.	Std. Err.	M.E.	Coef.	Std. Err.	M.E.	Coef.	Std. Err.	M.E.
Intercept	-9.716**	(1.108)		-5.487**	(1.081)		-5.203**	(0.958)	
Gender(male=1)	0.201	(0.253)	0.060*	-0.306	(0.260)	-0.058*	-0.041	(0.219)	-0.005
Age	0.012	(0.011)	0.000	0.010	(0.011)	0.000	0.015	(0.009)	0.001
Education (College+=1)	0.495**	(0.244)	0.058*	0.188	(0.238)	-0.016	0.243	(0.206)	-0.007
Income (4.8 mil+ won =1)	0.585**	(0.235)	0.068**	0.388*	(0.235)	0.015	0.213	(0.202)	-0.041
GF-info	1.854**	(0.262)	0.200**	1.164**	(0.260)	0.017	0.871**	(0.233)	-0.081**
No-med	-0.231	(0.253)	-0.019	-0.301	(0.252)	-0.031	-0.084	(0.215)	0.030
Years	0.337**	(0.059)	0.033**	0.302**	(0.059)	0.020**	0.140**	(0.054)	-0.027**
Trend	0.581**	(0.149)	0.037*	0.408**	(0.145)	-0.006	0.500**	(0.127)	0.025
Health	0.121	(0.156)	-0.018	0.145	(0.153)	-0.010	0.318**	(0.131)	0.052**
National int.	-0.353**	(0.161)	-0.029	-0.227	(0.161)	0.003	-0.253*	(0.141)	-0.005
Family	0.974**	(0.250)	0.148**	0.445*	(0.245)	0.014	0.093	(0.210)	-0.114**
Friends	0.535*	(0.289)	0.162**	0.097	(0.295)	0.028	-0.583**	(0.284)	-0.195**
Living area (Seoul-	0.492**	(0.237)	0.043	0.012	(0.232)	-0.068**	0.493**	(0.201)	0.068*
Easy to buy	0.125	(0.247)	0.030	0.086	(0.248)	0.016	-0.103	(0.216)	-0.045
Popular	0.703**	(0.261)	0.060*	1.046**	(0.257)	0.125**	0.144	(0.229)	-0.126**
Taste	0.971**	(0.110)	0.095**	0.498**	(0.105)	-0.022*	0.608**	(0.094)	0.003
Nutrition	-0.136	(0.134)	-0.031*	0.049	(0.132)	0.014	0.021	(0.116)	0.015
Weight	-0.084	(0.130)	-0.020	0.018	(0.129)	0.005	0.033	(0.116)	0.015
Thirst	0.107	(0.121)	-0.004	0.167	(0.120)	0.010	0.145	(0.105)	0.010
Good-value	0.348**	(0.122)	0.044**	0.040	(0.120)	-0.029**	0.199*	(0.107)	0.009
Easy to eat	-0.036	(0.097)	0.011	-0.089	(0.097)	-0.002	-0.127	(0.087)	-0.019
Snack	0.017	(0.102)	0.000	0.027	(0.101)	0.002	0.018	(0.089)	0.000
Not-bitter	0.007	(0.100)	0.004	0.020	(0.100)	0.007	-0.040	(0.088)	-0.012
Good-price	0.188*	(0.108)	0.032**	-0.082	(0.109)	-0.031**	0.083	(0.095)	0.008
N					1118				
Log-likelihood					-1176.904				
LR test					686.54 (P<0.0001)				
Predicted probability	0.299			0.308			0.170		

**, * indicates that estimated parameters are statistically significant at 5% and 10% level, respectively.