

Long Term Impact of Provision of Food Safety Information on Food Demand

K.D.T.M. GUNAWARDANA and U.K. JAYASINGHE-MUDALIGE

Department of Agribusiness Management, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Makandura, Gonawila (NWP), 60170, Sri Lanka

ABSTRACT

This study evaluates the extent to which food safety related information provided to consumers can have an influence on their buying behavior overtime (i.e. temporal changes), where the special focus was to assess the effect of provision of positive and negative food safety related information to the consumers. Two-stage research was carried out to gather panel data from a sample of consumers representing two distinct professionals, i.e. teaching and nursing (n=200) with a help of pretested structured questionnaires. Consumer perceptions and attitudes on four different food products, each containing certain ingredients that may have varying impacts on human health (i.e. sodium metabisulfite, monosodium glutamate, phosphoric acid and cocoa butter substitute) were assessed in particular, where the respondents were contacted in person after a period of eight weeks from the previous meeting to assess their attitudinal perceptions on purchasing behavior over these but, in the later phase they were not provided any secondary information. The findings from the analysis that used various quantitative techniques, suggest that provision of negative information on food safety attributes can have an impact on the mindset of a consumer, in general, at a higher level for a long time as compared to the state of provision of positive information.

KEYWORDS: Attitudinal perception, Consumer behavior, Consumer memory, Food information

INTRODUCTION

Food consumption patterns are rapidly changing, particularly in the Asian region. Amongst the others, urbanization, rising income levels and changing lifestyles have diminished the consumption of those traditional meals based on cereals, vegetables and root crops. Use of processed and convenience food have, in turn, become a major part of their life (Anon, 2007).

Food processing sector plays an indispensable role in any country in the context of overall economic development, as it caters a vital linkage between agriculture and industry (Perera, 2015).

In spite of all other factors, consumers today, expect more than the taste and pleasure from their food. They recognize that the food and nutrition play an important role in their health. Thus they tend to look for a nutrition benefit when they buy out of what is available in the market (Anon, 2007).

In order to match the rapidly growing demand for food, the food manufacturing sector tend to use different kinds of ingredients that could enhance the taste as well as the shelf life of food item (i.e. using monosodium glutamate as a flavor enhancer in potato chips and sodium metabisulfite as a preservative in fruit drinks). These ingredients could either be having positive or negative impacts over the consumer's health due to its chemical reactions.

Depending on the sources to which they get exposed, the consumers may gather information about the ingredients included in a

particular food item that they consume and directly impacts on their consumer buying behavior. Knowing more about the effects of food safety information on consumer behavior therefore has become particularly important not only to the consumers, but also to the respective government agencies as well as for the food marketers (Dillaway *et al.*, 2011).

Even though the research on how quickly the impact on food safety information decays is scarce (Dillaway *et al.*, 2011), it is quite important for the food marketers and policy makers to get an idea of the nature of consumer behavior, especially about the information retention in consumer memory.

Experiment of Hayes *et al.*, (2002) revealed that the availability of information can change consumers' purchasing habits in response to perceived risk. Hu *et al.*, (2006) demonstrated that provision of negative information had much stronger influence, even when the negative information comes from a non-scientific source such as consumer advocacy groups.

With regard to the factors that affect the consumer buying behavior, the four key consumer psychological processes, namely motivation, perception, learning and memory influence the consumer responses (Kotler *et al.*, 2013).

Marketing theory suggests that, perceptions are more important than reality as perceptions affect the consumers' actual behavior. Perception is the process by which we select, organize and interpret information inputs

to create meaningful picture of the world. Meanwhile attitude describes a person’s relatively consistent evaluations, feelings and tendencies towards an object or idea (Kotler *et al.*, 2013).

On this rationale, the specific objective of this research study was to evaluate the extent to which food safety related information provided to consumers can have an influence on their buying behavior overtime. Further, it explores the level of awareness of consumers, in general, for the selected food ingredients.

METHODOLOGY

Four different food products that belong to the processed food category were selected to evaluate the information retention level of the consumer memory. These four food items contained different ingredients that have varying impacts on human health.

Theoretical Framework

Consumers are influenced by their perception towards food safety aspects when purchasing food products. It was assumed that the influence caused by the provision of information could change overtime. To measure the extent to which it could influence the consumer mindset, this study was carried out within three phases using food safety related information (Table 1).

It was planned to measure the level of consumer awareness and attitudinal perception on the selected food ingredients in the initial phase (T₁) and then to measure the attitudinal perception of the same sample in Phase I (T₂) after providing the secondary information on food safety for those specific food ingredients.

As the next step, the attitudinal perception of the consumers in the same sample was again measured after a certain time period in Phase II (T₃), without the provision of any secondary information on food safety aspects. For this study, 8 weeks were considered as the time period between Phase I and II.

Development of Indices to Measure Awareness and Attitudinal Perception

In order to get a measurable value for the awareness and attitudinal perception levels of the consumers in the sample, following attitudinal perception index, (AI) was developed using an additive model, with regard to the standard questionnaire which consisted a set of statements rated on five point Likert scale ranging from strongly disagree to strongly agree.

$$Attitudinal\ Perception\ Index = \frac{\sum \beta_i}{Max\ I \times n} \quad (1)$$

(AI)

Where,

∑β_i - Sum of scores given by the ith respondent

Max I - Maximum score given by a respondent

n - Number of statements

Data Collection and Analysis

One of the key characteristic of the study was to identify the extent to which the attitudinal perception of consumers changes over time. Hence it was important to select a sample of consumers who are capable to understand this criterion along with having a good familiarity with the food consumption patterns of their household.

In light of that, the participants were selected from two professions of teaching and nursing, considering the fact that they have higher capability in retaining the gathered information since they are involved in the process of delivering knowledge and working in the health sector respectively. They were selected from the nurses’ training school and from several schools in Colombo district randomly. A pilot survey was conducted with a representative sample of 30 respondents for the purpose of validating the questionnaire.

Table 1. Information supplied to participants in each treatment

	Food item	Ingredient	Positive information	Negative information
A	Fruit juice	Sodium meta bisulfite	Inhibits bacterial and fungal growth; it also prevents the discoloration and deterioration	Irritates respiratory tract; allergic, asthma-type reaction; irritates eyes, cause pain
B	Processed potato chips	Monosodium glutamate	Enhance satiety; regulate the appetite by stimulating the receptors	Cause headache, flushing, Sweating, Facial pressure or tightness, numbness, tingling or burning in the face
C	Carbonated drinks	Phosphoric acid	Acts as a digestive aid; maintain the proper acidity inside the cell	Causes diabetes, obesity; damage the enamel on teeth
D	Chocolate	Cocoa butter substitute	Lubricate extra dry areas of body; aids in lowering blood pressure and improve elasticity of blood vessels	Contribute to obesity, diabetes.; cause constipation, digestive problems, colic in infants, chest pain and difficulty in breathing

Reference: A - Anon, 2016c; B - Leech, 2016; C-Anon, 2016c; D-Anon, 2016b

The survey questionnaire consisted of questions that were intended to collect information on the respondents' demographic structure, income, family status and the perception towards the selected food groups.

Primary data were collected through two structured questionnaires for a group of 200 consumers during the period of February to April in 2016. Participants were at least 20 years of age and familiar with the food consumption patterns of their household.

Both descriptive and inferential statistics were used to analyze the data. Using the calculated index values obtained from data collection in the two phases, Chi-square test was carried out to identify the association between the perception of the respondents during the first phase and the second phase of the conducted economic experiment with the help of Minitab version 15.

$$X^2 = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i} \quad (2)$$

Where,

O_i – Observed value E_i – Expected value

X² – Chi square value

RESULTS AND DISCUSSION

Descriptive Statistics of the Sample

According to the summarized socio-economic characteristics of the sample, the majority of respondents in the sample were married females. Only 24% of the sample includes males while 76% of the sample consists of females. Majority (59.5%) was having the educational qualification of diploma level while 24% and 16.5% people were having Degree and Postgraduate level respectively (Table 2).

Table 2. Descriptive statistics of the sample

Demographic Characters	Percentage (%)
Gender	
Male	24.0
Female	76.0
Marital Status	
Unmarried	10.5
Married	89.5
Educational level	
Diploma Level	59.5
Degree Level	24.0
Post graduate	16.5
Occupation	
Nursing	50.0
Teaching	50.0
Monthly income (Rs.)	
20,000- 40,000	25.5
40,000- 60,000	65.5
60,000 <	09.5

When considering the descriptive statistics on the level of awareness about the chosen food items, sample demonstrated highest level of awareness in product A while the lowest awareness level was reported in product B (Figure 1).

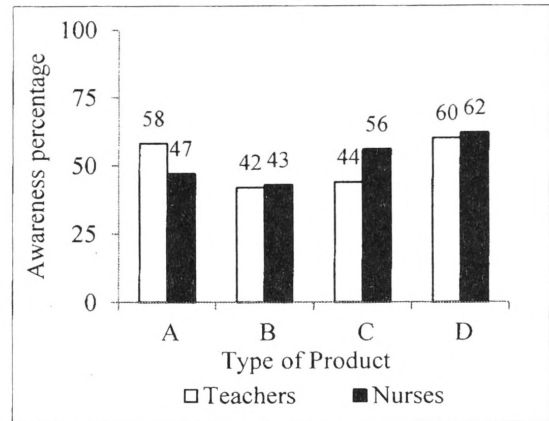


Figure 1. Level of consumer awareness. A- Fruit juice, B- Processed potato chips, C- Carbonated drink, D- Chocolate

It is interested to see that with regard to all the four food items that were chosen, consumers tend to receive them from different sources in a higher probability than buying it by their own. The different levels of buying and receiving the food items that have been denoted by the consumers were elicited in Figure 2.

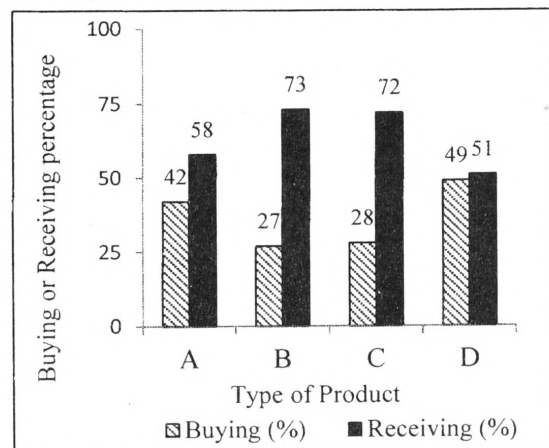


Figure 2. Level of buying or receiving a product. A-Fruit juice, B-Processed potato chips, C-Carbonated drinks, D-Chocolate

Relationship between Attitudinal Perceptions in Phase I and II

The results obtained from Chi-square analysis carried out showed that with respect to provision of positive information, there is a significant difference in the consumer attitudinal perception between the two phases (Chi-square; p value = 0.000, 0.05 level of significance). Whereas when the negative secondary information is provided, there is no significant difference in the consumer

attitudinal perception between the two phases (Chi-square; p value = 0.062, 0.05 level of significance).

The results mainly highlighted that the provision of negative information has a greater impact over the consumer's mind set in the long run than the provision of positive information. Furthermore, the mean values of attitudinal perception index for each of the food item were calculated for the initial phase, Phase I (after the provision of secondary information) and Phase II (without providing information after eight weeks) separately for regarding the provision of positive and negative information (Table 3 and 4).

Table 3. Attitudinal perception index values for positive information within each phase

Phase	A	B	C	D
T ₁	0.79	0.70	0.68	0.80
T ₂	0.80	0.75	0.74	0.81
T ₃	0.85	0.76	0.80	0.84

T₁- initial phase, T₂- Phase I, T₃-Phase II, A-Fruit juice, B-Processed potato chips, C-Carbonated drinks, D-Chocolate

Table 4. Attitudinal perception index values for negative information within each phase

Phase	A	B	C	D
T ₁	0.57	0.52	0.48	0.62
T ₂	0.31	0.42	0.36	0.40
T ₃	0.33	0.47	0.37	0.40

T₁- initial phase, T₂- Phase I, T₃-Phase II; A-Fruit juice, B-Processed potato chips, C-Carbonated drinks, D-Chocolate

With reference to the calculated AI values in the three different phases, it is apparent that, regardless of the type of information that was provided, either positive or negative it could impact the consumer in a stronger manner where it has depicted in the figures that the Phase II of each occasion has a greater level of attitudinal perception than that of in the initial phase (Figure 3 and 4).

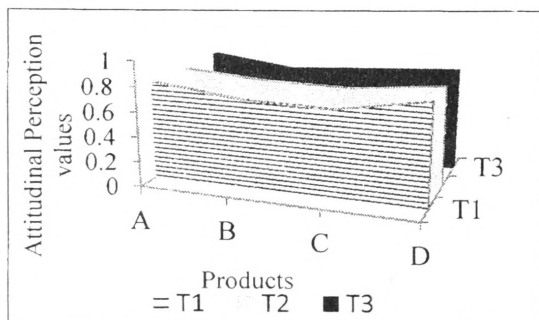


Figure 3. Attitudinal perception index values for positive information within each phase. A-Fruit juice, B-Processed potato chips, C-Carbonated drinks, D-Chocolate, T₁- initial phase, T₂- Phase I, T₃-Phase II

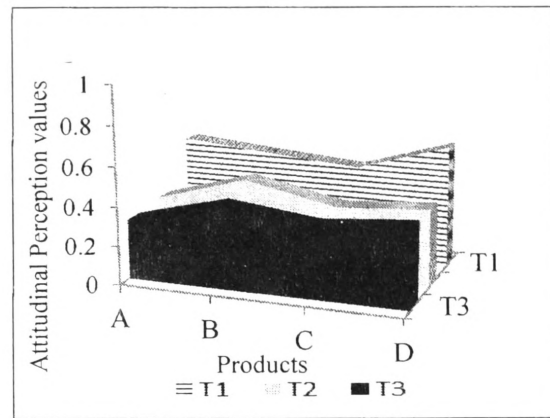


Figure 4. Attitudinal perception index values for negative information within each phase. A-Fruit juice, B- Processed potato chips, C- Carbonated drinks, D- Chocolate, T₁- initial phase, T₂- Phase I, T₃-Phase II

The level of influence which was triggered by the provided information to consumers might vary with the understanding of the provided information and also with the consumer's prior knowledge and attitudes. At the same time the results have clearly reflected that the consumers are highly attentive on food safety information, especially the negative aspects. Provision of food safety information has caused a considerable effect on consumer choice with respect to the food safety.

CONCLUSIONS

The impact that can be caused by the provision of food safety information on food demand in the long run was investigated in the study. The findings suggests that provision of negative information on food safety attributes can impact the mindset of the consumer in a higher level in comparison with the provision of positive secondary information. The retention of negative impacts is relatively higher than the retention of positive impacts.

The results of this study provide insights for the food marketers and policy-makers to make more informed decisions about the consumer behavior on being exposed to negative information about the food products and their ingredients.

Marketers have to be more vigilant about the consumers being directed towards the scientific exposure of the ingredients that are included in their food products to consumers, in order to be stable within their industry. If media could increase the consumer awareness through providing accurate information, it would certainly reveal a beneficial path to the processed food industry.

Since the consumers' reliance on the information that they gather from different sources can influence their wellbeing, policy makers should keenly focus on the strategies

that would be able to uplift the means of consumers to reach the accurate information of what they consume.

ACKNOWLEDGEMENTS

The authors wish to express their sincere gratitude to Dr. (Ms.) Jaanaki Gooneratne and all the respondents for their valuable corporation in responding to the questionnaire despite of their busy work schedules.

REFERENCES

- Anon. (2007). Symposium on Understanding and Influencing Consumer Behavior for Health. SEAsia Regional News, International Life Sciences Institute-Southeast Asian Branch, Singapore.
- Anon. (2016a). Dangers of sodium metabisulfite. Live Strong. Available from:<http://www.livestrong.com/article/208572-dangers-of-sodium-metabisulfite> (Accessed 2 February 2016).
- Anon. (2016b). The Side Effects of Cocoa Butter. Live strong. Available from:<http://www.livestrong.com/article/188407-the-side-effects-of-cocoa-butter/> (Accessed 2 February 2016).
- Anon. (2016c). Why is phosphoric acid bad for you. Live Strong. Available from:<http://www.livestrong.com/article/468217-why-is-phosphoric-acid-bad-for-you> (Accessed 2 February 2016).
- Dillaway, R., Messer, K.D., Bernard, J.C. and Kaiser, H.M. (2011). Do consumer responses to media food safety information last. *Applied Economic Perspectives and Policy*, **33** (3), 363-383.
- Hayes, D.J., Fox, J.A. and Shogren, J.F. (2002). Experts and activists: how information affects the demand for food irradiation. *Food Policy*, **27**, 185-193.
- Hu, W., Zhong, F. and Ding, Y. (2006). Actual media reports on GM foods and Chinese consumers' willingness to pay for GM soybean oil. *Journal of Agriculture and Resource Economics*, **31** (2), 376-391.
- Kotler, P., Keller, K.L., Koshy, A. and Jha, M. (2013). Marketing management – A South Asian Perspective: Pearson Education. New Delhi.
- Leech, J. (2016). MSG (Monosodium Glutamate): Good or Bad. Authority Nutrition. Available from:<http://authoritynutrition.com/msg-good-or-bad/> (Accessed 20 May 2016).
- Perera, M. (2015). Growth prospects in the food processing industry in Sri Lanka. DailyFT. Available from:<http://www.ft.lk/article/390385/Growth-prospects-in-the-food-processing-industry-in-Sri-Lanka> (Accessed 9 May 2016).