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Consumer Preferences for Canned Tuna Products: The Case of the Largest Tuna-Producing City in the Philippines

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Abstract

Consumption of processed products has increased due to changes in the eating habits of consumers. This paper aimed to examine consumer preferences for canned tuna in a top canned tuna-producing city in the Philippines. Qualitative approach was used to identify the attributes and levels that were commonly considered by consumers and a quantitative approach, conjoint analysis, was used to estimate utility and importance values of the product attribute and levels to consumers. Price, packaging form, eco-label and flavour have fairly equal relative importance. Two consumer segments were found using cluster analysis. The first segment placed high importance on packaging forms while the second segment on all attributes. Probit analysis showed the influence of socio-demographic factors and purchasing information to the consumer's association to the cluster. While consumers were aware of the concept of eco-label they tended to misinterpret the same as an assurance of food safety. The misconception can be reduced by intensive information drive on promoting marine resource conservation to influence consumer preference.

Introduction

Fish, including processed fish, are considered normal goods in a typical diet of Filipinos who live in an archipelago with more than 7,000 islands (Garcia et al. 2005). Fish consumption varies among different consumer segments and this is often reflected by variation in consumer behaviour (Leek et al. 2000), availability (Verbeke and Vackier 2005), price of fish and its substitutes (Kızıloğlu and Kızılaslan 2016) and income (Can et al. 2015; Verbeke and Vackier 2005; Honkanen et al. 2005). Demand for diverse and high value processed food products is driven by several factors such as rising incomes (Hsu et al. 2002), urbanization (Kearney 2010), greater women participation in the workforce resulting in their higher stress levels (Traill and Harmsen 1997), and nutrition knowledge (Brunner et al. 2010).

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These factors paved the way for markets to innovate products that would cater to particular market niches. Increased income, longer hours of work and a fast-paced lifestyle have driven the changes in the dietary patterns of consumers, therefore affecting their nutrition (Popkin 2009). People's tastes are becoming more diverse and the consumers have less time to spend preparing meals at home. Products that give emphasis on the nutritional value and convenience can capture a larger segment of consumers (Li et al. 2000). Filipinos too have shifted their shopping habits and way of life due to the faster paced lifestyle. The projected expansion of urbanization and increases in income and purchasing power influence Filipino consumers in identifying products and services that provide convenience (The Nielsen Company 2015). In the Philippines, tuna is the biggest and most valuable subsector in the country's fisheries sector and canned tuna is the leading export product contributing to 80% of the total tuna exports in 2009 (Barut and Garvilles 2005; Banaria 2011). In fact, the Philippine canned tuna market has shown high degree of integration with major markets such as Thailand and the United States since the 1980s (Herrick and Squires 1989). The growing demand for convenient foods has paved the way for recent innovations in the tuna industry in the country. For instance, aside from the traditional tuna in oil and tuna in water or brine, major manufacturers such as the General Tuna Corporation and CDO Foodsphere Inc. have recently included popular and traditional Filipino main dish recipes or viands in their domestic product lines. A number of vegetables, notably potato, carrots and sweet pepper, are added as ingredients to these new variants (Bayogan and Lacap 2015).

The production of canned tuna in the Philippines is increasing as more consumers become health-conscious (Yamashita 2008). The increasing demand for canned tuna similarly increases efforts to catch skipjack tuna, the species commonly used in canned tuna products. This indirectly contributes to higher by-catch of dolphins (Hall 1998; Archer et al. 2004) and juvenile yellowfin tuna (Romanov 2002) which are currently considered overfished. To respond to this environmental threat, private and public institutions have started promoting products with eco-labels (Washington 2008). These eco-labels are used as an instrument to encourage consumers to gain preference over environment-friendly products and eventually change patterns of consumption and production. With the changes in fish consumption patterns and the growing consciousness for marine preservation, it is important to identify the main attributes of canned tuna that influence purchase by consumers. This can provide a better understanding of the choices that consumers make when deciding to purchase canned tuna.Valuations for different product attributes are estimated through conjoint analysis. The most important or saleable attribute can be identified by assuming that a consumer's preferences for a product are in proportion to the utility an individual gains from buying it. It is widely used by both industry and the academe in measuring multi-attributed products and services (Green and Rao 1971; Green and Srinivasan 1990). The relative importance of each attribute and the consumer's preferences were determined in this study using conjoint analysis. While conjoint analysis has gained popularity in marketing research, it has also received important criticisms such as its hypothetical bias and limitations in the number of attributes to include in the analysis (Claret et al. 2012). This study examined consumer preference for canned tuna in General Santos City, Philippines.

The city has the highest production of both fresh and canned tuna in the Philippines and plays a major role in the world market. Six canneries are located in the city. These canneries are export-oriented (Yamashita 2008). This study also determined the effect of eco-labels on the purchasing decision of canned tuna buyers. The results of this study may provide information to canned tuna manufacturers and policy makers in crafting targeted marketing strategies in line with the attempt to encourage consumers to embrace environment-friendly products. A qualitative approach involving the use of focus group discussions (FGDs) was used to identify attributes and levels that are considered by consumers when buying canned tuna, and a quantitative approach using conjoint analysis was used to determine consumer preference for the levels of the attributes as well as the relative importance of the attributes placed by canned tuna consumers.

Materials and Methods

Focus group discussions: Selection of attributes and corresponding levels

A total of 10 FGDs were performed in Davao City during the months of June and July 2015. Focus groups were first classified according to their household income levels: one group for the high income level, two for the middle income, and two for the low income. Further categories included housewives (two groups), students (two groups) and young professionals (one group). Housewives were chosen mainly because of their involvement in the actual purchase of food in their households. Young adults were also considered on the assumption that younger people tend to prefer convenient food such as canned goods (Senauer et al. 1991; Newman et al. 2003). Groups consisted of 5 to 11 (N=69) participants who were involved in the decision-making process in their respective households and were also purchasing canned tuna at least once a year. Each FGD session lasted for about 40 minutes to an hour. The FGDs followed two stages: the sharing of experiences by the participants in buying canned tuna and their canned tuna buying preferences. Each session was facilitated by a moderator. The discussion was audio-recorded after permission was granted by the participants. The transcription from the audio recording provided data for an in-depth qualitative analysis.

Conjoint analysis

Presentation of product profiles: conjoint design

The attributes and levels were based from the results of the different FGDs. The flavour attribute had three levels: spicy, natural tuna taste, and flavoured variants (Filipino dish variants). Another attribute was the packaging form with three levels namely: easy-open can, non-easy-open can, and pouch. There were three price three levels: 15 PhP, 25 PhP, and 35 PhP. The dolphin safe eco-label had two levels: with and without the logo. A total of 13 product profiles were generated through orthogonal array design (nine cards were used for validation and four holdout cards were used for cross-validation).

The holdout cards were rated by the respondents but were not included in the generation of part-worth estimates. The number of product profiles was generated from the orthogonal array design using Statistical Package for the Social Sciences 18.0. The hypothetical product profiles generated are shown in Table 1.

Table1. Hypothetical canned tuna profiles obtained by means of the orthogonal array design.

Eco-label	Flavour	Packaging form	Price (PhP per 155 g)
With dolphin safe logo	Natural tuna taste	Easy-open can	35
		Non easy-open can	15
	Spicy	Non easy-open can	25
		Pouch	35
	Flavoured variants	Easy-open can	25
		Non easy-open can	15*
		Pouch	15
Without dolphin safe logo	Natural tuna taste	Pouch	25
		Non easy-open can	25*
		Non easy-open can	15*
		Easy-open can	15*
	Flavoured variants	Non easy-open can	35
	Spicy	Easy-open can	15

*holdout cards

Conjoint analysis data collection

A mock survey was conducted before the actual one among selected employees and households in Davao City to improve the questionnaire. The net weight considered was the regular net weight of 155 g so that respondents may have a basis in evaluating the price attribute. The respondent evaluated the profiles generated by rating them. Each profile is a combination of different attribute levels and was rated from zero (least preferred) to 10 (most preferred). The respondents were asked to answer the preliminary questions before the actual survey questions. Respondents included those who can influence or were the decision-makers in food purchase and preparation. In all cases, the participants were asked if they know about the global effort in preserving endangered marine species, particularly the dolphins. This was to avoid leading questions that may influence the participant's response as he/she could probably focus on providing higher ratings on product profiles that included the dolphin safe logo. To avoid confusion between the respondent and the enumerator in describing and explaining the eco-label, the picture of the dolphin safe logo was presented. The respondents were also asked about what they thought the logo was for.

Finally, the survey instrument used was a semi-structured questionnaire composed of two sections. The first section contained questions regarding their socio-demographic data and purchasing information. The second section was the presentation of the 13 product profiles for rating. The survey was conducted through personal interviews that lasted for a maximum of 30-45 minutes per respondent.

Participants

A total of 204 consumers were sampled in General Santos City. The sample size is approximately within the range of the minimum recommended 100-200 sample size to obtain reliable estimates (Green and Srinivasan 1990; Quester and Smart 1998). Data on demographics (age, gender, income, source of income, religion, number of household members and educational attainment), kind of canned/pouched fish products purchased, volume and frequency of purchase, criteria for choice of product, observations and perceptions on available variants, and reason/s for purchase were obtained. Having no actual population of canned tuna consumers in General Santos City, a non-probability sampling method was used. Convenience sampling in the five most populous urban *barangays* (villages) in General Santos City was carried out through personal interviews ensuring various socio-economic representation.

Cluster analysis

Identifying consumer groups through cluster analysis can help create a more efficient marketing strategy as specific product combinations are offered to a market segment. The Ward's agglomerative hierarchical clustering method with SPSS was used to define the optimal number of clusters from the data set. In this method, the total-cluster variance is kept at the minimum level. Ward's method starts out by calculating the means for all variables. The squared Euclidean distance to the cluster means is calculated for each case. At each step, two clusters that merge are those that result in the smallest increment in the total sum of the squared within-cluster distances (Norušis 2003). After using the hierarchical method, the k-means procedure to form the actual clusters was used. Conjoint analysis was performed on each of the clusters generated.

Probit analysis

The binary probit regression was used to determine the significant factors affecting a consumer's membership to a particular cluster. The factors considered were socio-economic and demographic variables (education, age, average monthly household income and household size) as well as purchasing information (number of canned tuna bought in a month, price of canned tuna, frequency of purchase, place of purchase, intent to look for product certifications and preference for dolphin safe labelled canned tuna).

The probability was computed as:

$$P_i = Pr(Y(1|X) = Pr(I_i^* \leq I_i) = P(Z_i \leq \beta_1 + \beta_2 X_i) = F\ (\beta_1 + \beta_2 X_i)$$

where P_i denotes probability and F is the cumulative distribution function (CDF) of the standard normal distribution. The CDF F is computed as

$$F(X) = \int_{-\infty}^{X_0} \frac{1}{\sqrt{2a^2\pi}} e^{-(X-\mu)^2/2\sigma^2}$$

where X_0 is some specified value of X (Gujarati 1995).

The parameters, denoted by β_i are estimated using maximum likelihood (MLE). The index I_i is an unobservable utility index, also known as a latent variable that is determined by one or more explanatory variablesX_i. The latent variable is interpreted in such a way that the greater the value of the index I_i, the greater the probability of an event to occur. The index is expressed as

$$I_i = \beta_1 + \beta_2 X_i$$

(Gujarati 1995). In this study, the probit analysis was performed using the Stata software.

Results

Attributes and levels preferred by consumers

Among the frequently mentioned product characteristics presented, namely, taste, price, convenience, brand, nutritional value, packaging, availability in the market, quality of meat, participants in the FGDs considered taste as the most important attribute when buying canned tuna product. Majority of the respondents favoured the natural tuna taste flavour over other Filipino dish flavours such as "hot and spicy" and tuna variants (e.g., *afritada, caldereta, mechado*). Price was also considered an important factor especially among low-income households and students. Since the product's packaging captures the consumer's attention first, it can be considered as an attribute that would make an impact to buying decision.

Hence, the three main attributes consumers considered vital in the decision-making process when buying canned tuna were taste, price and packaging form. The participants in the FGDs were aware of the concept of eco-labelling; however, they did not think that eco-labels were already integrated in the package. Majority (90%) of the FGD participants claimed that they were not aware of the logo. Despite the participants' knowledge on the global effort for the preservation of dolphins, most of the respondents had no idea about the dolphin safe logo. Some claimed that they have noticed the dolphin safe logo. However, they had misinterpreted it as an assurance that the product does not contain dolphin meat.

Characteristics of the survey participants

The survey had a total of 204 respondents with age ranging from 16 to 75 years old. Females made up 73% of the total respondents. The average household size was five members. Sixty-one per cent of the respondents had an average household monthly income of less than 15,000 PhP (approximately 312 USD). The majority of the respondents purchased from *sari-sari* (convenience) stores where available variants were limited.

Generally, the General Santos City respondents seldom consumed canned tuna products as they would rather buy fresh tuna which is much cheaper compared to the average 23 PhP price of a 150 to 155 g can. An average household bought eight cans of tuna per month. Furthermore, repacked tuna from different tuna canneries in General Santos was sold at a much cheaper price of 50 PhP for 500 g. These are canned tuna that did not pass the export quality standards of the canneries.

Conjoint analysis on consumer preference survey

The total sample placed fairly equal values on the four product attributes: packaging form (25.49%), flavour (24.98%), eco-label (24.79%), and price (24.21%). There was no significant difference in the importance values. However, packaging form had the highest importance among the four. The general sample specifically preferred easy-open cans as it had the highest utility estimate (Table 2). They also preferred natural tuna taste flavour, canned tuna with the dolphin safe logo and the cheapest option that was 15 PhP.

Table 2. Overall utilities per level and relative importance of each canned tuna attribute.

Attribute	Relative Importance	Levels	Utility Estimates
Packaging Form	25.49	Non easy-open can	.010
		Easy-open can	.406
		Pouch	-.417
Eco-label	24.79	With dolphin safe logo	.811
		Without dolphin safe logo	-.811
Flavour	24.98	Natural tuna taste	.212
		Spicy	-.356
		Flavoured variants	.144
Price	24.21	15 PhP	-.630
		25 PhP	-1.260
		35 PhP	-1.891

Cluster Analysis

Two clusters were formed from the 195 usable respondents (Table 3). The first cluster comprised 75% of the total sample. The first cluster – the "catch-all feature cluster" – had placed almost equal relative importance values on the product attributes. Among the four, the highest relative importance was given on eco-labels (27.22%) and specifically preferred the presence of the dolphin safe logo. This cluster had also placed 24.67% relative importance on flavour, 23.78% on price, and 23.64% on packaging form. Based on utility estimates, the ideal product for this cluster was a canned tuna that has an eco-label, at a price of 15 PhP and with an easy-open lid. The flavour could either be natural tuna taste (plain) or Filipino dish variants. With the little difference in the importance values on the four attributes, it is possible that the respondents may not have given enough attention to specific product attributes since most of them purchased from *sari-sari* (convenience) stores.

Table 3. Cluster distribution and corresponding utility estimates for each attribute level.

		Catch-all feature Cluster	Convenience Cluster
	N (%)	147(75%)	48(25%)
Relative Importance	Packaging form	23.64	31.06
	Eco-label	27.22	17.51
	Flavour	24.67	25.93
	Price	23.78	25.50
Utility values	Non easy-open can	-.151	.495
	Easy-open can	.265	.829
	Pouch	-.114	-1.324
	With dolphin safe logo	.895	.561
	Without dolphin safe logo	-.895	-.561
	Natural tuna taste	.154	.384
	Spicy	-.309	-.498
	Flavoured variants	.154	.113
	15 PhP	-.551	-.868
	25 PhP	-1.102	-1.736
	35 PhP	-1.653	-2.604
Intercept		8.027	5.922

The second cluster – the "convenience cluster", comprising 25% of the total respondents – had placed the highest relative importance on the packaging form with 31.06%. This was followed by flavour (25.93%), price (25.50%) and eco-labels (17.51%). This cluster considered the ease and convenience in opening the cans. They specifically preferred the easy-open cans which minimizes the effort necessary to prepare and serve the food. The respondents also compared tuna in cans with tuna in pouches. The latter had received negative response from the consumers.

Canned forms were thought to have better meat quality since meat remained intact compared to the pouched product. While both clusters have the same ideal products, it is noteworthy that this cluster had the lowest relative importance for eco-labels. This may mean that the respondents perceived that including the eco-labels in the packaging can lead to a price increase.

Probit analysis

Using the probit regression analysis (Table 4), four variables were found to have significant effects in explaining the cluster membership of a consumer in General Santos City. The marginal effects of the significant variables were also generated. The number of years of education was significant at $p \leq 0.10$. When the respondent's education level increased by one year, the likelihood that he/she belonged to the "catch-all feature" group decreased by 3%. Thus, a more highly educated respondent is more likely to place higher importance on packaging forms, specifically easy-open cans. The place of purchase was also significant at $p \leq 0.10$. Here, the probability of being in the "catch-all feature" cluster increased by 17% if the respondent purchased from a supermarket. According to the narratives of the respondents, they have more time inspecting product labels particularly the expiration date of the product when they buy from supermarkets rather than in a retail outlet such as in *sari-sari* stores. This may be related to the fact that members of the "catch-all feature" cluster regarded the dolphin safe logo as the most important among the four features as they may have browsed through this while scanning through the packaging.

Table 4. Marginal effects of significant variables.

Significant variables	Margins	
	Catch-all feature Cluster	Convenience Cluster
Years of education*	-0.03	0.03
Supermarkets*	0.17	-0.17
Certification[x]***	0.24	-0.24
Prefers dolphin safe canned tuna**	0.20	-0.20

*** *significant at 0.01 level;* ** *significant at 0.05 level;* * *significant at 0.10 level*

The presence of product certifications in canned tuna was also significant at $p \leq 0.10$. The likelihood of a respondent belonging to the "catch-all feature" cluster increased by 24% if he/she particularly looked for product certifications. The presence of the dolphin safe logo was also significant at $p \leq 0.05$. The survey results showed that 14% of the participants intentionally looked for the dolphin safe logo when scanning the product label. The likelihood of a respondent belonging to the "catch-all feature" cluster increased by 20% if they have high regard on the dolphin safe logo.

Discussion

The results of the conjoint analysis showed that the majority of respondents (75%) placed fairly equal importance values on the four attributes while the remaining 25% placed high importance on the convenience in opening and preparing the product. Consumer's evaluation and experience of a food product is highly influenced by its container (Schifferstein 2009). Majority of the respondents preferred the easy-open can packaging form, garnering the highest utility estimate among the packaging form levels. While the importance of convenience was clearly observed, an association between product quality and convenience seemed to be shown too. Respondents perceived that processed tuna in cans have superior quality over those in pouches. Despite the ease and convenience in opening, pouched tunas are believed to have lower meat quality. Moreover, the easy-open can was more favoured than the regular can. With this comparison, the present results are supported by studies showing that consumers perceived higher product quality in more expensive packages (McDaniel and Baker 1977; Marsh and Bugusu 2007).

On the other hand, consumers generally perceived that processed food have lost the natural flavour of a product. This is why innovations in the canned tuna flavours have been made to cater to the consumers' liking. Based on utility estimates, the respondents preferred the "natural taste" of tuna which conveys to the consumers' dislike for excessive addition of preservatives. Tuna in brine or water and in oil are closest in maintaining the "natural tuna taste". Respondents perceived that other flavours, particularly tuna variants of Filipino dishes, contained too much food colouring which to them indicates loss of natural flavour. This was consistent with the results of Garber et al. (2000) showing the link between food colour and perceived flavour. They reported that food colour had an effect of the consumer's ability in correctly identifying flavour, forming distinct flavour profiles and preferences, and dominating other flavour information sources, including labelling and taste. The respondents also perceived that processing led to loss of nutrients. Among the three attribute levels, the "natural tuna flavour" was perceived to have undergone minimal processing. Therefore, the acceptance of a product colour had a connection with the consumer's expectation of the naturalness of the product (King and Duineveld 1998). Consumer's preference for natural flavours could be linked to the growing concern for healthy products.

Based on utility estimates, respondents preferred canned tuna with the dolphin safe logo. Most respondents admitted to not paying attention to eco-labels in their purchasing decisions. This could be due to the less publicized efforts of companies in promoting sustainability. Respondents who have noticed the logo however were unaware of the purpose of the logo. These findings were consistent with Grunert et al. (2014) on consumers from France, Germany, UK, Spain, Sweden, and Poland. The study concluded that sustainability labels currently do not play a major role in consumers' food choices. However, in a study conducted in the United States, dolphin-safe labels have altered consumer preference of tuna (Teisl et al. 2002). The study provided market-based evidence on consumers' response to eco-labels as the market share of canned tuna increased since the introduction of the label and is expected to increase continuously over time.

Eco-labelling is a concept that is usually misinterpreted by the respondents. Based on the interviews, most interpretations were leaning towards the assurance that their food is not contaminated. The lack of understanding on sustainability may have caused the respondents to associate it to other concerns such as food safety. However, this could be a good starting point to explore the link between food safety assurance and environmental conservation.

The minimum importance given to the purchasing price attribute could be attributed to the respondents' option on whether to go for canned or fresh tuna. The price attribute ranked third in both clusters while for the general sample, it ranked last. The respondents, during the interviews, had stressed that they purchased canned tuna during emergency situations (e.g., when they run out of fresh food stock at home) or when they make dishes that specifically requires processed tuna (e.g., for pasta and sandwiches). The respondents preferred the cheapest price option (15 PhP per 150 to 155 g). Likewise, they preferred natural tuna taste flavour which was sold at a range of 20 PhP to 30 PhP per 155 g. This implied that respondents were willing to pay for a higher price for a better quality product. Thus, the price-quality perception holds true in this study.

Conclusion

Analysing consumer behaviour towards canned tuna is essential in crafting effective marketing strategies for manufacturers and retailers. The results of this study provides information on the consumer preferences of canned tuna buyers in the largest tuna and canned tuna producer in the Philippines. However, the results should be interpreted with caution as the participants in the survey have access to cheaper fresh fish as alternative, thus affecting their responses. Nevertheless, the trend on urbanization, growing income and purchasing power are captured.

Our results suggest the important role of convenience, as indicated by the consumers' preference for easy-open cans. On the surface, this seems to conform with the general trend found in the literature. But we hypothesize that consumers selected for the study might have based their perception of overall quality on packaging form. Hence, focusing on convenient packaging might have higher returns for manufacturers. However, this requires further verification since this is not part of the scope of our study.

Based on the results of the conjoint analysis, the positive response on eco-label may not equate to the consumer's concern on the depleting dolphin stock alone but on the environmental conservation in general. Despite this, we should note that there is an increasing awareness of eco-labels. This could be a good indicator of the consumer's interest on environmental preservation, particularly the marine resource, considering that General Santos City has the highest contribution to tuna supply in the country. The misinformation on the consumers' part could be reduced by conducting intensive information dissemination with regards to promoting marine resources conservation.

Key players in the canned tuna industry in the Philippines (e.g., General Tuna Corporation and CDO Foodsphere Inc.) have already incorporated eco-labels in some of its product lines. In the Philippines, studies focusing on consumer perception on eco-labels on fish and seafood products are still limited to date. Our results give valuable insights in exploring opportunities for the producers if there is a possibility for price premium for eco-labeled canned tuna. The market niches may be utilized for future product developments and to test for viability of expanding eco-labels across different products. This study provides missing information necessary for the conduct of more in depth analyses on policies regarding eco-labels and the effect on the supply, demand, and price.

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References

Archer, F., T. Gerrodette, S. Chivers and A. Jackson. 2004. Annual estimates of the unobserved incidental kill of pantropical spotted dolphin (*Stenella attenuata attenuata*) calves in the tuna purse-seine fishery of the eastern tropical Pacific. Fishery Bulletin 102:233-244.

Banaria, M.J.M. 2011. The canned tuna industry in the Philippines- Overview, market and economics, manufacturing, HSE, R&D. Department of Chemical Engineering, University of the Philippines Diliman. Quezon City, Philippines. 61 pp.

Barut, N.C. and E.G. Garvilles. 2005. Philippines fishery report. Technical report. National Fisheries Research and Development Institute, Bureau of Fisheries and Aquatic Resources, Philippines. Prepared for the Scientific Committee of the Western and Central Pacific Fisheries Commission, Noumea, New Caledonia, 8-19 August 2005. 13 pp.

Bayogan, E.V. and A.T. Lacap. 2015. Vegetables in canned tuna. Acta Horticulturae 1088:623-628.

Brunner, T.A., K. Van der Horst and M. Siegrist. 2010. Convenience food products. Drivers for consumption. Appetite 55:498-506.

Can, M.F., A. Günlü and H. Y. Can. 2015. Fish consumption preferences and factors influencing it. Food Science and Technology (Campinas) 35:339-346.

Claret, A., L. Guerrero, E. Aguirre, L. Rincón, M.D. Hernández, I. Martínez, J.B. Peleteiro, A. Grau and C. Rodríguez-Rodríguez. 2012. Consumer preferences for sea fish using conjoint analysis: exploratory study of the importance of country of origin, obtaining method, storage conditions and purchasing price. Food Quality and Preference, 26:259-266.

Garber Jr., L.L., E.M. Hyatt and R.G. Starr Jr. 2000. The effects of food colour on perceived flavour. Journal of Marketing Theory and Practice 8:59-72.

Garcia, Y., M. Dey and S. Navarez. 2005. Demand for fish in the Philippines: a disaggregated analysis. Aquaculture Economics and Management 9:141-168.

Green, P. and V. Rao. 1971. Conjoint measurement for quantifying judgmental data. Journal of Marketing Research 8:355-363.

Green, P. and V. Srinivasan. 1990. Conjoint analysis in marketing: new developments with implications for research and practice. Journal of Marketing 54:3-19.

Grunert, K., S. Hieke and J. Wills. 2014. Sustainability labels on food products: consumer motivation, understanding and use. Food Policy 44:177-189.

Gujarati, D. 1995. Basic Econometrics 3rd Edition. McGraw-Hill, Inc, Singapore. 1027 pp.

Hall, M.A. 1998. An ecological view of the tuna--dolphin problem: impacts and trade-offs. Reviews in Fish Biology and Fisheries 8:1-34.

Herrick Jr, S. and D. Squires. 1989. Integration of United States, Thailand and Philippine canned tuna markets. Asian Fisheries Science 3:85-99.

Honkanen, P., S.O. Olsen and B. Verplanken. 2005. Intention to consume seafood—the importance of habit. Appetite 45: 161-168.

Hsu, H.H., W.S. Chern and F. Gale. 2002. How will rising income affect the structure of food demand? In: China's Food and Agriculture: Issues for the 21st Century (eds. H.F. Gale Jr.), pp.10-13. Market and Trade Economics Division, Economic Research Service, U.S. Department of Agriculture, NW, Washington, DC.

Kearney, J. 2010. Food consumption trends and drivers. Philosophical Transactions of the Royal Society B: Biological Sciences 365: 2793-2807.

King, B.M. and C.A.A. Duineveld. 1998. Factors affecting the perception of naturalness and flavour strength in citrus drinks. Annals of the New York Academy of Sciences 855: 847-853.

Kızıloğlu, R. and H. Kızılaslan. 2016. Analysis of factors affecting households' fish consumption in Erzurum, Turkey. International Journal of Social Sciences and Education Research, 2:527-537.

Leek, S., S. Maddock, and G. Foxall. 2000. Situational determinants of fish consumption. British Food Journal 102:18-39.

Li, H., J. Houston, K. Chen and H. Lee. 2000. Factors affecting consumer choice of canned fish in Taiwan. IIFET Proceedings. (eds. R.S. Johnston).6 pp.. International Institute of Fisheries Economics and Trade (IIFET), Corvallis, OR, 2001.

Marsh, K. and B. Bugusu. 2007. Food packaging—roles, materials, and environmental issues. Journal of Food Science 72:R39-R55.

McDaniel, C. and R. Baker. 1977. Convenience food packaging and the perception of product quality. Journal of Food Marketing 41:57-58.

Newman, C., M. Henchion and A. Matthews. 2003. A double-hurdle model of Irish household expenditure on prepared meals. Applied Economics 35:1053-1061.

Norušis, M.J. 2003. Chapter 16: Cluster analysis. In: SPSS 12.0 Statistical procedures companion, pp. 361-391. Prentice Hall, Upper Saddle River, N.J.

Popkin, B.M. 2009. Global changes in diet and activity patterns as drivers of the nutrition transition. Emerging Societies-Coexistence of childhood malnutrition and obesity. 63:1-14.

Quester, P.G. and J. Smart. 1998. The influence of consumption situation and product involvement over consumers' use of product attribute. Journal of Consumer Marketing. 15 : 220-38.

Romanov, E.V. 2002. Bycatch in the tuna purse-seine fisheries of the western Indian Ocean. Fishery Bulletin 100: 90-105.

Schifferstein, H.N. 2009. The drinking experience: cup or content? Food Quality and Preference 20: 268-276.

Senauer, B., E. Asp and J. Kinsey. 1991. Food trends and the changing consumer. Eagan Press, Minnesota. 385 pp.

Teisl, M., B. Roe and R. Hicks. 2002. Can eco-labels tune a market? Evidence from dolphin-safe labeling. Journal of Environmental Economics and Management 43:339-359.

The Nielsen Company. 2015. http://www.nielsen.com/ph/en/insights/news/2015/convenience-is-key-to-appealing-to-busy-Filipinos.html. Accessed 20 Oct 2016

Traill, B. and H. Harmsen. 1997. Pennine foods: always prepared for a new ready meal. In: Product and process innovation in the food industry (eds. B. Traill and K.G. Grunert), pp. 187–199. Chapman and Hall, United Kingdom.

Verbeke, W. and I. Vackier. 2005. Individual determinants of fish consumption: application of the theory of planned behaviour. Appetite 44: 67-82.

Washington, S. 2008. Ecolabels and marine capture fisheries: Current Practice and Emerging Issues. Globefish Research Program 91, Rome, FAO. p.52.

Yamashita, H. 2008. The value chain for Philippine tuna commodity: recent developments and future directions. IIFET 2008 Vietnam Proceedings, Nha Trang, Vietnam. (eds. Shriver A.L.). 7 pp., International Institute of Fisheries Economics and Trade, Corvallis, Oregon, USA, 2008.

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