ASSESSING CONSUMER BEHAVIOUR TOWARDS FISH SAUCE PRODUCTS BY USING FOOD CHOICE QUESTIONNAIRE

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Abstract. This study aims to assess Vietnamese consumer behaviour towards fish sauce product. It consists of two experiments. In the first experiment, consumer concept was explored using word association method. It was performed on 300 Vietnamese consumers with the prompt word as “fish sauce”. The data were analysed by a triangulation method. The results evoke six factors associated with fish sauce as Sensory Appeal, Health, Price, Convenience, Traditional Value, Quality and Safety. These findings were the starting point for a modification of food choice questionnaire (FCQ) adapted to fish sauce product. In the second experiment, the modified FCQ with 18 items was used to assess the consumer behaviour. The survey was performed on 300 Vietnamese consumers. The data were analysed by using Exploratory Factor Analysis and Confirmatory Factor Analysis. The obtained model with five factors was adapted to fish sauce for Vietnamese consumers (χ²/DF = 1.67, GFI = 0.93, CFI = 0.92, RSME = 0.47). In this, Sensory Appeal is the most important factor which might affect consumer food choice motivations. We expect that these results will be useful for the local manufacturers who want to develop traditional food products and/or enlarge national market.

Keywords: consumer behaviour, fish sauce, word association, food choice questionnaire.

Classification numbers: 1.5.1, 1.5.5.

1. INTRODUCTION

Since the early half of the 20th century, sensory science has grown rapidly and been used as a tool to support food product development process. Over the last two decades, the complexity of consumers has been increasingly acknowledged. Thus sensory researchers have become interested in studying other aspects of product consumption, for instance consumer concept and behaviour, which play an important role in consumer decision making process.

To address aspects of consumer concept, several qualitative methods have been added into the toolbox of sensory researchers. Among these methods, word association (WA) is frequently
used because of its easy application. WA has psychometric origins [1]. It is a qualitative method, which is based on the process of reminiscent in human perception. In the field of food science, WA has been widely applied to determine consumer concept towards, for instance, traditional food product [2], local food product [3], rice [4], green tea [5], well-being [6], and packaging [7].

To address aspects of consumer behaviour on food choice motives, Food Choice Questionnaire (FCQ) is the most frequently used tool. Its original form consists of 36 items, which were structured into nine factors [8]. Some authors showed that the nine factors proposed by were consistent across cultures, for instance, food choice motivations were studied in Japan, Taiwan, Malaysia, and New Zealand [9], in Canada, Belgium and Italy [10], and in Belgium, Hungary, Romania, and Philippines [11]. Nevertheless, in practices, these current factors as well as their items could not cover diverse research contexts. Therefore, FCQ were modified for an adaptation to particular research aims, populations and/or languages [12]. For instance, Fotopoulos et al. (2009) proposed a short version of FCQ in which the “ethical concern” factor was eliminated for Greek people [13]. Honkanen and Frewer proposed a modified FCQ in which the three items as animal welfare, political and religious values were taken into account for Russian people [14]. More recently, Pieniaka et al. proposed a modified version of FCQ with the mood factor excluded for subjects in six European countries (Belgium, France, Italy, Norway, Poland, and Spain) [15].

Fish sauce is a very popular and traditional condiment in most of Eastern countries, such as: Korea, Indonesia, Thailand and Vietnam. Since Vietnam officially became a full member of ASEAN and WTO, fish sauce products in particular and other traditional products in general can be easily exchanged across countries. From a positive aspect, this is an opportunity to enlarge the national market for domestic products. But still, from a negative aspect, domestic products have a certain amount of competition. So understanding the consumer concept and behaviour towards traditional food products (TFPs) is of crucial importance as this could help domestic businesses increase their competitive position in the marketplace.

This study aimed to assess the consumer concept and behaviour towards fish sauce products. It consists of two parts. First, the concept of fish sauce products was explored using WA method. The obtained results were the basis to modify the FCQ adapted to fish sauce. The modified questionnaire was validated before being used to measure the behaviour of Vietnamese consumers.

2. MATERIALS AND METHODS

2.1. Exploring consumer concept using word association

WA task consists of three following steps. Step 1 – Introduction – The experimenter explains to subjects that they will receive a prompt word, and they are asked to elicit three words (or phrases) that come to mind. The time taken for each word is limited to a maximum of 30 seconds. There is no right or wrong answers. Step 2 – Warm up – To make subjects familiar with the task, a prompt word “spring” was presented to each subject. Once the subject understood the task, he/she moves to the next step. Step 3 – Main task – Subjects were presented the prompt word as “fish sauce.”

This experiment was conducted in Ho Chi Minh City using a convenience sample. Solely the subjects who consumed fish sauce at least once per week were recruited. Table 1 represents the demographic characteristics of 300 subjects participated in this study. For analyzing the data,
the words elicited were counted and their frequencies were then graphically illustrated by means of word cloud. In addition, these elicited words were grouped into categories based on their similarity by triangulation method. In other words, three independent consumer researchers were in charge of categorization task. These results are the starting point to modify the current FCQ adapted to fish sauce. This provisional FCQ will be used for the next step.

Table 1. Demographic characteristics of participants in word association method.

| Gender (%) | Education (%) |
|------------|---------------|
| Female     | University    |
| 67.3       | 88            |
| Male       | High school   |
| 32.7       | 11.3          |
|            | Under high school |
| 0.7       |               |

| Region (%) | Frequency of use (%) |
|------------|----------------------|
| South      | Daily                |
| 54.6       | 68                   |
| Middle     | Normal               |
| 31.7       | 20.7                 |
| North      | Sometimes            |
| 13.7       | 11.3                 |

| Age (years) | Occupation (%) |
|-------------|----------------|
| 20 – 24     | Full-time job   |
| 62.3        | 41.3            |
| 25 – 35     | Part-time job   |
| 21          | 12.7            |
| >35         | Student         |
| 16.7        | 41.7            |
|             | Retire          |
|             | 0.7             |
|             | Housework       |
|             | 3.6             |

2.2. Assessing consumer behaviour using food choice questionnaire

The provisional version of FCQ in our research context consists of six factors. In this four factors were inherited from the original version of FCQ and other two factors were obtained from WA experiment. The survey was performed on 300 subjects, whose demographic characteristics was presented in Table 2. Table 3 represents the 24 items/statements of the FCQ developed for this study. Each item (i.e. statement) was evaluated using a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree. All statements begin with “When I choose fish sauce products, the important thing is that…”.

Table 2. Demographic characteristics of 300 subjects in Food Choice Questionnaire.

| Gender (%) | Education (%) |
|------------|---------------|
| Female     | University    |
| 66.3       | 89            |
| Male       | High school   |
| 33.7       | 10.3          |
|            | Under high school |
| 0.7       |               |

| Region (%) | Frequency of use (%) |
|------------|----------------------|
| South      | Daily                |
| 65         | 68                   |
| Middle     | Normal               |
| 22         | 25                   |
| North      | Sometimes            |
| 13         | 21                   |

| Age (years) | Occupation (%) |
|-------------|----------------|
| 20 – 24     | Full-time job   |
| 57.7        | 51.7            |
| 25 – 35     | Part-time job   |
| 18.7        | 11               |
| >35         | Student         |
| 23.6        | 34.3            |
|             | Retire          |
|             | 0.7             |
|             | Housework       |
|             | 3               |
Table 3. Motivation factors and survey items.

| Factor                        | Item No. | Code |
|-------------------------------|----------|------|
| **1. Sensory appeal* (Se)**   |          |      |
| Tastes good                   | Item 13  | Se1  |
| Smells nice                   | Item 3   | Se2  |
| Eye-catching packaging        | Item 17  | Se3  |
| Distinctive brownish color    | Item 14  | Se4  |
| Has a pleasant texture        | Item 19  | Se5  |
| **2. Health* (He)**           |          |      |
| Keeps me healthy              | Item 2   | He1  |
| Contains lots of protein, vitamins, omega-3, iron and lysine | Item 16 | He2 |
| Eating with fish sauce will help us eat more, thus providing more active energy | Item 24 | He3 |
| **3. Traditional value (Tra)**|          |      |
| Has origin of materials (geographical indications) | Item 4 | Tra1 |
| Is familiar with me and my family | Item 6 | Tra2 |
| Be processed/prepared in a special way | Item 12 | Tra3 |
| Is special product that reflects the nation or local culture | Item 15 | Tra4 |
| Is associated to specific celebrations of my country/family | Item 22 | Tra5 |
| **4. Quality and safety (Qu)**|          |      |
| Get certification of Vietnam high quality goods by consumers | Item 7 | Qu1 |
| Conform to Vietnam or global quality standard | Item 5 | Qu2 |
| Has a clear origin of production | Item 20 | Qu3 |
| Has Eco-friendly packaging    | Item 10  | Qu4  |
| **5. Price* (Pr)**            |          |      |
| Is not expensive              | Item 11  | Pr1  |
| Is cheap                      | Item 24  | Pr2  |
| Is good value for money       | Item 8   | Pr3  |
| **6. Convenience* (Co)**      |          |      |
| Is easy to prepare            | Item 1   | Co1  |
| Takes no time to prepare      | Item 18  | Co2  |
| Can be bought in shops close to where I live or work | Item 21 | Co3 |
| Is easily available in shops and supermarkets | Item 9 | Co4 |

*Reference: Steptoe, Pollard, & Wardle (Steptoe et al., 1995).

The survey data was analysed using exploratory factor analysis (principal component analysis and varimax rotation) to examine the underlying structure of the questionnaire. The number of factors was selected following criteria: (1) Kaiser’s criterion and scree test where the factors with eigenvalues greater than 1.0 and above the “breaking point” on the scree plot were retained, and (2) a good interpretability of the factor. The number of items within each factor, the so-called internal consistency reliability, was selected by using Cronbach’s alpha and corrected item-total correlation [16]. From the statistical point of view, Cronbach’s alpha represents average correlations among items on a scale, normally greater than 0.6. Due to the fact that Cronbach’s alpha are sensitive to the number of items in the scale, the corrected item-total correlations could also be reported, with acceptable values greater than 0.3 [17]. The CFA model was assessed using maximum likelihood estimation. Model fit indices presented include: Chi-square, Degrees of freedom (df), Root Mean Square Error of Approximation (RMSEA), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI). It is important to note that RMSEA < 0.08, TLI and CFI > 0.95 suggest an acceptance for model fit. The analysis was
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conducted using the Statistical Package for Social Sciences (SPSS®) version 23 (IPM Corp, Armonk, NY, USA).

3. RESULTS AND DISCUSSION

3.1. The concept of Vietnamese consumers towards fish sauce product

Consumer concept provides an interesting insight into a particular product. In the context of this study, a list of 710 words was elicited from the prompt word “fish sauce” and represented in form of word cloud (cf. Figure 1). The larger size the word, the more frequently it was associated with the concept. The concept “fish sauce” was related to delicious, tasty, salty, smell, and traditional, etc. The elicited words were grouped into categories based on their semantic similarity by triangulation method. In other words, three independent consumer researchers were in charge. Table 4 represents eight categories/factors. Their percentage of occurrences are as following: sensory appeal (69.9 %), quality & safety (11 %), tradition (6.8 %), convenience (3.8 %), health (3 %), price (2.9 %), familiarity (2 %), and origin (0.6 %).

![Figure 1. Word cloud for the prompt word fish sauce.](image)

| Category          | Word/phrase responding                                      | Total (%) | Frequency |
|-------------------|-------------------------------------------------------------|-----------|-----------|
| Sensory appeal    | Delicious, tasty, easy eating, good smell, flavor, package, salty, brown, limpid | 69.9      | 496       |
| Quality & Safety  | Safety, quality, hygiene, prestige, natural                | 11        | 79        |
| Tradition         | Traditional, long-standing                                 | 6.8       | 48        |
| Convenience       | Easy to buy, popular, usual                                 | 3.8       | 27        |
| Health            | Nutrient, good for health                                   | 3         | 21        |
| Price             | Price, cheap, reasonable price                              | 2.9       | 21        |
| Familiarity       | Familiarity, habit, necessary, popular                      | 2         | 14        |
| Origin            | Viet Nam, Phu Quoc, origin                                  | 0.6       | 4         |

The four factors sensory appeal, health, convenience, and price were retained in the modified FCQ. Due to the fact that they were not only refound in this study but also determined
in other studies [18 - 21]. In addition, “traditional value” and “quality and safety” were found as the two new factors adapted to fish sauce, (cf. Table 2).

3.2. The food choice motives of Vietnamese consumers towards fish sauce product

The internal consistency of the 24 items was assessed using Cronbach’s α and Corrected Item-Total Correlations. Table 5 represents Cronbach’s α values of six factors. As these values are greater than 0.6, it indicates a good internal consistency of the items within their factor, except for the health. Besides, the corrected item-total correlations are examined for their sign. As can be seen from the results, such recorded indices for the five factors were all positive. This suggests that the items were measuring the same underlying characteristics and none of them had been reverse-scored.

Table 5. Measure of scale reliability.

| Factor            | Item  | Cronbach's Alpha | Corrected Item-Total Correlation | Mean |
|-------------------|-------|------------------|----------------------------------|------|
| Sensory           | Se1   | 0.628            | .481                             | 3.8  |
|                   | Se2   | 0.744            | .392                             |      |
|                   | Se3   |                  | .407                             |      |
|                   | Se4   |                  | .659                             |      |
|                   | Se5   |                  |                                  |      |
| Health            | He1   | 0.744            | .612                             | 3.8  |
|                   | He2   | 0.451            | .306                             |      |
|                   | He3   |                  | .204                             |      |
| Traditional value | Tra1  | 0.651            | .457                             | 3.9  |
|                   | Tra2  |                  | .434                             |      |
|                   | Tra3  |                  | .316                             |      |
|                   | Tra4  |                  | .418                             |      |
|                   | Tra5  |                  | .392                             |      |
| Quality and safety| Qu1   |                  | .362                             |      |
|                   | Qu2   | 0.632            | .527                             | 3.8  |
|                   | Qu3   |                  | .423                             |      |
|                   | Qu4   |                  | .353                             |      |
| Price             | Pr1   | 0.704            | .543                             | 3.9  |
|                   | Pr2   | 0.628            | .435                             |      |
|                   | Pr3   |                  | .343                             |      |
| Convenience       | Co1   |                  | .438                             |      |
|                   | Co2   |                  | .458                             |      |
|                   | Co3   | 0.744            | .564                             |      |
|                   | Co4   |                  | .500                             |      |

Note: Cronbach's alpha on standardized items.
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Table 6 represents the results obtained from EFA performed on a five factors model. With KMO = 0.71 and p-value < 0.05 for Bartlett's test of sphericity, this suggests that Sensory, Quality & Safety, Convenience, Price and Traditional value are the five factors more suitable when measuring food choice motivation. Figure 2 represents the CFA model along with its statistics ($\chi^2$/DF = 1.67, GFI = 0.93, CFI = 0.92, RSME = 0.47). Such values are close to the standard meaning that the goodness of fit of the scale is acceptable.
Table 6. Exploratory factor analysis, item means, standard deviations, and item-total correlations.

| Item | Factors | Se. | Con. | Q & S | Pr. | Trad. | M   | SD    | I-T  |
|------|---------|-----|------|-------|-----|-------|-----|-------|------|
| Se5  | 0.880   |     |      |       |     | 3.70  | 0.819| 0.659 |
| Se3  | 0.847   |     |      |       |     | 3.58  | 0.867| 0.612 |
| Se1  | 0.601   |     |      |       |     | 4.03  | 0.813| 0.481 |
| Se2  | 0.539   |     |      |       |     | 3.91  | 0.831| 0.392 |
| Co3  | 0.762   | 0.760|      |       |     | 3.85  | 0.821| 0.564 |
| Co4  | 0.731   |     |      |       |     | 4.04  | 0.817| 0.500 |
| Co2  | 0.659   |     |      |       |     | 3.91  | 0.740| 0.458 |
| Co1  | 0.636   |     |      |       |     | 3.83  | 0.695| 0.438 |
| Qu2  | 0.676   |     |      |       |     | 3.57  | 0.984| 0.527 |
| Qu4  | 0.656   |     |      |       |     | 3.80  | 0.918| 0.353 |
| Qu3  | 0.586   |     |      |       |     | 4.18  | 0.869| 0.423 |
| Qu1  | 0.860   |     |      |       |     | 3.80  | 0.851| 0.362 |
| Pr1  | 0.731   | 0.840|      |       |     | 3.65  | 0.901| 0.543 |
| Pr2  | 0.554   |     |      |       |     | 3.25  | 0.932| 0.435 |
| Pr3  | 0.754   |     |      |       |     | 4.02  | 0.814| 0.343 |
| Tra3 | 0.730   |     |      |       |     | 3.90  | 0.824| 0.457 |
| Tra4 | 0.623   |     |      |       |     | 4.23  | 0.735| 0.316 |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Abbreviation: EV: Eigenvalues; Cum.: Cumulative %; M: Mean; Se.- Sensory; Q&S- Quality & Safety; Con.-Convenience; Trad.-Traditional value, Pr.- Price

4. CONCLUSION

This study highlights the food choice model with five factors (Sensory appeal, Quality & Safety, Tradition, Convenience, Price) adapted to fish sauce products for Vietnamese consumers. In this, Sensory Appeal is the most important factor which might affect consumer food choice motivations. In addition, this study retained two other important factors as “Quality and Safety” and “Traditional value”, which were mentioned previously in the publication of [5]. Further research could be conducted to determine invariant factors toward traditional food products across time and product categories, especially for Vietnamese consumers. From the application’s perspective, such factors are crucial in the context where the local manufacturers want to develop traditional food products and enlarge national market.

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