

**Preference-based segmentation: A study of food category and meal preferences among Vietnamese teenagers**

**VU THI HOA**



**Master Thesis in Fisheries and Aquaculture  
Management and Economics  
(30 ECTS)**



**The Norwegian College of Fishery Science  
University of Tromsø, Norway  
&  
Nha Trang University, Vietnam**

**May, 2010**



**Abstract**

The purpose of this paper is to examine the applicability of preference-based segmentation for a broad array of meals and food categories in the context of teenagers in Vietnam. A convenience sample of 413 Vietnamese teenagers in secondary and high schools provided an evaluation on the preference of 30 items of food categories and 36 common meals was collected based on structured questionnaires and then used as inputs for the analyses. A five-cluster solution for the food category segmentation is defined: fish haters, eggs haters, shellfish haters, vegetables haters and food likers. Four distinct preference-based meal segments are also identified namely likers of all meals, haters of poultry meals, haters of seafood meals and haters of pork meals. The segments are profiled by means of food consumption, social and family related attitudes, interest and lifestyle and socio-demographic variables. The findings indicate that there are distinct and interesting differences between these segments. Thumbnail sketches of the teenager segments enable food producers and meal suppliers to make better and more informed decisions in terms of effectively targeting different market segments.

**Keywords:** Food preferences, segmentation, attitude, lifestyle, demographic, teenagers



**Acknowledgements**

I am deeply indebted to my international supervisor, Professor Kåre Skallerud, Department of Social and Marketing – NCFS, University of Tromsø, Norway who supported, encouraged and gave me a lot of guidance and valuable comments from the very beginning up to the end of my thesis doing.

I am deeply grateful to Professor Svein Ottar Olsen, Department of Social Science and Marketing –NCFS, University of Tromsø, Norway, who not only gave me a lot of guidance and valuable comments but also provided the collection data grant for my study.

I also wish to thank my supervisor in Vietnam, Dr. Nguyen Van Ngoc, who assisted in designing the questionnaire and analyzing data.

I would like to thank NORAD for funding my study and research in Fisheries and Aquaculture Management and Economics at Nha Trang University. Many thanks are extended to Nha Trang University for the time and facilities that they have provided to this course.

Finally, I wish to send many thanks to my friends, who have helped me in performing the survey; without their friendly cooperation it was impossible for me to collect the data within the stipulated time. The authors would like to thank the anonymous referees for their helpful suggestions and comments.

Last but not the least, I also give many thanks to my family, who encouraged and supported me a lot during my study period.

Nhatrang, May 15<sup>th</sup> 2010

Vu Thi Hoa



**Table of contents**

Abstract .....	iii
Acknowledgements .....	v
Table of contents .....	vii
List of tables .....	ix
List of figures .....	ix
List of appendix .....	69
1. INTRODUCTION.....	1
1.1. Background .....	1
1.2. Purpose of research .....	3
1.3. Structure of thesis .....	5
2. CONCEPTUAL FRAMEWORK.....	7
2.1. Segmentation analyses.....	7
2.2. Food preferences as basis for segmentation .....	8
2.3. Profiling segments .....	9
2.3.1. Food consumption .....	10
2.3.2. Social and family related attitudes .....	11
2.3.3. Interests and lifestyle .....	12
2.3.4. Demographic .....	13
2.4 Research model .....	13
3. DATA AND METHODS .....	15
3.1. Data collection.....	15
3.2. Measurements of constructs .....	17
3.2.1. Preferences for food categories and meals .....	17
3.2.2. Consumption .....	20
3.2.3. Social and family related attitude .....	21
3.2.4. Interests and lifestyle .....	23
3.2.5. Demographic .....	25
3.3. Analytical methods and procedures.....	26

4. RESULTS..... 31

    4.1. Descriptive results ..... 31

    4.2. Cluster identification ..... 34

        4.2.1. Cluster identification for food category preference..... 34

        4.2.2. Cluster identification for meals preference ..... 36

    4.3. Cluster profiles ..... 38

        4.3.1 Consumption differences..... 38

        4.3.2. Social and family related attitudes differences..... 40

        4.3.3. Interest and lifestyle differences..... 43

        4.3.4. Social demographic differences ..... 45

5. DISCUSSION AND IMPLICATIONS..... 51

    5.1. Discussion ..... 51

    5.2. Theoretical implications ..... 55

    5.3. Practical implications for marketers/policy-makers..... 56

    5.4. Limitations and future research ..... 58

REFERENCES ..... 59



**List of figures**

Figure 1: The structure models of category and profiling variables. ....	14
Figure 2: Two-stage clustering.....	29

**List of tables**

<b>List of tables.</b> .....	ix
<b>Table 3.1.</b> Social-demographic characteristics of the sample.....	16
<b>Table 3.2.1a.</b> The most important food categories in Vietnam.....	18
<b>Table 3.2.1b.</b> The most important meals in Vietnam.....	19
<b>Table 3.2.2.</b> The scale form used to measure food consumption frequency.....	21
<b>Table 3.2.3a.</b> The scale form used to measure attitude towards eating fish.....	21
<b>Table 3.2.3b.</b> The scale form used to measure social norms on food choice.....	23
<b>Table 3.2.4.</b> The scale form used to measure interest and lifestyle.....	25
<b>Table 4.1.1.</b> Vietnamese teenager's food category preference.....	31
<b>Table 4.1.2.</b> Vietnamese teenager's meal preference.....	32
<b>Table 4.1.3.</b> Result of exploratory factor analysis of food category preference.....	33
<b>Table 4.1.4.</b> Result of exploratory factor analysis of meal preference.....	34
<b>Table 4.2.1.</b> Cluster descriptors of food categories based on factor score.....	35
<b>Table 4.2.2.</b> Cluster descriptors of meals based on factor score.....	37
<b>Table 4.3.1a.</b> Differences in consumption for selected food groups.....	39
<b>Table 4.3.1b.</b> Differences in consumption for selected meal groups.....	40
<b>Table 4.3.2a.</b> Differences in attitudes towards fish consumption across the segments.....	40
<b>Table 4.3.2b.</b> Differences in attitudes towards fish consumption across the segments.....	41
<b>Table 4.3.2c.</b> Differences in social and family related attitudes across the segments.....	42
<b>Table 4.3.2d.</b> Differences in social and family related attitudes across the segments in meal preference segmentation.....	43
<b>Table 4.3.3a.</b> Interest and lifestyle differences between the segments in food category preference segmentation.....	44

---

<b>Table 4.3.3b.</b> Interest and lifestyle differences between the segments in meal preference segmentation.....	45
<b>Table 4.3.4a.</b> Socio-demographic differences between the segments .....	47
<b>Table 4.3.4b.</b> Socio-demographic differences between the segments .....	49
<b>Table 5.1:</b> Thumbnail sketches of the five clusters in food category segmentation .....	52
<b>Table 5.2:</b> Thumbnail sketches of the four clusters in the meals preference segmentation	54

## 1. INTRODUCTION

### 1.1. Background

Seafood represents a popular and important food item in Vietnam. The domestic seafood consumption has increased in recent years. Per capita consumption of fishery products in Vietnam increased from 13.2 kg in 1990 through 18.7 kg in 2000 to 19.4 kg in 2002 (Globefish 2004: [http://www.fao.org/fishery/countrysector/FL-CP\\_VN/en](http://www.fao.org/fishery/countrysector/FL-CP_VN/en)). On average, local consumers take 50 percent of their dietary protein from different kinds of aquatic products (VASEP, 2003). Comparing to other protein sources, average *per capita* pork consumption in Viet Nam reached around 20 kg in 2003 (Dinh et al., 2005). Seafood, notably fish, is therefore one of the most popular food items consumed in Vietnam.

Adolescence is an important period in the life-cycle of a person which brings about significant psychological and physiological changes. Some new preferences are formed due to the growing autonomy of children, their opportunities to eat outside of their family and their desire to enter the adult world (Ton Nu et al., 1996). For marketers, it is therefore of critical importance to understand teenagers' values and preferences, in order to satisfy their needs (Honkanen et al., 2004). According to Halford et al., (2008) children's food preferences are influenced by many factors such as weight status, food type, branding and television food advertisements (commercials). And children develop their food preferences as they grow and are exposed to a variety of food items, textures, taste and flavours (Birch, 1999). Research has shown that children's food preferences predict their food consumption patterns (Drewnowski and Hann, 1999) and food choice behaviours remain stable during adolescence (Kelder et al., 1994). What a child learns to like in his early years can build his food preferences and food choices as an adult. In other words, food preference of adolescent not only impacts their parent's decisions but also impacts their future food/seafood consumption behaviour. This is why adolescent's food preferences can have major health effects on a whole generation and for the rest of their life. Thus, understanding children's food preferences and how these preferences change over time is therefore critical for marketers in order to make more informed

decisions about their marketing mix programmes, as well as for governments to plan more effective nutrition education and dietary intervention programmes (Hoelscher et al., 2002). In this study, the link between preference and food-related behaviours of teenager segments in Vietnam will be investigated

Segmentation allows marketers to identify distinct groups of customers whose behaviours significantly differ from others. This allows firms to adjust their marketing mix to cater to particular needs of different market segments. Four segmentation bases have emerged as the most popular in segmentation studies (Kotler, Armstrong, Saunders, & Wong, 2002): geographic segmentation (i.e. markets segmented by geographic region, population density or climate); demographic segmentation (i.e. markets segmented by age, sex, size and family type, etc.); psychographic segmentation (i.e. markets segmented by life-style variables); and behavioural segmentation (i.e. markets segmented by purchase occasion, benefits sought, user status). The segmentation base chosen to subdivide a market will depend on many factors such as “the type of product, the nature of demand, the method of distribution, the media available for market communication, and the motivation of the buyers” (Chisnall 1985, p. 266). Food and seafood consumption behaviour is influenced by many interrelated factors of product attributes, personality and cultural and social environment (Olsen, 2004; Furst et al., 1996; Shepherd, 1989; Yudkin, 1956). The basis for segmentation of food markets have varied. Demographic variables have been used (Verbeke and Lopez, 2005) as well as food related risk perceptions (McCarthy and Henson, 2005). The evaluation and perception of fish quality by consumers have also been used as a basis for benefit-based segmentation of Belgium seafood consumers (Verbeke et al., 2007). However, food preferences are recognized as playing a central role in food choices and consumption in adulthood (Logue and Smith, 1986; Steptoe, Pollard, and Wardle, 1995) and probably even more in adolescence (Birch, 1999; Drewnowski, 1997). Previous studies have suggested that preference or benefit - based segmentation is a fruitful way to identify segments because it often better segments actual purchase or consumption (Haley, 1968; Honkanen et al., 2004; Olsen et al., 2009).

Segmentation of seafood markets have not been a topic of considerable research in Viet Nam. Xuan (2009) has conducted one of the first segmentation studies of fish

market in Vietnam. In her research, she used perceived quality, ambivalence and health involvement as segmentation bases. Not many studies have used preferences as the basis for market segmentation (Wedel and Kamakura, 1998) even though heterogeneity among consumer preferences is probably one of the most relevant segmentation bases (Kardes, 1999; Honkanen et al., 2004, Honkanen, 2010). No previous studies on preference-based segmentation among Vietnamese teenagers have been identified. According to Honkanen et al., (2004) preferences for comparative meal selections are an appropriate basis for segmenting the food market among Norwegian teenagers. Moreover, several studies have suggested that preferences for fish differ between cultures and regional areas. Therefore, in this study, differences in food preferences of adolescents across regions in Vietnam will be examined. More specifically, adolescents will be segmented based on their preferences for different food/protein categories (i.e. seafood, beef, poultry, pork etc.) and also based on their preferences for different prepared meals (i.e. specific meals made of the different food categories). The two different segmentation bases will be compared with regards to the richness of profiling variables and their usefulness in managerial and policy-making contexts.

## **1.2. Purpose of research**

The purpose of this study is to evaluate the usefulness of preference-based segmentation in understanding food-related behaviour among teenagers in Vietnam. More specifically, the primary goals of this study are:

- To explore what kind of food categories and meals that Vietnamese teenagers like or dislike and how they evaluate the main sensory aspects of seafood (e.g., quality, consistent quality, taste, health...).
- To explore the appropriateness of segmenting Vietnamese teenagers based on meal and food category preferences.
- To determine whether preference clusters can be profiled based on distinctive consumer characteristics, consumption activities, social norms, lifestyle and other interests / attitudes.

- To suggest implications for marketers as well as for public policy makers in order to effectively target different market segments.

Market segmentation allows marketers to identify unique segments in the market so that they can tailor product features, services, distribution, pricing, and marketing communication messages specifically to fit each segment. The research findings can provide a good reference for marketers and public policy makers to make informed decisions. Practical implications will be identified to provide inputs for long term market strategies, which is to increase the teenage consumer's satisfaction with meal and food products and therefore benefiting the marketers. Public policy makers may benefit from the study by using the results to devise more specific policies in order to boost teenager's healthy meal/food consumption.

This research is built on preference literature and research about food and seafood consumption behaviour of adolescent (Shepherd, 1989; Birch, 1999; Drewnowski and Hann, 1999; Hoelscher et al., 2002; Skinner et al., 2002; Pérez-Rodrigo et al., 2003; Honkanen et al., 2004; Halford et al., 2008; Olsen et al., 2009; Honkanen, 2010). According to Olsen et al. (2009), even at local markets, the knowledge of differences in preferences and motivation to consume products across segments is of vital importance. For example, there are fundamental differences in preferences between younger and more elderly consumers (Olsen, 2003). Consumers who are similar in beliefs, attitudes, or preferences within a particular classification can be grouped together (Myrland et al., 2000).

Convenience samples are collected among secondary and high school teenagers in Ha Noi, Da Nang, Nha Trang, and Ca Mau cities, which provided the population base for the selection of teenagers between the ages of 12 and 20. Collected data includes preferences (liking or disliking, taste or distaste), demographics (information relevant to individual demographics such as education, religion, social class and household information), consumption (types of meal; regular consumption), and attitude and lifestyle data (individuals' general interests, opinions and activities within their social environments). The market segmentation will be performed by two-stage cluster analysis. The profiling of the segments is performed by ANOVA (analysis of variance) and cross-tabulation analysis. These analyses were supported by SPSS 17.0.

### **1.3. Structure of thesis**

This section is going to address the theoretical overview on preference – based segmentation. Also, research about food and seafood consumption behaviour will be systematized to provide the fundamental background for data processing and analyses in the next parts. In the introduction, the concepts of segmentation, preferences, and some profiles variables have been briefly introduced. In part 3, the data collecting procedure and the methodology will be described, focusing on the measurement, cluster analysis and techniques for group mean differences. Then in part 4, the result of the empirical survey will be presented. The last part will contribute to the discussions and applications of this research.





## 2. CONCEPTUAL FRAMEWORK

### 2.1. Segmentation analyses

Segmentation is a technique for assigning consumers or customers into homogenous groups based on some segmentation variables (Wedel and Kamakura, 1998), providing opportunities to develop targeted marketing strategies towards a specified group of consumers. The concept of market segmentation, first introduced by Smith (1956), has attracted much marketing attention. The concept is based on three basic premises (Engel et al., 1972): (1) customers are different, (2) differences in customers relate to differences in demand, and (3) segments of customers can be isolated within the overall market.

Market segmentation comes about as a result of the observation that all potential users of a product are not alike. They are different in the consumption behaviors, in their life-styles, and in patterns of buying and using. As a result, the same general appeal will not interest all prospects and satisfy every customer's needs. Therefore, in order to enhance customers' satisfaction, it is necessary to divide the generic market into segments. Different marketing strategies and tactics will be developed accordingly by properly considering both the differences among prospective consumers and that the firm's objectives and resources.

The literature discusses two principal approaches to segmentation. They are *a-priori* and *post-hoc* or *data driven* (Dolnicar, S., 2004; Kara and Kaynak, 1997, Wind, 1978). *A-priori* segmentation requires first to choose variables of interest and then classify buyers according to that designation (Wind, 1978). This approach may guarantee within segment similarity by ensuring, for example, that all segment members come from similar geographic regions and income ranges. However, this does not necessarily mean that all segment members will respond in the same way to marketing stimuli (Hoek, Gendall and Esslemont, 1996). The second approach is to segment markets on a *post-hoc* basis where a range of interrelated variables is selected and then buyers clustered into groups whose average within-group similarity is high while between-group similarity is low (Wind, 1978). The interrelated variables in this case are called bases, and then the segments can be further examined for differences in other characteristics- called profiled variables. These

variables are not concurred with the based variables. Moreover, the number of segments is not known until the cluster analysis has been completed. In this paper, the *post-hoc* approach to segment is applied.

## **2.2. Food preferences as basis for segmentation**

The first step in the segmentation process is a classifying objects/customers based on a chosen set of variables. A segmentation basis is a set of variables or characteristics used to assign potential customers into homogeneous groups (Wedel and Kamakura, 1998). These variables can include demographic and socioeconomic characteristics, personality, values and lifestyle characteristics (psychographics), situation, product use and purchase patterns, attitudes towards products and their consumption, benefits sought in a product category, and attitudes and behaviour responses towards different marketing variables like product, price, promotion or distribution (Beane and Ennis, 1987; Tynan and Drayton, 1987; Wind, 1978). Many of the early segmentation studies were based upon dividing the sample into frequent and infrequent users of a product (Honkanen and Frewer, 2009). Personality and psychographic factors became popular in the 1980s as bases for segmentation (Quinn et al., 2007). Shopping orientation (Gehrt and Shim, 1998), attitudes, and benefits sought by consumers (Haley, 1968) have also been used. Consumers have also been segmented by their quality evaluation (Bernues, Olaizola, and Corcoran, 2003; Verbeke, Vermeir, and Brunsø, 2007), including food preferences (Delarue and Loescher, 2004).

Which quality characteristics of food will the consumers perceive as the most important? Taste, nutrition, freshness, health, and appeal are mostly considered as salient food attributes forming a general attitude of food (see Olsen, 2004 for a review). Some studies about foods have found that taste is considered the most important quality attribute influencing food selection (Drewnowski, 1997; Roininen et al., 1999). Health is another issue frequently mentioned as a reason for food choices (Williams and Hammit, 2001). Researches showed that taste/distaste, instead of nutrition as suggested by their parents, seems to be the key driver for children's and adolescents' food choices (Berg, Jonsson, and Conner, 2000; Olsen and Ruiz, 2008). Gummesson et al. (1996) found that the 'healthiness' of the meal was not a significant contributor while personal preferences for the taste, texture and appearance of

the food had a much greater influence. In similar studies, Berge et al., argued that taste and distaste are more important for younger consumers (Berge, Johnson and Conner, 2000) while Roininen concluded elderly people are more concerned about nutrition and health (Roininen et al., 1999). Although health and taste have been found to be important predictors of food/meal consumption, only a few studies have investigated attributes of health and taste simultaneously (Roininen et al., 1999; Olsen, 2003). In several studies, nutritional aspects are considered to be the second most important product feature, only after sensory aspects (Letarte et al., 1997; Roininen et al., 1999; Olsen, 2004).

Preference is sometimes used to indicate that a person chooses one item over another (Kardes, 1999). Food preference can also be defined as a comparison between two or more foods which leads to choice (Rozin, 1996). Another common usage in food science is linking preference to of liking/taste. Consumer needs or preferences for a particular product may vary considerably between individuals, segments, groups and cultures (Ngapo, Martin, and Dransfield, 2007; Nielsen, Bech-Larsen, and Grunert, 1998; Prescott and Bell, 1995). Previous studies have suggested that differences in attitudes, preferences or benefits with products or services ultimately drive marketing or consumer segmentation (Kim et al., 2002; Myrland et al., 2000; Honkanen et al., 2004; Olsen et al., 2009; Honkanen, 2010). For the reasons discussed above, in this study, meals and food categories preferences were chosen as bases to segment the Vietnamese teenager's food market. A comparison of preferences for meals and food categories as two segmentation bases has not been conducted in previous studies. This paper is hoped to contribute to the food consumption literature by first exploring and the usefulness of the two bases, followed by comparing and the richness of profiling variables.

### **2.3. Profiling segments**

After dividing the market into groups of individuals with similar characteristics, these segments would then be profiled based on other characteristics – descriptors to highlight the differences between these groups, to fulfill the accessibility requirements for effective market segmentation. Profiling is critical for the proper implementation of segmentation strategy (Wedel and Desarbo, 2002). A segment profile describes the significantly unique characteristics of the typical buyer group in a certain market segment. The profile variables used to indicate distinct segments are varied in food market segmentation including

demographics, consumption, interest and life style (Honkanen et al., 2004); food consumption, food choice motives, attitudinal variables and socio-demographic variables (Honkanen, 2010); involvement with fish quality, self confidence to assess fish quality, food involvement, food-health awareness (Verbeke et al., 2007). The validity of using demographic variables is well supported in the literature (Frank, Massey and Wind, 1972). However, the marketing literature has shown that it is difficult to profile market segments using only traditional descriptor variables (e.g., demographics) (Wedel and Desarbo, 2002). According to Honkanen et al., (2004), demographics have typically performed well in identifying market membership but they have performed less satisfactorily in identifying segment membership or in understanding buying behaviour. They have also pointed out that social and family-related attitude and lifestyle variables have a greater ability to profile the segments and explain segment membership than demographic variables (Honkanen et al., 2004). Green and Krieger (1991) noted that preference homogeneity for products /services can be related to either personal variables (e.g. demographic characteristics) or situational variables (e.g. type of meal in which beverage is consumed, buying for oneself versus a gift for someone else, etc.) and their interactions. This study will therefore use social and family related attitudes, interests, and life style variables in addition to demographics to profile segments.

### **2.3.1. Food consumption**

Food choice is a complex process that influences food production systems and consumers' nutrient intake as it determines what food consumers buy and eat. Consumers' food choices involve a complex interaction between the sensory properties of the food itself, factors specific to the individual (such as a liking for particular foods), and environmental, cultural and contextual influences (Furst et al., 1996). According to Honkanen (2010) "food choice is another variable related to preference and the different segments should then show different consumption patterns unless interfered with by other factors". On the other hand, food liking and consumption frequency for most foods were significantly positively related (Sukalakamala and Brittin, 2008). The frequency of consumption may be sufficient for establishing the relative intake of foods (Horwath, 1990). The fish consumption frequency will be compared across the preference segments.

### **2.3.2. Social and family related attitudes**

According to Fishbein and Ajzen (1975), attitudes represent a person's general feelings (of favourableness or unfavourableness, liking or disliking, good or bad) toward some stimulus objects (issue, person, product, activity etc.). A broadly accepted definition of attitude is as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly and Chaiken 1993, Jaccard and Blanton, 2005). In food context, attitudes are suggested to be one of the main determinants in explaining food consumption (Bredahl and Grunert, 1997; Olsen 2001; 2004; Shepherd and Raats, 1996; Verbeke and Vackier, 2005). The various definitions of attitudes have guided marketing researchers to use benefits or needs as the core concept in attitude – based segmentation (Olsen et al., 2009).

Social norms are characterized as the perceived social pressure or expectation of the society (subjective norms) or from specific groups or individual (normative beliefs) (Fishbein and Ajzen, 1975; Olsen, 2004). Social norms have a significantly positive influence on intention of fish consumption behaviour in Vietnam within a family situation (Tuu et al., 2008). Social factors have been shown to be more important than genetic factors for the development of individual differences in food preferences (Rozin, 1995, Olsen, 2004). According to a review by Rolls (1988), family environment and peers are major determinants for children's and teenagers' food preferences; however, individual variation in preferences can only be partly explained by parental influences. Teenagers know what kind of food their parents want them to eat, and what food is good for them, but nutrition does not seem to be a major concern for the teenagers (see Hokanen et al., 2004 for a review), taste seems to be much more important than nutrition when teenagers make their food choices (Berg et al., 2000). In Vietnam, mothers have important role in household work and take care of the children; they often prefer healthy and nutritional food and they seem to be most influential concerning adolescents' food attitudes, choices and healthy eating behaviour. On the other hand, according to Olsen and Ruiz (2008) discrepancies in preferences are common in family food consumption behaviour as well as between parents and children. A meta-analysis by Borah-Giddens and Falciglia (1993) demonstrated a significant but small correlation between parents' and their children's food preferences (see Olsen and Ruiz, 2008 for a review). Fish is a main (or one of the main)

family meal(s) in many countries' households in general and in Vietnam in particular. Previous studies have shown that adolescents and their parents have different preferences for fish in this context (Olsen, 2001; Olsen and Ruiz, 2008). In this paper, family expectations and conflicts between teenagers and their parents about food choice will be investigated. Environmental influences such as publicity -advertising (Byrd-Bredbenner and Grasso, 2000), school-based nutrition education programmes or school meal plans may also play a relevant role (Neumark-Sztainer et al., 1999; Skinner et al., 2002).

### **2.3.3. Interests and lifestyle**

Psychographics and consumer lifestyle are also used as profiling factors in segmentation studies due to the insights they can provide about the target market (Lin, 2002; Wycherley et al., 2008). "Lifestyle segmentation" has been a useful concept for marketing and advertising planning purposes (Wells and Tigert, 1977). Lifestyle has been defined simply as how one lives (Kucukemiroglu, 1999). Engel et al., (1996) gives the definition of lifestyle as a summary construct defined as patterns in which people live and spend time and money. The lifestyle relates to the economic level at which people live, how they spend their money, and how they allocate their time (Anderson and Golden, 1984). According to Kucukemiroglu (1999), lifestyle segmentation research measures people's activities in terms of: i) how they spend their time; ii) what interests they have and the level of importance they place on their immediate surroundings; iii) their views of themselves and the world around them; and some basic demographic characteristics such as the stage in life cycle, income, education and where they live. The most widely used approach to lifestyle measurements has been activities, interests, and opinions (AIO) rating statements (Wells and Tigert, 1977). The term 'lifestyle' is used in this study to express general attitudes or feelings associated with individuals' interests and activities within their social environments (Honkanen et al., 2004). In other words, this research has generally focused on identifying the broad trends that influence how teenagers live, work, and play. This includes aspects of teenagers' eating habits, attitudes towards friends, families, schoolwork, media and social activities. It also includes the way they perceive themselves and how interested they are in aspects of food (Hokanen et al., 2004).

### **2.3.4. Demographic**

Demographic variables included in the present study are age, gender, occupation (Shim et al., 1999), locations, the number family members, and the average allowance per month. Socio-demographic variables have been shown to be related to food preferences, especially as they pertain to age and gender (Honkanen et al., 2004). Gender influence food likes, dislikes and taste perception (Drewnowski and Hann, 1999; Duffy and Bartoshuk, 2000; Skinner et al., 2002). Women show higher food aversions than men and had a different pattern of consumption (Ton Nu et al., 1996). In other studies, young men have shown to have lower interests in food (Ares and Gambaro, 2007). According to Ton Nu et al. (1996) study of French adolescents of 10 to 20 years old, it indicates that food habits and tastes are mostly related to age and gender. Girls pay more attention to dietetics and snack more than boys. Young adolescents prefer bland and familiar foods whereas older ones learn to appreciate ‘adult’ foods. As they grow older, children snack more, skip more meals and seem more interested in foreign foods. The results of Honkanen and Frewer’s (2009) study of Russian consumers’ motives for food choice suggest that being younger, male and less educated, or being a student, or in a household with children under 18 is associated with a higher perceived health status. So they reduced perception of health benefits being associated with healthy food choices, and lack of concern about the healthiness of food. In other words, the older the consumers are the higher concern about health they have. The study will particularly aim to identifying and explaining gender- and age-related difference in preference because variables such as age, gender and socio- economic status may affect food habits and preferences, as described in several studies (Ton Nu et al., 1996). This study will also explore food habits and preferences of adolescents in various geographical locations in Vietnam in order to see if geographic differences may be used as a profiling variable.

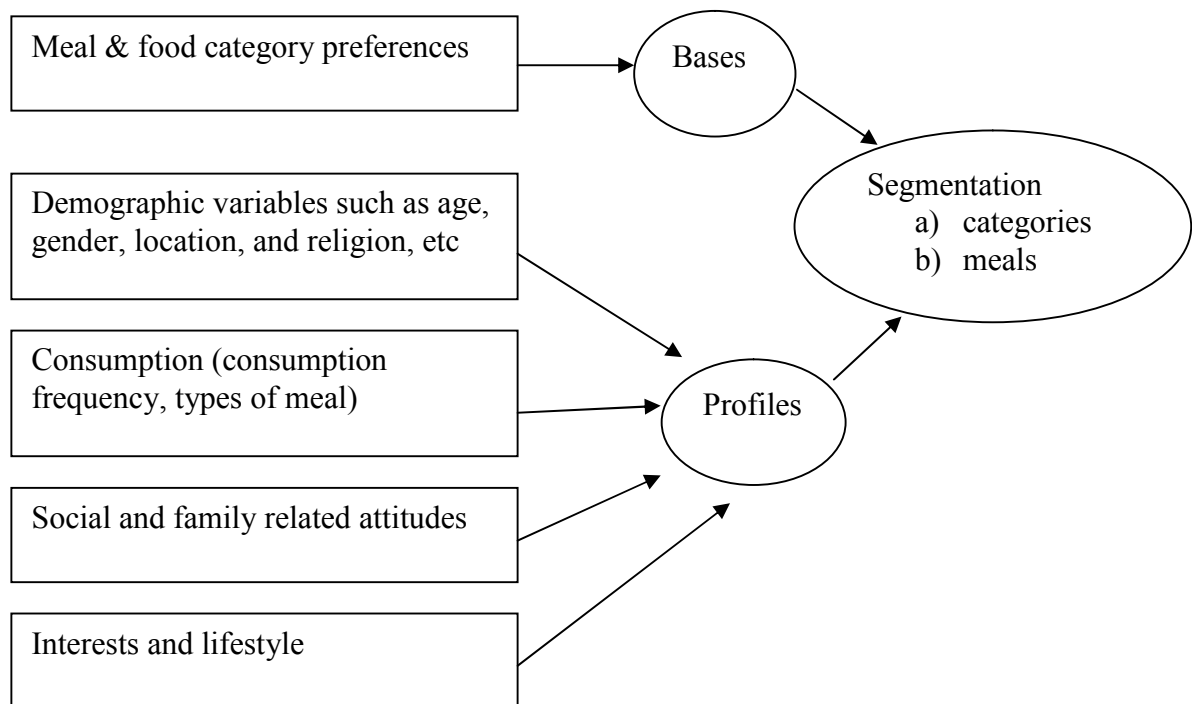
### **2.4 Research model**

The conceptual discussion above includes the specific review of determinants on food/seafood consumption. The right choice of variables used for clustering and profiling the segments plays the important role in the success of market segmentation. In this study, food category and meal preferences have been chosen as the segmentation base. To profile the segments, several variables examined are those expected to be related to preferences:

food consumption, social and family related attitudes, interest and lifestyle, and demographic variables. The selection of these variables was based on findings reported in research combined with previous discussion of consumer behaviour and food consumption. The above discussion also provides a description on how these attributes (consumption, social and family related attitudes and interest and life style, and demographics) have impact on food preference in general and fish in particular. It is important to understand the constructs of the model with their antecedents in order to understand the complexity of fish consumption behaviour.

The conceptual model in Figure 1 summarises the theoretical discussion. The figure shows that food category and meal preferences will be used as the base for the segmentation study. Consumption pattern, social and family related attitudes, interest and lifestyle, and demographic variables will be used as profiling variables in the empirical study.

The conceptual model for the preference-based segmentation is illustrated in Figure 1



**Figure 1:** The structure models of category and profiling variables.



### **3. DATA AND METHODS**

This part presents the process of data collection, questionnaires and analysis methods. A survey of Vietnamese teenagers in secondary and high schools was performed. The designing items to measure the constructs were done. Before the survey administration, pre-test of the questionnaire with a small group of respondents was conducted, and the results were satisfactory. The section places an emphasis on designing the items to measure the constructs. Besides, Cluster analysis, ANOVA procedure and Crosstabs procedure are the main methods mentioned in this section.

#### **3.1. Data collection**

Vietnamese teenagers in secondary and high schools provide the population base for the selection of teenagers between the ages of 12 and 20. The research was conducted at some secondary and high schools in Ha Noi (the capital, in the North of Vietnam), Da Nang, Nha Trang (two main cities in the Central of Vietnam), and Ca Mau (the city in the South of Vietnam) with the convenience sample size of 413. Thus, the data should not be considered representative for the entire Vietnam. In each school, one class representing each age level was randomly selected and one teacher in each school was instructed and responsible for distributing and collecting the questionnaire. First, these teachers explained the main purpose and the importance of the research to the respondents. While explaining the questionnaire, these teachers tried to avoid possibly influencing the respondents' answers. Upon instructions, these respondents completed the questionnaires during the class time. The process took place without communications among students. This is to ensure the highest possible objectivity for the data collected. The questionnaires, including questions about food preference, consumption, attitudes towards food/fish consumption and related with social and family, interest and life style and demographic variable, were distributed to the students within 12-20 years old range. The sample mainly focuses on the criteria of age (from 12-20), gender, education, region, religion and the size of households. In total, 600 questionnaires were sent to schools which were willing to participate. Among these, 463 questionnaires were returned, and 413 questionnaires were qualified for analysis.

The average age among the children is 15.1 years. The characteristics of the sample are presented in Table 1. The sample distribution is 22.5 percent in Ha Noi, 24.5 percent in Da Nang, 26.6 percent in Nha Trang and 26.4 percent in Ca Mau City. The table also shows that 85.7 percent of the participants are between 12 and 17 years old. The majority of the respondents are girls (63.7 percent). This helps to enhance the validity of the research since girls tend to make key decisions regarding meals planning in most households. This observation was also affirmed by Tuu, who concluded that girls are more involved in food behavior/preparing in their families (Tuu et al, 2008). The nonreligious respondents account for 47.2 percent of the total, while Buddhists count for 38 percent and the remaining is of other religions. The family size of 4 to 6 members is popular, representing 78 percent of the total population. The remaining 22 percent are families which have less than 3 or more than 6 members. Altogether, 64.1 percent of the households are with two to three children. Some 59.6 percent live in cities, while the remaining respondents live in rural areas. Of all the respondents, 55.4 percent of the teenagers live in the landlocked areas. Only 44.6 percent lived along the coastal areas. 54.7 percent of teenagers have monthly allowance of less than 100,000 VND.

**Table 3.1.** Social-demographic characteristics of the sample (% of respondents, n = 413)

City	Ha Noi	22.5	Number of person	1-3,	8.7
	Da Nang	24.5		4-6,	78.0
	Nha Trang	26.6		7 or more	13.3
	Ca Mau	26.4			
Age group			Number of children	0-1	31.5
	12-13,	30.0		2-3,	64.1
	14-15	29.5		4 or more	4.4
	16-17	26.2			
Gender			Area	City	59.6
	18-20	14.3		Rural	40.4
	Boy	36.3		Near to the sea	44.6
Religion	Girl	63.7	Allowance (1000 VND) (19,100VND=1USD)	Far from the sea	55.4
	Catholicism	7.0		<= 100	54.7
	Protestantism	0.5		101-300	28.8
	Buddhism	38.0		301-500	8.5
	Cao Dai	0.5		501-1500	8.0
	No religion	47.2			
	Others	6.8			

### **3.2. Measurements of constructs**

This part of the thesis discusses the measurement procedure of the constructs and attributes. In most cases, 7-point Likert scale and semantic differential scales were used. Based on the review of earlier studies and the authors' knowledge of Vietnamese attitudes and behaviour towards food, a questionnaire was designed covering the key variables in this study.

#### **3.2.1. Preferences for food categories and meals**

A pre-study of two groups of teenagers in Nha Trang area was done to identify a list of food that is perceived as important by Vietnamese teenagers. Each group of ten students was asked to tell about the most important fish species in the Vietnamese cuisine, the food that they like or dislike and the most regular food used in their meal at home. The meal list can be divided in two parts:

Category level: the students were asked to discuss about the most important food in Vietnam and the result are following:

**Table 3.2.1a.** The most important food categories in Vietnam

---

1. Shellfish:	3. Beef/Veal
a. Shrimp	4. Pork
b. Crab	5. Poultry
c. Scallops/snail	a. Chicken
d. Squid	b. Duck
2. Fish:	6. Eggs
a. Pangasius-Tra	a. Chicken eggs
b. Pangasius-Basa	b. Duck eggs
c. Snake- head	c. Bird eggs
d. Tilapia	7. Vegetables
e. Carp	a. Green vegetables
f. Mackerel	b. Peas
g. Tuna	c. Green beans
h. Round Scad	d. Potatoes
i. Anchovy	e. Tomatoes
j. Amberjack	8. Rice
k. Grouper	
l. Skate	
m. Snapper	

---

**Table 3.2.1b.** The most important meals in Vietnam

---

1. Shellfish meals: <ul style="list-style-type: none"> <li>a. Steamed shellfish</li> <li>b. Fried shellfish</li> <li>c. Grill shellfish</li> <li>d. Shellfish soup</li> </ul>	5. Poultry meals <ul style="list-style-type: none"> <li>a. Roast poultry</li> <li>b. Fried poultry</li> <li>c. Boiled poultry</li> <li>d. Steamed poultry</li> <li>e. Grilled poultry</li> </ul>
2. Fish meals <ul style="list-style-type: none"> <li>a. Grill fish</li> <li>b. Fish soup</li> <li>c. Steamed fish</li> <li>d. Fried fish</li> <li>e. Fish dipped</li> <li>f. Fish cooked with brine</li> </ul>	6. Eggs meals <ul style="list-style-type: none"> <li>a. Boiled eggs</li> <li>b. Fried eggs</li> <li>c. Omelet eggs</li> <li>d. Egg cook with brine</li> </ul>
3. Beef meals <ul style="list-style-type: none"> <li>a. Fried beef/veal</li> <li>b. Grilled beef/veal</li> <li>c. Beef/veal dish make of raw beef/veal and vegetables</li> </ul>	7. Vegetables <ul style="list-style-type: none"> <li>a. Salad</li> <li>b. Boiled vegetables</li> <li>c. Soup vegetables</li> <li>d. Raw vegetables</li> <li>e. Fried vegetables</li> </ul>
4. Pork meals <ul style="list-style-type: none"> <li>a. Grilled pork</li> <li>b. Pork soup</li> <li>c. Steamed pork</li> <li>d. Roast pork</li> <li>e. Boiled pork</li> <li>f. Pork cook with brine</li> <li>g. Stew pork</li> </ul>	8. Rice <ul style="list-style-type: none"> <li>a. Cooked rice</li> <li>b. Fried rice</li> </ul>

---

The students were asked about the preferred meal of the category of food above and the result was based on the preparation of the food. For fish, the orders of preferred meal are:

- (1) Grill fish
- (2) Steamed fish
- (3) Fish dipped (e.g. fish dipped in sweet and sour sauce)
- (4) Fish soup
- (5) Fried fish
- (6) Fish cooked with brine

For poultry the preferred meals are:

- (1) Roast poultry

- (2) Boiled poultry
- (3) Grilled poultry
- (4) Fried poultry
- (5) Steamed poultry

There are the differences between the preferred food and the regular food used at home for example, poultry is one of the most preferred foods but the frequency use of this kind of food is only on the first or middle date of the lunar months or in special days of the Vietnamese.

The preferences were measured along a seven-point semantic differential scale ranking from ‘dislike very much’ to ‘like very much’. The scale was anchored from 1 to 7. This scale is in accordance with most scales used to measure food preferences, overall liking or food quality (Raats et al., 1995). Respondents were presented with sentence “In the following I would like to know your preference in each kind of meal. The level to rate a meal will increase 7-point scale from “1-dislike very much” to “7- like very much””. The preferences were measured by the liking/taste because the author believes that the general liking may produce the stable segments.

### **3.2.2. Consumption**

In order to measure the frequency of the consumption, measures were adopted from previous researches; here the researcher used a 1-year time frame with a 7-point scale in response to the question. The question was presented with 7 alternatives ranging from “never” (level 1) to “12 times or more a week” (level 7) (Raats et al., 1995, Olsen, 2003, Verbeke and Vackier, 2005, Tuu et. al., 2008). Food consumption was measured on a seven-point scale in the form: ‘Please make a  for each alternative on how many times on **average during the last year** you have consumed any following type of meal in your meal? Please mark only one answer in each row’.

**Table 3.2.2.** The scale form used to measure food consumption frequency.

Type of meal	Never	1-2 times a week	3-4 times a week	5-6 times a week	7-8 times a week	9-11 times a week	12 times or more a week
Regular eating ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The types of food categories and meals are the same as listed for the preference measures.

### 3.2.3. Social and family related attitude

Attitude toward behaviour is defined as a person's overall evaluation of performing the behaviour in question (Ajzen, 2002). Attitude toward an objective (e.g. fish/fish product) or behaviour (fish consumption) can be assessed by salient beliefs (Fishbein and Ajzen, 1975, Ajzen, 1991). The semantic differential scales are the most commonly used in measuring attitude (Ajzen, 2002); in this study, the items are presented in semantic differential formats with 7-points scale from "very bad" to "very good", and a neutral score at middle of 4. The respondents were asked to rate their feelings as "In the following I would like to ask you to think about, how you feel when you eat fish as a meal. Please indicate which scale (1-7) is best describing your feeling in each case (e.g. 1 = Very bad feeling or up to 7 for a very good feeling) by putting one mark on each line".

**Table 3.2.3a.** The scale form used to measure attitude towards eating fish.

	1	2	3	4	5	6	7	
Low quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High quality
Inconsistent quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Consistent quality
Bad taste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Good taste
Bad texture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Good texture
Bad appearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Delicate appearance
Bad color	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nice color
Dislike the smell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Accept the smell
Unhealthy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Healthy

The bipolar adjectives used were low quality/high quality, inconsistent quality/consistent quality, bad taste/ good taste, bad texture/ good texture, bad appearance/ delicate appearance, bad colour/ nice colour, dislike the smell / accept the smell, unhealthy / healthy.

Most previous studies on the role of norms in attitude-behaviour relations have been conducted from the perspective of the theories of reasoned action (Fishbein and Ajzen, 1975) or planned behaviour (Ajzen, 1991). Social norms in these studies are intended to measure the influence of social environment, and often operationalized as perceived social pressure or expectations from people in general or from specific groups or individuals (Fishbein and Ajzen, 1975; Olsen, 2004). In consistence with the definition, this study defines subjective norms as social pressure and expectation that have impact on people's food / seafood preference and choice. Family members, and mothers in particular, seem to be most influential concerning children's food attitudes, choice and healthy eating behaviour (Story et al., 2002). In case of food/seafood consumption; family expectation, moral obligations, and health involvements are determined as the main antecedents of social norms (Olsen, 2001, Olsen, 2004). In this paper, influence of mother, father, friends and the others mean a lot to them (teachers, and advertising in the media, Sports stars and Pop stars) on what pupil's choice as a meal were measured. The students also asked about influence from others on what they eat as a meal and the conflicts between children and adults in food chosen for family meal. These items were measured on a seven-point Likert scale anchored by 'disagree strongly' (-3), 'neither disagree nor agree' (0), and 'agree strongly' (+3). Then, these items were coded into a 7 bipolar scale (1 = -3 to 7 = +3).



**Table 3.2.3b.** The scale form used to measure social norms on food choice

<b>The expected from others:</b>	-3	-2	-1	0	1	2	3
People who mean a lot to you expect you to eat fish as meal regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your parents expect you to eat fish for meal regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The adults in your household generally like fish for meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The conflict between children and adults:</b>	-3	-2	-1	0	1	2	3
You often feel that your family disagrees about what you should have for meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You are tired of your parents always nagging about healthy and unhealthy food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You often feel a conflict between eating healthy food and that which tastes good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You often feel a conflict between the family's taste and your taste when there is fish for meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adults like food that is different from what their children like	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Influence from others:</b>	-3	-2	-1	0	1	2	3
Your friends and you have the same opinion about what is good meal food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resistance from other family members makes it difficult for you to eat fish as often as you would like	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your friends like fish as meal food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You have great influence on what you're going to have as meal food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Your influence on food choice of your family:</b>	-3	-2	-1	0	1	2	3
You try to give your parents tips or advice about what they should buy as meal food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Children should be allowed to disagree with their parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3.2.4. Interests and lifestyle

Lifestyle items were measured on a seven-point Likert scale anchored by 'disagree strongly' (-3), 'neither disagree nor agree' (0), and 'agree strongly' (+3). Respondents were presented with the sentence: "We are now suggesting several propositions about food, health, fish etc. For every proposition has been suggested here, please indicate your agreement or disagreement. If you totally disagreed, put a mark ☒ under -3. If you totally agreed, put a mark ☒ under +3, or something in between if you have another attitude or

meaning”. The life style construct is then addressed and measured by these items related to teenagers’ eating habits, attitudes towards friends, families, schoolwork, media and social activities and the way they perceive themselves and how interested they are in aspects of food such as: ”you often skip dinner once or more times during the week”, “you often discuss food with your friends”; “you often help with household chores”; ”you spend a lot of time on your homework” and so on. The items were obtained from relevant marketing and food consumption behavioural literature (Rozin, 1996; Honkanen et al., 2004). Interest in food, cooking and other activities were measured using three items: “you are very interested in (a) cooking; (b) sports; (c) environment issues and (d) reading newspapers/magazines, etc” on a 7-point Likert scale (ranging from -3 = “strongly disagree”; through 0 = “neither disagree nor agree”; to +3 = “strongly agree”). Those items were adapted from the Food choice Questionnaire (Steptoe, Pollard and Wardle, 1995) and a previous study (Honkanen et al., 2004).

**Table 3.2.4.** The scale form used to measure interest and lifestyle.

<b>Connect closely with others</b>	-3	-2	-1	0	1	2	3
You feel strongly tied to your teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You spend a lot of time on your homework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You feel very close to your parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Concern in cooking</b>							
You can make simple dishes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You often help with household chores	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You are very interested in cooking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Concern in health</b>							
You have tried dieting during the last year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You often skip dinner one or more times during the week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You consider yourself a thin person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You don't trust food you haven't heard about	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>General Interests</b>							
You are very interested in sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You are interested in reading newspapers/magazines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You are very interested in environmental issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Concern in friendship</b>							
You spend a lot of time with your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
you feel strongly tied to your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3.2.5. Demographic

Demographics usually refers to individual demographics (age, education, income, occupation, etc); social class and household information (number and age of children, marital status, etc); urbanization, localization and other geographical aspects (Tynan and Drayton, 1987). The result of the research of Ton Nu et al., (1996) about effects of age and

gender on adolescents' food habits and preference of 222 French adolescents of 10 to 20 years old showed that food habits and tastes are mostly related to age and gender and other demographic variables such as the region where they live, their parents' profession, the number of sisters and brothers they have and whether or not they had reached puberty. Based on the result of previous research, in this study, demographic measures are used to classify the segments in this study: sex, age, and total member in the family, number of children ordinarily live in the family, whether they lived in a city or in a rural area, near or far from the sea and the allowance per month, religion. The study is expected to find the variation in food preference in older adolescents, and the differences between boys and girls, geographic areas and other demographic variables as regards dieting, snacking and food habits. This part includes the questions to ask respondents to indicate their general views such as: (1) "what is your age?"; (2) "what is your gender?"; (3) "How many persons live in your home/household including yourself (on weekdays)"; (4) "How many children (less than 18 years old) ordinarily live (on weekdays) in your home, including yourself"; (5) "on a daily basis, where do you live?"; (6) "What is your estimated allowance per month". The respondents also were asked about their religion as following: "what is your religion" and the answer will be chosen among the main religions in Vietnam including Catholicism, Protestantism, Buddhism, Cao Dai, nonreligious and others.

### **3.3. Analytical methods and procedures**

This part of the thesis will discuss the analytical methods and procedures employed to achieve the objectives of the study. The main analytical method is cluster analysis (SPSS version 17.0) used to identify segments of consumers based on meal preference to accomplish these objectives. Various definitions of a cluster can be formulated, depending on the objective of clustering. Generally, one may accept the view that a cluster is a group of objects that are more similar to one another than to members of other clusters (Abonyi and Feil, 2007).

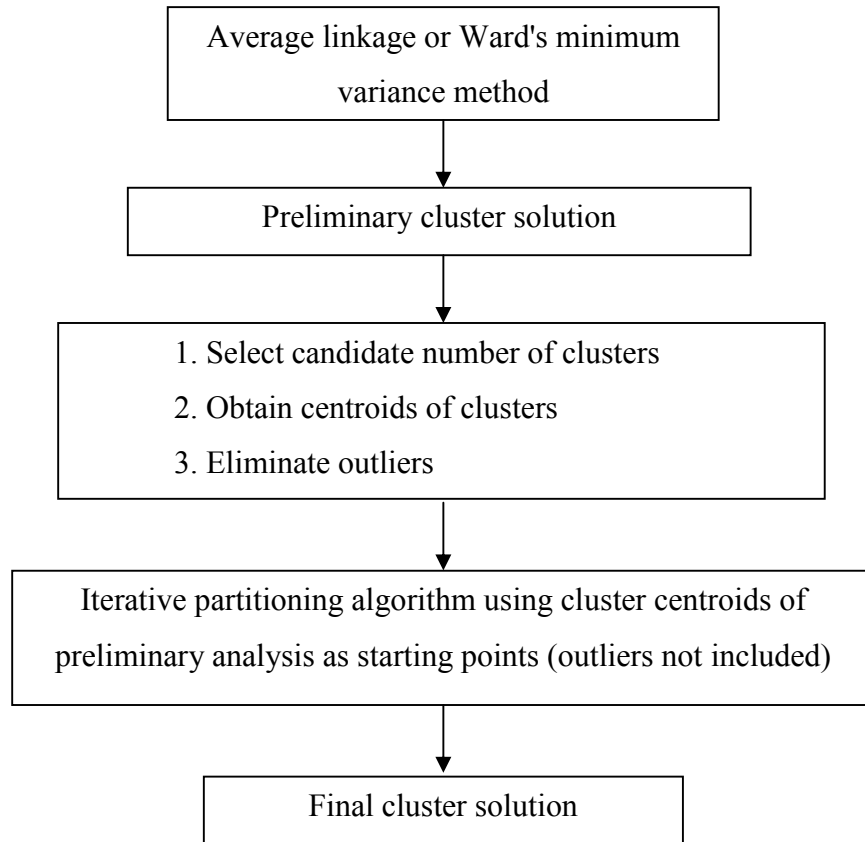
The most important part of formulating the clustering problem is selecting the variables on which the clustering is based. In this paper, preference of Vietnamese teenagers about the most important Vietnamese meals including food category level and meal level was chosen to be the bases for two segmentation analyses. And in each level the similar food/meal were also

grouped together to cluster including as such kind of food: shellfish, fish, pork, beef, poultry, eggs, vegetables and rice and the most important and Vietnamese meal associated with these food. In order to find out whether the teenagers could be grouped according to their preferences, a cluster analysis will be performed.

The selection of the clustering algorithm and solution characteristics appears to be critical to the successful use of cluster analysis (Punj and Steward, 1983). Empirical studies of the performance of clustering algorithms suggest that one of the iterative partitioning methods is preferable to the hierarchical methods. In the typical structure of hierarchical clustering applied to a set of  $N$  data points, initially the  $N$  data points are associated to  $N$  separate clusters. Then, the clustering procedure proceeds by successive steps, grouping together one pair of clusters at each step (reducing the number of clusters by one), until the predefined number of clusters has been reached, or until all data points have been grouped into a single cluster. The criterion used to group the clusters is based on a similarity measure. A common characteristic of these criteria is that, after forming the similarity matrix, the two clusters exhibiting the maximum similarity (or the minimum distance) are merged. K-means clustering (non-hierarchical) is sometimes preferred when datasets are large. *K-means clustering* has the researcher specify the number of clusters in advance, and then the algorithm calculates how to assign cases to the  $K$  clusters (Mesías et al., 2009). There are two issues in using cluster analysis given the subjective nature of the cluster solution. The first relates to the stability and the second concerns validity of the cluster solution (Kee and Wang, 2008). Clustering using hierarchical and non-hierarchical methods yield different cluster results and there are pros and cons using either method (Hair et al., 1998). Therefore, there is a need to validate the cluster solution. One way of doing this is to use a two-stage clustering method (Hair et al., 1998; Wang, Chatzisarantis, Spray, & Biddle, 2002), which was adopted for this study. Figure 2, which was built by Punj & Stewart (1983), is a schematic representation of the procedure of this method. They also confirmed that this method has been found to outperform other methods in marketing and social sciences research (Punj & Stewart, 1983). The number of clusters was determined by the use of Bayesian information criterion, and factor scores were used as input in the cluster analysis.

The next step in the analysis was to identify the profiles of each cluster. The segments were profiled with ANOVA procedure, Crosstabs procedure. In order to profile the segments, consumption (shellfish, fish, beef/ veal, pork, poultry, eggs, vegetables and rice), social and

family related attitudes towards eating fish and food consumption, interest and lifestyle and demographic data (age, gender, religion, place of living, number of family members, number of children in family, the average allowance per month) were used. This insightful information was used in determining which teenager segments were ideal for the food provider to target. The appropriate analysis procedures depend on different scale measurements. Specifically, Cross-tabs procedure was performed to profile demographics variables which hoped to be useful in profiling segments. These variables were “age,” “gender,” “religion”, total member in the family, number of children ordinarily live in the family, whether they lived in a city or in a rural area, near or far from the sea and the average of monthly allowance. In cross-tabulation, the sample is divided into subgroups in order to learn how the dependent variable varies from subgroup to subgroup. In this paper, this procedure forms the two-way table (demographic variables specified as rows and segments specified as columns) and provides the tests and measures of association between the demographic variables and the clusters (Xuan, 2009). Chi-square analysis is used on the variables of this section to determine whether there were any statistically significant differences among these segments. The last analysis, profiling social and family related attitudes, interest and lifestyle and fish/ food consumption were done by analysis of variance (ANOVA) with Duncan multiple comparison post hoc tests differences in group means between segments.



**Figure 2:** Two-stage clustering (Punj & Stewart, 1983)





## 4. RESULTS

### 4.1. Descriptive results

Vietnamese teenagers like meat. As can be seen in the table 4.1.1, their preference for meat products is ranked higher than fish. Fish has the lowest preference scores, although all scores are above four, which means that teenagers do not like fish so much. Vegetables also achieve a higher score than fish.

**Table 4.1.1** Vietnamese teenager's food category preference (Mean values)

Food	Mean score	Std. Deviation	Food	Mean score	Std. Deviation
Chicken	5.73	1.69	Potatoes	4.98	1.84
Chicken eggs	5.50	1.67	Peas	4.95	1.82
Beef/veal	5.47	1.86	Squid	4.93	2.00
Pork	5.32	1.76	Green beans	4.78	1.68
Duck	5.23	1.78	Scallops, snail	4.78	1.79
Shrimp	5.22	1.53	Carp	4.15	2.01
Green vegetables	5.22	1.90	Tilapia	4.15	2.03
Duck eggs	5.21	1.76	Snake- head	4.09	2.15
Crab	5.12	1.68			

Scale: ranging from 1=dislike very much to 7= like very much.

As can be seen in table 4.1.2, the preference of Vietnamese teenagers about meals studied are approximated to their preference for food categories. They have high preference for poultry, eggs, beef and fish meals while they have slight low preference for pork and vegetables meals.

The main purpose of this analysis was using a cluster analysis to classify Vietnamese teenagers by groups based on their preferences. The dimensions of preference data rather than the raw data were used in the cluster analysis in order to discover a pattern among the preference items instead of studying the single items (Honkanen, 2010). A principal component factor analysis with the Varimax rotation was performed (SPSS 17) as the method has been used and supported in the literature (Honkanen, 2010). Originally, there were 30 food items and 36 meal items in the questionnaire, but the items with many “never

tasted” scores (more than 13 percent) were excluded (the excluded items were 10 items on food categories including: Pangasius –Tra, Pangasius- Basa, Mackerel, Tuna, Round-scad, Amberjack, Grouper, Skate, Snapper and 1 item on meals list is Salad). After excluding items with multiple factor loadings (Anchovy, bird eggs, rice, tomato in food category and two kinds of rice meals, boiled poultry, steamed poultry, roast pork, grilled pork, fish soup, steamed fish, shellfish in meal level), we were left with 17 food category items and 26 meal items as can be seen in the following tables .

**Table 4.1.2.** Vietnamese teenager’s meal preference (Mean values)

Meal	Mean score	Std. Deviation	Meal	Mean score	Std. Deviation
Roast poultry	5.49	1.80	Soup vegetables	4.92	1.79
Fried poultry	5.38	1.83	Steamed shellfish	4.81	1.94
Omelet eggs	5.34	1.84	Boiled eggs	4.63	1.92
Grilled poultry	5.34	1.84	Fish cooked with brine	4.54	1.81
Fried beef/veal	5.33	1.76	Pork cook with brine	4.45	1.88
Fried fish	5.27	1.79	Egg cook with brine	4.39	2.06
Grilled beef/veal	5.23	2.04	Boiled vegetables	4.37	1.97
Grill fish	5.22	1.74	Boiled pork	4.35	1.93
Grill shellfish	5.19	1.94	Raw vegetables	4.29	2.02
Fried shellfish	5.16	1.93	Stew pork	4.29	2.06
Fried eggs	5.11	1.85	Pork soup	4.28	1.97
Fish dipped	5.00	1.90	Beef/veal dish make of raw beef/veal and vegetables	4.24	2.31
Fried vegetables	4.95	1.79	Steamed pork	3.74	2.01

Scale: ranging from 1=dislike very much to 7= like very much.

Upon factor analyzing the correlation matrix of the 17 items of food category, a five-factor solution appears tenable, which explains 56.5 percent of the variation in the data. The factor analysis of 26 remaining meal items (of the 36 variables) resulted in seven factors with Eigenvalues greater than 1.0 and 62.5 percent of the total variance explained. The rotated factor patterns are presented in table 4.1.3 describing preferences for food category. The first factor is labeled Vegetables ( $\alpha = 0.70$ ), the second factor is labeled

Shellfish ( $\alpha = 0.63$ ), the third factor is labeled Meat ( $\alpha = 0.64$ ), the fourth factor is labeled Fish ( $\alpha = 0.62$ ), and the last factor is labeled Eggs ( $\alpha = 0.76$ ).

**Table 4.1.3.** Result of exploratory factor analysis of food category preference: Rotated factor patterns (Varimax)

	Factor 1 Vegetables	Factor 2 Shellfish	Factor 3 Meat	Factor 4 Fish	Factor 5 Eggs
Cronbach alpha	0.70	0.63	0.64	0.62	0.76
Peas	0.83				
Green beans	0.81				
Green vegetables	0.62				
Potatoes	0.59				
Shrimp		0.76			
Crab		0.75			
Scallops, snail		0.66			
Squid		0.56			
Chicken			0.73		
Duck			0.68		
Beef/veal			0.67		
Pork			0.53		
Tilapia				0.80	
Carp				0.72	
Snake- head				0.69	
Chicken eggs					0.83
Duck eggs					0.81

On the other hand, the table 4.1.4 presents Vietnamese teenagers' preferences for the meals studied. The first factor is labeled Pork meals ( $\alpha = 0.80$ ), the second factor is labeled Vegetables meals ( $\alpha = 0.75$ ), the third factor is labeled Shellfish meals ( $\alpha = 0.79$ ), the fourth factor is labeled Eggs meals ( $\alpha = 0.76$ ), the fifth factor is labeled Poultry meals ( $\alpha = 0.75$ ), the sixth factor is labeled Fish meals ( $\alpha = 0.70$ ), and the last factor is labeled Beef meals ( $\alpha = 0.71$ ). The Cronbach alpha values for three factors do not exceed the preferred level of 0.70. However, the values exceed the minimum level of 0.60 accepted in exploratory research (Bagozzi, 1994). Summated scales are made from the factors and used in the subsequent analyses.

**Table 4.1.4.** Result of exploratory factor analysis of meals preference: Rotated factor patterns (Varimax)

	F.1 Pork meals	F.2 Vegeta -bles meals	F.3 Shellf -ish meals	F.4 Eggs meals	F.5 Poultry meals	F.6 Fish meals	F.7 Beef meals
Cronbach alpha	0.80	0.75	0.79	0.76	0.75	0.70	0.71
Stew pork	0.77						
Pork cook with brine	0.73						
Steamed pork	0.72						
Pork soup	0.72						
Boiled pork	0.64						
Boiled vegetables		0.84					
Soup vegetables		0.77					
Fried vegetables		0.74					
Raw vegetables		0.61					
Grill shellfish			0.81				
Steamed shellfish			0.80				
Fried shellfish			0.79				
Fried eggs				0.81			
Omelet eggs				0.76			
Egg cook with brine				0.66			
Boiled eggs				0.65			
Roast poultry					0.82		
Fried poultry					0.81		
Grilled poultry					0.70		
Fish dipped						0.78	
Fish cooked with brine						0.70	
Fried fish						0.66	
Grill fish			0.30			0.53	
Fried beef/veal							0.76
Grilled beef/veal			0.33				0.76
Beef/veal dish make of raw beef/veal and vegetables			0.41				0.62

## 4.2. Cluster identification

### 4.2.1. Cluster identification for food category preference

The factor scores were used as input in a Two-Stage cluster analysis, resulting in a five-cluster solution. Because the factor scores are used in the analysis, the cluster descriptors in table 4.2.1 are deviations from the average, and not the actual differences in the preference mean scores.

**Table 4.2.1** Cluster descriptors of food categories based on factor score

Percentage of the sample	Fish haters	Eggs haters	Shellfish haters	Vegetable haters	Food likers	F	Sig.
	17.2%	16.9%	17.4%	18.6%	29.8%		
Vegetables	0.37	-0.15	0.68	-1.46	0.39	126.919	0.000
Shellfish	0.86	-0.31	-1.24	-0.10	0.47	94.889	0.000
Meat	-0.64	-0.05	-0.13	0.15	0.38	13.943	0.000
Fish	-0.94	0.21	-0.30	0.04	0.58	38.868	0.000
Eggs	0.11	-1.55	0.27	0.54	0.32	105.778	0.000

The cluster descriptors are based on factor scores, which have a mean of 0 and standard deviation of 1. ANOVA with Tukey post hoc multiple comparison test was used.

As can be seen in table 4.2.1, Vietnamese teenagers can be clustered in five segments based on their food category preferences. A relatively distinct pattern appears from the cluster analysis. Four out of the five segments are mainly based on negative preferences. Table 4.2.1 shows that the first four clusters are “haters” of different food categories. The fifth cluster is based on positive preferences to food categories in general.

#### **(a) Fish haters (17 %)**

The first cluster is named Fish haters, consisting of 17 percent of the teenagers. This cluster represents teenagers who disliked most common foods such as fish and meat, they have a below average preference for these two factors. They have especially negative preferences for fish (-0.94) and meat (-0.64). They have above-average preference for vegetables and eggs and shellfish. The most positive preference is towards shellfish (0.86).

#### **(b) Egg haters (17 %)**

The second cluster is labelled Egg haters, representing 17 percent of the sample. These teenagers have scores clearly below the average for Eggs. Preferences for some other common foods such as meat, shellfish and vegetables are also slightly negative. The teenagers have the most negative preference for eggs (-1.55), and shellfish factor came next (-0.31), vegetables products were in the third place (-0.15). The teenagers in this clusters also show the ambivalent preference with meat (-0,05). The teenagers only have a positive preference for fish (0.21). This group is named egg haters because of their strong dislike of eggs.

#### **(c) Shellfish haters (17 %)**

The third cluster makes up 17 percent of the sample. This cluster has low scores on

shellfish, fish and the meat food category, which consisted of chicken, duck, beef, pork, etc. The lowest score factor is shellfish that account for -1.24, while the scores of the fish and meat factor are -0.3 and -0.13, respectively. However, this group has high preferences for vegetables and eggs with the scores of 0.68 and 0.27 respectively. This segment is labelled Shellfish haters.

**(d) Vegetables haters (19 %)**

The teenagers have below-average scores for shellfish and particularly vegetables in this cluster. The lowest score in this group is for vegetables (-1.46) so it is called Vegetables haters. These teenagers have an above-average preference for fish, eggs and meat, the scores of these items are 0.04, 0.54, 0.15 respectively. This group represents 19 percent of the sample.

**(e) Food likers (30 %)**

Cluster 5 is the largest group, consisting of 30 percent of the teenagers, and has positive preference scores for all food categories. Teenagers in this segment do not dislike any of the food categories studied. This group is labelled Food likers. The teenagers belonging to this group have the highest scores for fish category (0.58) and another preferred food is shellfish (0.47). The lowest score in this group is for eggs (0.32).

#### **4.2.2. Cluster identification for meals preference**

A final cluster solution is developed for meals preference of Vietnamese teenagers based on factors scores including 4 segments namely Likers of all meals, Haters of poultry meals, Haters of seafood meals, Haters of pork meals. It is similar to the previous table, three out of four segments are mainly based on negative preferences. Table 4.2.2 shows that the first cluster is based on positive preferences to all meals in general, three remaining clusters are “haters” of different meals or most of the meals.

**a) Likers of all meals (29 %)**

This cluster consists of the largest proportion of teenagers with nearly 30 percent. This cluster represents teenagers who liked all of meals from the common food categories. Specifically, pork meals and vegetables meals are the most preferred, followed by the seafood meals. Teenagers in this cluster do not dislike any of meal studied, just only neutral

for poultry meals with the score 0.03 which is approximately the same as the average score.

### b) Haters of poultry meals (27 %)

In contrast, the second cluster clearly have below average score for most of meals especially for poultry meals (-1.06). The teenagers only have positive score in beef meals but this score is nearly equal to the average score (0.01). It means that respondents have the ambivalent preference for these meals.

**Table 4.2.2** Cluster descriptors of meals based on factor score

Percentage of the sample	Likers of all meals (29.3%)	Haters of poultry meals (26.9%)	Haters of seafood meals (19.1%)	Haters of pork meals (24.7%)	F	Sig.
Pork meals	0.50	-0.15	0.62	-0.91	75.817	0.000
Vegetables meals	0.50	-0.25	0.14	-0.43	22.451	0.000
Shellfish meals	0.46	-0.08	-0.84	0.19	35.753	0.000
Eggs meals	0.21	-0.65	0.34	0.19	25.344	0.000
Poultry meals	0.03	-1.06	0.46	0.77	130.655	0.000
Fish meals	0.47	-0.12	-0.54	-0.02	19.207	0.000
Beef meals	0.22	0.01	-0.56	0.15	11.861	0.000

The cluster descriptors are based on factor scores, which have a mean of 0 and standard deviation of 1. ANOVA with Tukey post hoc multiple comparison test was used.

### c) Haters of seafood meals (19 %)

The third cluster scores on shellfish and fish meals are -0.84 and -0.54 respectively so we call this segment is Heters of seafood meals. This cluster also has negative preference for beef meals. The group has, however, quite high positive preference for pork meals, poultry meals and the remaining meals.

### d) Haters of pork meals (25 %)

The teenagers in the last cluster have lowest score on pork meals and the vegetables meals represented in -0.91 and -0.43 respectively; while this cluster has highest preference for poultry meals (0.77). The teenagers have also the positive score of preference for shellfish, eggs and beef meals studied. The preference score for fish meals is under but approximate the average score.

### **4.3. Cluster profiles**

After the clusters were developed, the next step is to build profiles of each segment as a method to describe and understand distinct clusters of teenagers in Vietnam. Profile analysis is performed to discover the differences and similarities among the segments identified by two-stage cluster analysis and tested with ANOVA analysis and cross-tabulation analysis (with  $\chi^2$  to test for significant differences). This section will report the results of the variables that revealed significant differences among the segments using ANOVA with Duncan post hoc multiple comparison tests to build the segment profiles. The profiling variables used are socio-demographic variables, consumption frequencies of different foods, social and family related attitudes and the interest and lifestyle information.

#### **4.3.1 Consumption differences**

The mean values for consumption of six food groups are calculated for the purpose of profiling the segments in food category: shellfish, fish, meat (pork, beef/veal, and poultry meat), eggs, vegetables, and rice (appendix 1). Similarly, the mean values for consumption of eight meal groups also are calculated in order to profile the segments in meals level such as: shellfish meals, fish meals, beef meals, pork meals, poultry meals, eggs meals, vegetables meals and rice meals (appendix 2).

The table 4.3.1a shows that there are significant differences in means among the various segments in the consumption of selected foods. Fish haters and eggs haters have high level of shellfish consumption (about more than 1-2 times per week), while shellfish consumption was lowest among shellfish haters. Shellfish haters and fish haters have highest consumption of vegetables (5-6 times per week), but vegetables haters have clearly lowest consumption of this kind of food. Rice is consumed so high among the shellfish haters and vegetables haters segment, while it is lower in the eggs haters segment. There are no significant differences across the segments in fish, meat and eggs consumption.



**Table 4.3.1a** Differences in consumption for selected food groups (1= never, 2= 1-2 times a week, 3= 3-4 times a week, 4=5-6 times a week, 5=7-8 times a week, 6-9-11 times a week, 7= 12 times or more a week) ANOVA

	1) Fish haters	2) Eggs haters	3) Shellf -ish haters	4) Vegeta -ble haters	5) Food likers	Total	F	Sig.	Difference
Shellfish	2.54	2.38	2.01	2.20	2.22	2.26	4.294	0.002	1>2>3, 4, 5
Fish*	1.79	1.82	1.72	1.82	1.85	1.81	0.366	n.s.	
Meat*	3.07	3.04	2.78	3.11	2.83	2.95	1.879	n.s.	
Eggs*	3.08	2.78	2.71	2.74	2.78	2.81	1.118	n.s.	
Vegetables	3.75	3.68	3.73	2.60	3.47	3.44	13.032	0.000	1, 3, 2, 5>4
Rice	6.30	5.97	6.58	6.48	6.46	6.37	2.584	0.037	3, 4, 5>1, 2

\* Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used.

The tables above also shows that the order of consumption frequency levels of the different food groups within the segments is almost the same for all the groups: rice is eaten the most often, vegetables come next, meat products are in third place and fish/shellfish finished last. Therefore, the differences between clusters are relative.

There are no significant differences across the segments in almost all of the meals consumption such as shellfish meals, beef meals, pork meals, poultry meals, eggs meals and vegetables meals. In contrast, there are significantly different means between various meals segments in fish meals and rice meals consumption (table 4.3.1b). The likers of all meals and the haters of poultry meals have highest level of fishes meals consumption (about 3-4 times per week), while the consumption is lowest among haters of seafood meals segment. Rice meals are consumed highest in haters of seafood meals and haters of pork meals while they are consumed lowest in the haters of poultry meals segment. Moreover, the order of consumption frequency of the different meals groups within the segments is almost the same for all the groups (rice, vegetables, eggs meals ...).

**Table 4.3.1b** Differences in consumption for selected meal groups (1= never, 2= 1-2 times a week, 3= 3-4 times a week, 4=5-6 times a week, 5=7-8 times a week, 6=9-11 times a week, 7= 12 times or more a week) ANOVA

	1) Likers of all meals	2) Haters of poultry meals	3) Haters of sea- food meals	4) Haters of pork meals	Total	F	Sig.	Differen- ce
Shellfish meals*	2.07	2.02	1.83	1.90	1.97	2.003	n.s.	
Fish meals	2.65	2.63	2.36	2.43	2.54	2.723	0.044	1,2>4,3
Beef meals*	2.02	2.26	2.08	2.02	2.10	1.586	n.s.	
Pork meals*	2.31	2.21	2.40	2.10	2.25	2.050	n.s.	
Poultry meals*	1.98	2.01	2.26	2.03	2.05	1.589	n.s.	
Eggs meals*	2.92	2.76	2.92	2.73	2.83	0.924	n.s.	
Vegetables meals*	3.27	3.23	3.18	2.90	3.15	1.825	n.s.	
Rice meals	4.95	4.84	5.35	5.12	5.04	2.977	0.031	3>4,1,2

\* Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used

### 4.3.2. Social and family related attitudes differences

As can be seen in the table 4.3.2a the attitudes towards consuming fish are positive throughout the entire sample (all the segments had scores above the midpoint on the scale). This table also shows that the differences across the segments are few but significant: food likers have the most positive attitude about fish quality with a score of 4.93 (on a scale from 1 to 7 with 7 being the most positive). Shellfish haters have the least positive attitude towards fish quality with a score of 4.17. Fish haters, vegetables haters and eggs haters also have very positive attitudes towards fish quality.

**Table 4.3.2a.** Differences in attitudes towards fish consumption across the segments (ANOVA)

	1) Fish haters	2) Eggs haters	3) Shellf -ish haters	4) Vegeta -ble haters	5) Food likers	Total	F	Sig.	Difference
Quality	4.31	4.40	4.17	4.26	4.93	4.48	2.946	0.020	5>2,1,4,3
Consistent quality	3.94	4.10	4.36	3.82	4.45	4.17	2.376	0.050	5>3,2,1,4
Taste	4.37	4.46	4.29	4.34	5.16	4.60	4.415	0.002	5>2,1,4,3
Texture*	4.06	4.19	4.10	4.06	4.65	4.26	2.255	n.s.	
Appearance	4.00	4.06	4.25	3.97	4.63	4.24	2.726	0.029	5>3,2,1,4
Colour*	4.39	4.06	4.35	4.16	4.63	4.35	1.622	n.s.	
Smell	6.35	6.13	6.18	6.10	6.84	6.35	2.528	0.040	5>1,3,2,4
Healthy	5.17	5.59	5.26	5.53	6.14	5.61	4.791	0.001	5>2,4,3,1

\* Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used.

There are significant differences across the segments in the consistent quality perception associated with fish consumption. The consistent quality associated with eating fish is perceived to be lowest in the vegetables haters segment (3.82), while it is perceived as highest in the food likers segment (4.45). Besides, the tastes associated with eating fish are perceived to be the highest in the food likers segment (5.16), while they are lowest in the shellfish haters segment (4.29). The food likers also have very positive attitudes towards fish appearance with the score of 4.63. Fish haters have the least positive attitudes towards fish appearance with the score of 4.00. The attitudes towards smell and healthiness associated with eating fish are relatively high. The attitude towards smell of eating fish is highest among the food likers segment, and it is lowest in the vegetables haters segment (6.10). Food likers have the most positive attitudes towards healthiness of eating fish (score of 6.14), while the fish haters segment has the least positive attitudes towards healthy of eating fish (score of 5.17). In contrast, there are no significant differences across the segments in the attitudes towards texture and colour of fish.

**Table 4.3.2b.** Differences in attitudes towards fish consumption across the segments in meal preference segmentation (ANOVA)

	1) Likers of all meals	2) Haters of poultry meals	3) Haters of seafood meals	4) Haters of pork meals	Total	F	Sig.	Differen- ce
Quality*	4.77	4.27	4.19	4.58	4.48	2.268	n.s.	
Consistent quality*	6.28	5.83	6.35	6.36	6.17	2.431	n.s.	
Taste	6.88	6.22	6.73	6.69	6.60	2.821	0.039	1>3, 4, 2
Texture*	6.48	6.08	6.46	6.16	6.26	1.520	n.s.	
Appearance*	6.39	5.88	6.47	6.36	6.24	2.515	n.s.	
Colour*	4.51	4.05	4.51	4.37	4.35	1.748	n.s.	
Smell*	4.64	3.97	4.48	4.30	4.35	2.347	n.s.	
Healthy*	5.80	5.24	5.62	5.78	5.61	2.445	n.s.	

\* Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used.

Table 4.3.2b shows that there are no significant differences across the segments in attitudes towards quality, consistent quality, texture, appearance, colour, smell and healthy associated with eating fish. There is only a significant difference across the segments in

attitudes towards fish taste. The likers of all meals segment has the most positive attitudes towards taste of eating fish with the score of 6.88 (on a scale from 1 to 7 with 7 being the most positive), while the haters of poultry meals segment has the least positive attitudes towards fish taste but the score is still at very high score (6.22).

There are no significant differences across the segments in regard to the expectation from others (parents, adults in the family, the important people), the conflict between children and adult, the influence from others on food choice of their family (table 4.3.2c). However, the influence of respondents on food choice of their family is significantly different across the segments. Teenagers in eggs haters segment have the greatest impact on food choice of their family with the score is 5.64. In contrast, the teenagers in shellfish haters have the lowest influence on their family's food choice (4.99). Teenagers in food likers, fish haters and vegetables haters have quite high score represented their influence on the food choice of their family with the scores of 5.44; 5.31; 5.29 respectively.

**Table 4.3.2c.** Differences in social and family related attitudes across the segments in food category preference segmentation (ANOVA)

	1) Fish haters	2) Eggs haters	3) Shellf -ish haters	4) Vegeta -ble haters	5) Food likers	Total	F	Sig.	Difference
The expected from others*	4.50	4.63	4.58	4.53	4.91	4.66	1.265	n.s.	
The conflict between children and adults*	4.17	4.52	4.24	4.08	4.29	4.26	1.234	n.s.	
Influence from others*	4.07	4.53	4.21	4.12	4.36	4.27	1.836	n.s.	
Your influence on food choice of your family	5.31	5.64	4.99	5.29	5.44	5.34	2.554	0.039	2,5>1,4,3

\* Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used.

As can be seen in table 4.3.2d, there are no great differences between the segments in regard to average social and family related attitudes toward food scores, half of them are significant. The influence from others does not seem to be the large impact for any of the segments- it has a relatively low score (4.01 to 4.53). The haters of seafood meals segment has been influenced largest from others with the score of 4.53, while the haters of pork

meals have lowest influence from others on their food choice (4.01). The influence of teenagers on food choice of their family is highest in haters of pork meals segment represented at the score of 5.61 and lowest in haters of poultry meals segment (5.12). In contrast, there are no significant differences across the segments in regard to the expected from others and the conflict between children and adults.

**Table 4.3.2d.** Differences in social and family related attitudes across the segments in meal preference segmentation (ANOVA)

	1) Likers of all meals	2) Haters of poultry meals	3) Haters of seafood meals	4) Haters of pork meals	Total	F	Sig.	Differen- ce
The expected from others*	4.88	4.65	4.63	4.45	4.66	1.548	n.s.	
The conflict between children and adults*	4.08	4.18	4.57	4.31	4.26	2.558	n.s.	
Influence from others	4.35	4.22	4.53	4.01	4.27	3.122	0.026	3>1,2,4
Your influence on food choice of your family	5.26	5.12	5.45	5.61	5.34	3.058	0.028	4>3,1,2

\* Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used.

### 4.3.3. Interest and lifestyle differences

Concerning in cooking is especially important factor represents the differences between the segments in food category segmentation. As be showed in table 4.3.3a, the shellfish haters seem to be most concerned about cooking with the score of 5.27. The segments of eggs haters and food likers represent the interest in cooking at the second place with the approximately score (5.20 and 5.19). Vegetables haters segment seem to have lowest interest in cooking (4.48). The general interest varied across the segments, the food likers have the highest score in general interest (such as interest in environment issues, interest in sport and reading magazine) with the score of 5.10 while the eggs haters segment has lowest score on this issue. On the other hand, there are no significant differences across the segments in regard to other issues such as concern in health, connect closely with other and concern in friendship.

**Table 4.3.3a.** Interest and lifestyle differences between the segments in food category preference segmentation (ANOVA)

	1) Fish haters	2) Eggs haters	3) Shellf -ish haters	4) Vegeta -ble haters	5) Food likers	Total	F	Sig.	Difference
Connect closely with others*	5.11	5.10	5.18	4.75	5.13	5.06	1.697	n.s.	
Concern in cooking	4.91	5.20	5.27	4.48	5.19	5.02	5.146	0.000	3,2,5,1>4
Concern in health*	3.47	3.65	3.58	3.18	3.29	3.41	2.053	n.s.	
General Interests	4.96	4.90	5.05	4.58	5.10	4.94	2.686	0.031	5,3,1,2>4
Concern in friendship*	4.84	4.84	4.98	4.84	5.13	4.95	1.029	n.s.	

\*Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used

Table 4.3.3b shows that teenagers in distinct segments have differences in interest and lifestyle. Specifically, haters of seafood meals have the highest concern in cooking with the score of 5.33, while the haters of pork meals have the lowest score in regard to this issue (4.82). Teenagers in all segments have low concern in health represented with the scores lower than the neutral score (on a scale from 1 to 7 with a neutral score at middle of 4). In which, the haters of poultry meals and haters of pork meals have the lowest concern in health with the score of 3.28 and 3.27 respectively. Likers of all meals and haters of seafood meals have highest score in regard to general interests including interest in environment issues, interest in sport and reading magazine, while the haters of poultry meals have lowest score in regard to this issue. In contrast, there are no significant differences across the segments with respect to connect closely with other and concern in friendship.

**Table 4.3.3b.** Interest and lifestyle differences between the segments in meal preference segmentation (ANOVA)

	1) Likers of all meals	2) Haters of poultry meals	3) Haters of seafood meals	4) Haters of pork meals	Total	F	Sig.	Differen- ce
Connect closely with others*	5.08	4.96	5.36	4.92	5.06	2.563	n.s.	
Concern in cooking:	5.17	4.83	5.33	4.82	5.02	3.568	0.014	3>1,2,4
Concern in health	3.43	3.28	3.74	3.27	3.41	2.819	0.039	3>1,2,4
General interests	5.09	4.66	5.09	4.93	4.94	3.456	0.017	1,3>4,2
Concern in friendship*	4.95	4.85	5.09	4.95	4.95	0.579	n.s.	

\* Not significant at 0.05 level.

Others indicate significantly different means. ANOVA with Duncan post hoc multiple comparison test was used

#### 4.3.4. Social demographic differences

##### a) Social demographic differences between segments in food category preference segmentation

The table 4.3.1 shows that the five segments have different profiles with respect to the city they live in ( $\chi^2 = 71.275$ ,  $p = 0.000$ ). The fish haters segment is dominated by teenagers from from Da Nang, Nha Trang and Ca Mau (about 30 percent from each city). Only 7 percent of the segment lives in Ha Noi. Eggs haters are clearly dominated by people from Ha Noi by 56 percent followed by Nha Trang (18 percent), Da Nang and Ca Mau (13 percent). Shellfish haters have an even distribution throughout all the cities (between 25 and 30 percent) except Da Nang with only 17 percent. Vegetables haters are mainly from Ca Mau (36 percent), but also from Da Nang (29 percent) and Nha Trang (25 percent). Only 10 percent of the vegetable haters live in Ha Noi. Similarly, only 10 percent of the food likers segment lives in Ha Noi. The teenagers in this group are likely to live in three remaining cities.

The significant differences across the segments for age groups are assessed with  $\chi^2$  ( $\chi^2 = 25.6$ ,  $p = 0.012$ ). Table 4.3.1 shows that the fish haters group has an above-relative share of teenagers between the ages of 14 and 15, while the shellfish haters segment is clearly dominated by the youngest consumers between 12 and 15. Vegetables haters

have a slightly under-average representation in the 16-17 year-old age range, but all remaining age groups are represented in this segment clear above-proportion shares. The food likers segment has a large share of teenagers between 16 and 17 and has many respondents in the oldest age group (18-20) although this group also has an under-proportion share of teenagers aged 14 to 15. This group also has a low share of the youngest teenagers (12-13 years old).

Gender seems to be a differentiating factor between the clusters ( $\chi^2 = 15.104$ ,  $p = 0.004$ ). Girls are likely to be the food haters in general with about 60 to 70 percent in all hater-segments. Boys are more likely to food likers (fifty-fifty between boys and girls)

There are also the significant differences between the segments with respect to religion ( $\chi^2 = 18.031$ ,  $p = 0.021$ ). The fish haters segment is dominated by the Buddhist teenagers. Buddhist respondents are also well represented in food likers group; this cluster has also an above-relative share of respondents who are nonreligious. In contrast, three remaining clusters (vegetables hater, eggs haters, and shellfish haters) have an under-proportion share of Buddhist teenagers. The other religions consist of small rate in total samples but it dominated in fish haters, eggs haters and shellfish haters and represented under-proportion share in three remaining clusters. Similarly, vegetables haters and eggs haters segments have above- proportion share of teenagers who are nonreligious.

There were no significant differences across the clusters with respect to the size of family and the number of children lives in the family.



**Table 4.3.4a.** Socio-demographic differences between the segments ( $\chi^2$ ) in food category preference segmentation.

	1) Fish haters (%)	2) Eggs haters (%)	3) Shellf- ish haters (%)	4) Vegeta- ble haters (%)	5) Food likers (%)	Total (%)	$\chi^2$	P- value
<i>City</i>							71.275	0.000
Ha Noi	7.0	55.7	30.5	10.4	15.4	22.5		
Da Nang	31.0	12.9	16.7	28.6	29.3	24.5		
Nha Trang	31.0	18.5	27.8	24.7	29.3	26.6		
Ca Mau	31.0	12.9	25.0	36.3	26.0	26.4		
<i>Age group</i>							25.600	0.012
12-13,	26.8	28.6	37.5	31.2	27.6	30.0		
14-15,	35.2	35.7	37.5	32.4	16.3	29.5		
16-17,	25.4	24.3	15.3	22.1	36.6	26.2		
18-20	12.6	11.4	9.7	14.3	19.5	14.3		
<i>Gender</i>							15.104	0.004
Boy	29.6	32.9	23.6	37.7	48.8	36.3		
Girl	70.4	67.1	76.4	62.3	51.2	63.7		
<i>Religion</i>							18.031	0.021
Buddhism	43.7	27.1	37.5	36.4	42.2	38.0		
No religion	35.2	50.0	44.4	55.8	48.8	47.2		
Others	21.1	22.9	18.1	7.8	8.9	14.8		
<i>Family size</i>							49.878	n.s.
1-3,	5.6	10.0	15.3	7.8	6.5	8.7		
4-6,	78.9	74.3	70.8	80.5	82.1	78.0		
7 or more	15.5	15.7	13.9	11.7	11.4	13.3		
<i>Number of children</i>								
0-1	31.0	20.0	26.4	35.1	35.8	30.5	26.736	n.s.
2-3,	63.4	72.9	69.4	61.0	61.8	65.1		
4 or more	5.6	7.1	4.2	3.9	2.4	4.4		
<i>Area</i>							39.276	0.000
City	78.9	32.9	51.4	72.7	60.2	59.6		
rural	21.1	67.1	48.6	27.3	39.8	40.4		
							13.047	0.011
Near to the sea	53.5	28.6	37.5	50.6	48.8	44.6		
Far from the sea	46.5	71.4	62.5	49.4	51.2	55.4		
<i>Allowance</i>							196.139	0.044
<= 100	46.5	81.4	62.5	42.9	47.2	54.7		
101-300	33.8	8.6	26.4	33.8	35.8	28.8		
301-500	15.5	5.7	1.4	11.6	8.1	8.5		
501-1,500	4.2	4.3	9.7	11.7	8.9	8.0		

The various segments also have different profiles with respect to the city/rural teenagers lived in ( $\chi^2 = 39.276$ ,  $p = 0.000$ ). While eggs haters and shellfish haters group have an under-average share of teenagers from cities, the fish haters and vegetables haters group are mainly dominated by the teenagers from this area. In contrast, the teenagers from rural are well represented in egg haters and shellfish haters cluster. Fish haters segment has under-proportion levels of respondents from the rural, as does the vegetables haters group.

The significant differences across the segments for area where the teenager lived in near the sea or far from the sea ( $\chi^2 = 13.047$ ,  $p = 0.001$ ). The fish haters mostly live near the sea. While the eggs haters segment is mainly dominated by teenagers who live far from the sea. Teenagers living near the sea are also well represented in the vegetables haters and food likers cluster. Fish haters, vegetables haters and food likers had under-related levels of teenagers lived far from the sea.

There are also significant differences between the segments with respect to monthly allowance level ( $\chi^2 = 196.139$ ,  $p = 0.044$ ). The eggs haters are mostly teenagers with a low allowance (<100,000 Vietnamese dong per month), while the food likers are likely to have an allowance between 100,000 and 300,000 Vietnamese dong. The fish haters segment has a high share of teenagers with an allowance between 100,000 and 300,000 as well as between 300,000 and 500,000 Vietnamese dong. The shellfish haters teenagers are likely to have either a low allowance (<100,000 Vietnamese dong per month) or one between 500,000 and 1,500,000 Vietnamese dong. The majority of vegetables haters have an allowance above 100,000 Vietnamese dong per month.

#### **b) Social demographic differences between segments in meals preference segmentation.**

There are significant differences between the segments with respect to the city they lived in ( $\chi^2 = 42.184$ ,  $p = 0.000$ ). The haters of seafood meals group are clearly dominated by people from Ha Noi, and it also has an above-proportion share representation of respondents from Ca Mau. Likers of all meals cluster is mainly from Da Nang, but also has teenagers from Nha Trang. In contrast, the haters' seafood meals cluster has very few respondents from Da Nang and Nha Trang. The haters of poultry meals segment is dominated by teenagers from Ha Noi and Nha Trang, and the haters of pork meals are likely to live in Ca Mau.

**Table 4.3.4b.** Socio-demographic differences between the segments ( $\chi^2$ ) in the meals preference segmentation.

	Likers of all meals (%)	Haters of poultry meals (%)	Haters of seafood meals (%)	Haters of pork meals (%)	Total (%)	$\chi^2$	P- value
<i>City</i>						42.184	0.000
Ha Noi	11.6	31.5	34.2	16.7	22.5		
Da Nang	33.1	20.7	13.9	26.5	24.5		
Nha Trang	32.2	31.5	22.8	17.6	26.6		
Ca Mau	23.1	16.2	29.1	39.2	26.4		
<i>Age group</i>						17.405	0.043
12-13,	24.8	33.3	39.2	25.5	30.0		
14-15,	22.3	34.2	25.3	36.3	29.5		
16-17,	36.4	19.8	21.5	24.5	26.2		
18-20	16.5	12.6	13.9	13.7	14.3		
<i>Gender</i>						5.777	n.s.
Boy	43.0	28.8	32.9	39.2	36.3		
Girl	57.0	71.2	67.1	60.8	63.7		
<i>Religion</i>						25.814	0.000
Buddhism	49.6	33.4	27.8	37.3	38.0		
No religion	36.4	42.3	60.8	54.9	47.2		
Others	14.0	24.3	11.4	7.8	14.8		
<i>Family size</i>						51.449	n.s.
1-3,	8.3	8.1	5.1	12.7	8.7		
4-6,	76.0	73.9	84.8	79.4	78.0		
7 or more	15.7	18.0	10.1	7.8	13.3		
<i>Number of children</i>						30.667	n.s.
0-1	34.7	20.7	25.3	40.2	30.5		
2-3,	60.3	71.2	72.2	58.8	65.1		
4 or more	5.0	8.1	2.5	1.0	4.4		
<i>Area</i>						10.694	0.014
City	67.8	51.4	50.6	65.7	59.6		
rural	32.2	48.6	49.4	34.3	40.4		
						18.834	0.000
Near to the sea	59.5	45.0	32.9	35.3	44.6		
Far from the sea	40.5	55.0	67.1	64.7	55.4		
<i>Allowance</i>						108.449	n.s.
<= 100	46.3	62.2	58.2	53.9	54.7		
101-300	34.7	27.0	22.8	28.4	28.8		
301-500	9.1	4.5	11.4	9.8	8.5		
501-1,500	9.9	6.3	7.6	7.8	8.0		

The significant differences across the segments for age groups were assessed with  $\chi^2$

( $\chi^2 = 17.405$ ,  $p = 0.043$ ). Table 4.3.2b shows that the likers of all meals cluster has a highest share of teenagers between the ages of 16 and 17, while the haters of poultry meals segment has the lowest share of teenagers in this ages. The haters of seafood meals have a highest share representation in the youngest teenager (12-13 years old), but all remaining age groups are represented in this segment without any clear above-proportion shares. The haters of pork meals segment has a large share of teenagers between 14 and 15, while the oldest teenagers (18-20 years old) seem mostly live in likers of all meals segment.

Religion seem to be a differential factor between the clusters ( $\chi^2 = 25.814$ ,  $p = 0.000$ ). Likers of all meals cluster is dominated clearly by Buddhist teenagers while the teenagers who are nonreligious or belong to other religions have under proportion share. The haters of seafood meals group has the largest share of teenagers who are nonreligious but the teenagers with the Buddhist and other religions have the under-proportion share. The distribution of teenagers between different religions are similar for the case of the haters of pork meals segments. In the haters of poultry meals segment, the teenagers who are of other religions including Catholicism, Protestant, Cao Dai and others religion have higher share than the proportion level while the Buddhist and nonreligious teenagers have lower share than this rate.

There are also significant differences between the segments with respect to the area the teenagers lived in is city or rural ( $\chi^2 = 10.694$ ,  $p = 0.014$ ). The likers all meals and haters of pork meals segment have higher proportion share of teenagers who come from city and has lower share of ones who come from rural area. In contrast, two remaining segments (haters of poultry meals and haters of seafood meals segment) have under relative share of teenagers who lived in city and have above relative share of teenagers who lived in rural.

Likers all meals are mostly teenagers who lived near the sea, while haters of seafood meals are likely to live far from the sea. Haters of pork meals segment has a high share of teenagers who lived far from the sea. In the haters of poultry meals segment, the rate of teenagers lived near to the sea and far from the sea are distributed approximately with the general rate.

There are also no significant differences across the clusters with respect to gender, size of family, number of children lived in the family and monthly allowance.

## **5. DISCUSSION AND IMPLICATIONS**

### **5.1. Discussion**

Evaluating the usefulness of preference-based segmentation in understanding food-related behaviour among teenagers in Vietnam is of major importance to marketers, from both academic and practical perspectives. However, not much research is conducted in the context of emerging markets. This research intends to investigate in the segmentation strategies and its effect on food consumption behaviours in a prospective market segment – Vietnamese teenagers - for suppliers and marketers of food and meal products. This paper examines what type of food and meals commonly served at homes in Vietnam are most liked or disliked as well as meals and food categories that are most likely to be consumed by Vietnamese teenagers. As suggested by the research findings, Vietnamese teenagers seem to like meat (chicken, beef/veal and pork and duck), average score of more than 5.23 in the scale of 1-7). Preference for fish obtains positive scores, but is not the food most preferred by Vietnamese teenagers. The foods that Vietnamese teenagers consume most frequently are rice, vegetables, meat, egg, shellfish and fish, which are listed in order of importance. The order of preference for meals is different. Meals that most Vietnamese teenagers like most are poultry, beef/veal, fish and shellfish, and pork. Preference for seafood meals all enjoy positive scores (more than 4) but they are not the meals that Vietnamese teenagers favour most. On the other hand, the priority for consumption is also not the same. Meals of highest consumption are rice, vegetables, egg, fish, and pork, respectively. The paper also identifies the main sensory aspects that in of the eating have weights in fish consumption. This study shows that preferences for meals are an appropriate basis for segmenting the food and meal market among Vietnamese teenagers. The results of this paper are 5 and 4 teenager segments identified by cluster analysis based on preferences for the food category and meal respectively. Five segments of teenagers in food category preference were identified including fish haters (17 %), eggs haters (17 %), shellfish haters (17 %), vegetables haters (19 %) and food likers (30 %), while four segments of teenagers in meal preference were: likers of all meals (29 %), haters of poultry meals (27 %), haters of seafood meals (19 %), haters of pork meals (25 %). Then the

differences between segments are tested by using profiling variables to make segmentation meaningful. The differences found across the clusters for the differentiating variables can provide the basis for developing marketing strategies to target different segments. Table 5.1 and table 5.2 provide thumbnail sketches of the five clusters in food category preference segmentation and four clusters in the meal preference segmentation respectively, based on the above differences.

**Table 5.1:** Thumbnail sketches of the five clusters in food category segmentation.

<p><b>Cluster 1: Fish haters</b></p> <p>Low preference for fish and meat, high preference for vegetables, shellfish and eggs.</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Girls; 14-15 years old age group, living in city and near to the sea: Da Nang, Nha Trang and Ca Mau; belong to Buddhism or other religions, average allowance per month from 100,000 to 500,000VND</li> <li>o High consumption frequency of vegetables and shellfish, low consumption of rice</li> <li>o Lowest attitudes scores for quality, consistent quality, taste, appearance, smell and health of eating fish</li> <li>o Low influence on their family food choice</li> <li>o Low interested in cooking and general interest</li> </ul>	<p><b>Cluster 2: Eggs haters</b></p> <p>Negative preference to most foods especially eggs</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Girls, the average age from 14-15 years old; living in rural area and far from the sea: Ha Noi; not to be Buddhist; average allowance per month is less than 100,000 VND</li> <li>o High consumption frequency of shellfish, vegetables; low consumption of rice</li> <li>o Low positive attitude towards eating fish</li> <li>o Having the greatest influence on their family food selection</li> <li>o High concerning in cooking and less concern in the general interests.</li> </ul>
--	---

<p><b>Cluster 3: Shellfish haters</b></p> <p>Low preference for shellfish, fish and meat; high preference for vegetables and eggs.</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Girls, belonging to the 12-15 years old age group, live in rural, far from the sea area; have allowance per month less than 100,000 or more than 500,000VND; to be in small religions</li> <li>o Low consumption of shellfish, the consumption of vegetables and rice is quite high.</li> <li>o Low score of attitude towards quality, taste, texture, smell and health of eating fish</li> <li>o Low impact on their family food choice.</li> <li>o The most concern in cooking and general interests.</li> </ul>	<p><b>Cluster 4 :Vegetables haters</b></p> <p>Lowest preference for vegetables and shellfish; high preference for eggs, the preference for fish and meat are positive but not so high.</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Live in city and near to the sea (Ca Mau); Buddhist, average of allowance per month are in range of 100-300,000 VND</li> <li>o High consumption of rice; low consumption of shellfish and vegetables</li> <li>o Low attitudes towards appearance, smell and texture and consistent quality of eating fish.</li> <li>o Low influence on the food selection of their family</li> <li>o Not concern so much on cooking and general interests.</li> </ul>
<p><b>Cluster 5: Food likers</b></p> <p>Positive preference to most foods studied.</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Mostly boys, old (16-20 years old) and Buddhist teenagers with the average allowance per month in range of 101 to 300,000 VND</li> <li>o High consumption frequency of vegetables and rice; low consumption of shellfish</li> <li>o The most positive attitude towards sensory aspects (smell, taste, appearance...) of fish consumption</li> <li>o Have great influence on their family food choice</li> <li>o Highly concern in both general interests and specific food-related lifestyle</li> </ul>	

**Table 5.2:** Thumbnail sketches of the four clusters in the meals preference segmentation.

<p><b>Cluster 1: Likers of all meals</b></p> <p>High positive preference for all of meals studied</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Buddhists; 16-20 years old range; live in city and near to the sea (Nha Trang and Da Nang)</li> <li>o High consumption of fish meals and low consumption of rice meals</li> <li>o Good attitudes towards taste of eating fish</li> <li>o To be influenced from others in food choice; low influence in food choice of their family</li> <li>o High concern in cooking and general interests; low concern in health</li> </ul>	<p><b>Cluster 2: Haters of poultry meals</b></p> <p>Negative preference for most of the meals</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Likely to be young (from 12 to 15 years old), belong to the small religions</li> <li>o Positive attitudes towards taste of eating fish</li> <li>o High consumption of fish meals; low consumption of rice meals</li> <li>o Low influenced from others on their food choice; Low impact on their family food decision</li> <li>o Low concern in cooking, general interests and health</li> </ul>
<p><b>Cluster 3: Haters of seafood meals</b></p> <p>Negative preference for shellfish, fish and beef meals; positive preference for pork, eggs, poultry and vegetables meals.</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Live the rural and far from the sea area (Ha Noi and Ca Mau); youngest group of teenagers (12-13 years old) and no religion.</li> <li>o Low consumption of fish meals; high consumption of rice meals</li> <li>o High attitude towards taste of eating fish</li> <li>o High influence in food selection of their family; to be impacted from others on their food choice.</li> <li>o High concern in cooking, in general interest and in health</li> </ul>	<p><b>Cluster 4 : Haters of pork meals</b></p> <p>Negative preference for pork, vegetables and fish meals; positive preference for the remaining meals</p> <p><i>Profile:</i></p> <ul style="list-style-type: none"> <li>o Likely to live in Ca Mau; belong to the age group of 14-15 years old.</li> <li>o Low consumption of fish meals and high consumption level of rice meals.</li> <li>o Positive and high attitude towards taste of eating fish.</li> <li>o They are influenced the least from others; highest influence on their family food choice.</li> <li>o Lowest concern in cooking, in general interest and health.</li> </ul>



## **5.2. Theoretical implications**

This research is not only built on preference literature and research about food and seafood consumption behaviour of adolescent (Shepherd, 1989; Birch, 1999; Drewnowski and Hann, 1999; Hoelscher et al., 2002; Skinner et al., 2002; Pérez-Rodrigo et al., 2003; Honkanen et al., 2004; Halford et al., 2008; Olsen et al., 2009) but also adapted to the specific conditions of Vietnam. While previous studies have primarily explored children's food preferences in general, few of these have examined both their preferences for food category and meal for the same set of foods. This paper focuses on discovering which kind of food and meals are commonly served as the main meals in Vietnamese homes. Segmentation based on both these food category preferences and meal preferences is explored accordingly. The results show that preference is a suitable base for general segmentation analyses and preference-based segmentation also works in Vietnam. The paper confirms that preferences are important in food studies given their significant relationship with consumption behaviors. Also, there are marked differences in preference among Vietnamese teenagers. These results are in accordance with several earlier studies (Honkanen et al., 2004; Berg et al., 2000). Honkanen et al., 2004 have showed that the teenagers are less concerned with healthy meals and many of them dislike seafood. This study also supports findings from previous studies that social factors are important in explaining and categorizing different preference segments (Honkanen et al., 2004). Gender and age influence food preferences of teenagers (Ton Nu et al., 1996). Religion is also a factor driving differences in young people's food preferences. Taste is considered to be the most important quality attribute influencing food selection (Drewnowski, 1997; Roininen et al., 1999), taste/distaste, and not nutrition as suggested by their parents, seems to be most important for children's and adolescents' food choices (Berg, Jonsson, and Conner, 2000; Olsen and Ruiz, 2008).

Other variables such as family size and the number of children are not considered significant factors for the preference-based segmentation. The most important results of this study indicate that differences in food preferences of adolescents in different regions in Vietnam are important in explaining variations in the adolescent market for food. Specifically, in food category, teenagers in Ha Noi hate eggs and shellfish while teenagers in Da Nang, Nha Trang and Ca Mau hate fish and vegetables but they are food

lovers in general. On the other hand, with respect to meals, adolescents in Ha Noi hate poultry and seafood meals, adolescents in Da Nang and Nha Trang are likers of all meals while adolescents in Ca Mau are haters of pork meals. This study indicates that consumption frequency, attitudes towards fish consumption, social and family related attitudes and interest and lifestyle factors are also important variables in explaining differences among adolescent segments.

### **5.3. Practical implications for marketers/policy-makers**

The adolescent period is the one in which an individual becomes a more independent consumer, exerting increased degrees of independence and a subsequent freedom of preference (Brown, et al., 2000). Retailers, restaurants and school canteens have been operating commercially in Vietnam and can only provide the food that adolescents show their interest in. To cater to this specific segment, these businesses need to be informed of children's food/meal preferences. The aim of this study is to define the young consumers segment based on food and meal preferences. The result of this study shows that preferences can be an appropriate basis for segmentation, providing insights into the depth of teenagers' food and meal market. They suggest implications for marketers, retailers and school canteens as well as for public policy makers in terms of effectively targeting different market segments of teenagers in Vietnam.

Producers can enhance their bottom line by developing products based on the preference-based segmentation. This method shows to be more effective than the tradition of producing based solely on food categories (i.e. fish, poultry or egg, vegetable). The thumbnail sketch of the five clusters in food category segmentation helps food producers targeting their market, positioning their product offers and effectively creating marketing mix. For example, a seafood producer that wants to gain the fish haters segment's satisfaction with seafood (occupy 17 percent of the market) should develop the product in a way that improves teenagers' positive attitude towards fish and shellfish eating. This is because teenagers in this segment have low attitudes scores for quality, consistent quality, taste, appearance, smell and health of eating fish. Besides, they have a low concern in cooking and general interests such as environment issues, sport and reading. They seem to have unbalanced diet. High consumption of meat and

egg makes their eating patterns quite unhealthy. One could expect that promoting health aspects among this segment would persuade people to increase their consumption of healthy food. Moreover, they are likely to be girls with ages ranging from 14-15 years old, and most of them live in cities along coastal areas such as Da Nang, Nha Trang and Ca Mau city. They practice Buddhism or other religions and have average monthly allowance from 100,000 to 500,000 VND. With the specific demographic information above, the seafood industry, public health organizations and the school system can work together to increase the consumption of fish in this segment.

Besides, the retailers, restaurants, school canteens, and institutions which are offering meals may find the meal preference - based segmentation beneficial for their businesses. Meal suppliers can use this knowledge to identify the segments most likely to be attracted to their product offerings. These inputs can also be fed into strategic activities to enhance their image, including decisions about assortment and service to suit various target segments. These providers must therefore treat the segments with respect for the consumer service industry to achieve its full potential. In order to meet the teenagers' selection criteria, meal providers must be able to supply novel meals that are preferred by teenagers. For example, according to the thumbnail sketch of the four clusters in the meals preference segmentation, although the haters of seafood meals (occupying 19 percent of the market) have positive attitude towards fish taste, they have low preference for seafood meals and low consumption frequency of seafood meals. Moreover, teenagers in this segment mostly live in the rural, far from the coastal area (Hanoi and Camau city). They seem to be the youngest group of teenagers (12-13 years old) and nonreligious. Besides, they have high tendency in home cooking, in general interest. So if meal suppliers intend to target this segment, they should improve the marketing mix strategies. Specifically, with the products - as of seafood meals in this case, in addition to the taste quality meal suppliers should focus on improving the sensory aspects of their offerings. This is to enhance the teenagers' positive attitudes about seafood meals consumption. Besides, with respect to price, since most teenagers in this segment live in rural areas, meal suppliers should adjust the price to the suitable level to appeal this target market. About the place or the distribution for those products, most young consumers in this segment live far from the sea, which means that seafood may not be highly available in these areas. For that reason, suppliers should

reasonably stock their supplies to meet the customer's demands. As for promotion, because teenagers in this segment are highly engaged in home cooking and have general interest in environment issues, sports and reading magazines, retailers, restaurants, school canteens, and institutions should incorporate this information into their respective policies, which is to enhance teenagers' perception about health issues. This can ultimately lead to the increase in the consumption of healthy meals including seafood meals among teenagers.

#### **5.4. Limitations and future research**

There are some limitations in the study that should be mentioned. The present research is based on convenience sample from four cities in Vietnam, so the results are not necessarily representative for the whole population. Future studies should include a broader representation in other areas of Vietnam. Then, food preference for the whole population of Vietnamese teenagers can be better explained. From the technical perspective, the questionnaire used for this study has initially designed for adults in Western countries. Its relevance to Vietnamese teenagers therefore may need more insightful adjustments. Moreover, because of the limited cost and time investment for collecting data in 4 different areas across Vietnam (differences in language, culture), the data was collected by one teacher in each area instead of directly by the authors. When analyzing data, the authors have tested the factor structures in the profiling step to find the underlying dimensions of the variables (such as attitude towards eating fish, social and family related attitude, interest and lifestyle). We also tested the reliability of these underlying dimensions but the results have shown that the underlying dimensions are weak and not so reliable. Because the measurement scales are unreliable, single items were used for the analyses as indicators of the dimensions. Future studies should be encouraged to adjust the scale specifically for teenagers in Vietnam in order to compare the relative influence of different independent variables on explaining the profile of the segments.

**REFERENCES**

- Abonyi, J., & Feil, B. (2007). *Cluster analysis for data mining and system identification*. Birkhauser Verlag AG, Basel, Boston, Berlin. ISBN 978-3-7643-7987-2.
- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.
- Ajzen, I. (2002). Constructing a TPB questionnaire: conceptual and methodological considerations [*artical online*], available from: [www.people.umass.edu/aizen/pdf/tpb.measurement.pdf](http://www.people.umass.edu/aizen/pdf/tpb.measurement.pdf), Accessed: February 28, 2010.
- Anderson, W.T., & Golden, L. (1984). Life-style and psychographics: a critical review and recommendation. In Kinnear, T. (Ed.), *Advances in Consumer Research*, XI (pp. 405-411). Association for Consumer Research, Ann Arbor, MI.
- Ares, G., & Gambaro, A. (2007). Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite*, Vol.49 No.1, pp.148–158.
- Bagozzi, R.P. (1994), Measurement in marketing research. In Bagozzi, R.P. (Ed.), *Principles of Marketing Research* (pp. 1-50). Blackwell Publishers, Cambridge, MA.
- Beane, T.P., & Ennis, D.M. (1987). Market segmentation: a review. *European Journal of Marketing*, Vol. 21 No. 5, pp. 20-42.
- Berg, C., Jonsson, I., & Conner, M. (2000). Understanding choice of milk and bread for breakfast among Swedish children aged 11-15 years: an application of the theory of planned behaviour. *Appetite*, Vol. 34 No.1, pp. 5-19.
- Bernues, A., Olaizola, A., & Corcoran, K. (2003). Extrinsic attributes of red meat as indicator of quality in Europe: an application for market segmentation. *Food Quality and Preference*, Vol. 14 No. 4, pp. 265–276.

- Birch, L. (1999). Development of food preferences. *Annual Review of Nutrition*, Vol. 19, pp. 41–62.
- Bredahl, L.G., & Grunert, K. (1997). Determinants of the consumption of fish and shellfish in Denmark: an application of the theory of planned behaviour. In Luten, J.B., Borresen, T., & Oehlenschläger, J. (Ed.), *Seafood from producer to consumer: integrated approach to quality* (pp. 21-30). Amsterdam, Elsevier.
- Brown, K., McIlveen, H., & Strugnell, C. (2000). Young consumers' food preferences within selected sectors of the Hospitality Spectrum. *Journal of Consumer Studies & Home Economics*, Vol. 24 No. 2, pp. 104-112.
- Byrd-Bredbenner, C., & Grasso, D. (2000). What is television trying to make children swallow? A content analysis of nutrition information embedded in prime-time advertisements. *Journal of Nutrition Education*, Vol. 32 No. 4, pp. 187-195.
- Chisnall, P.M, (1985). *Marketing: a behavioural analysis*. 2nd ed., McGraw-Hill Book Company (UK) Ltd, Maidenhead
- Delarue, J., & Loescher, E. (2004). Dynamics of food preferences: a case study with chewing gum. *Food Quality and Preference*, Vol.15, pp 771–779.
- Dinh, X.T., Nguyen, T.T., Tran C.T. (2005). Current status and prospects for the pig sector in Vietnam: a desk study. Research report from pro-poor livestock policy initiative, Hanoi, Vietnam: *Pro-Poor Livestock Policy Initiative*, Available at: [http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/rep-psd\\_pigmarkets\\_desk.pdf](http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/rep-psd_pigmarkets_desk.pdf). Accessed: January 7, 2010
- Dolnicar, S. (2004). Beyond commonsense segmentation: a systematics of segmentation approaches in tourism. *Journal of Travel Research*, Vol. 42 No. 3, pp. 244-50.
- Drewnowski, A. (1997). Taste preferences and food intake. *Annual Reviews Nutrition*, Vol.17 No.1, pp. 237 – 253.
- Drewnowski, A., & Hann, C. (1999). Food preferences and reported frequency of consumption as predictors of current diet in young women. *American Journal of Clinical Nutrition*, Vol. 70 No. 1, pp. 28–36.

- Duffy, V.B., & Bartoshuk, L.M. (2000). Food acceptance and genetic variation in taste. *Journal of the American Dietetic Association*, Vol. 100 No.6, pp. 647–655.
- Eagly, A.H., & Chaiken, S. (1993). *The psychology of attitudes*, Fort Worth, TX: Harcourt Brace Jovanovich.
- Engel, J.F., Blackwell, R.D., & Miniard, P.W. (1996). *Consumer behaviour*. 7<sup>th</sup> ed., the Dryden Press, Hinsdale, IL
- Engel, J.F., Fiorillo, H.F., & Cayley, M.A. (1972). *Market segmentation, concepts and applications*. Holt, Rinehart and Winston, New York, NY
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: an introduction to theory and research*. Addison –Wesley Publishing Company, Inc.
- Frank, R., Massy, W.F., & Wind, Y. (1972). *Market segmentation*. Englewood Cliffs, New Jersey, Prentice-Hall.
- Furst, T., Connors, M., Bisogni, C.A, Sobal, J., & Falk, L.W. (1996). Food choice: a conceptual model of the process. *Appetite*, Vol. 26 No. 3, pp. 247-266.
- Gehrt, K. C., & Shim, S. (1998). A shopping orientation segmentation of French consumers: implications for catalogue marketing. *Journal of Interactive Marketing*, Vol. 12, pp. 34–47.
- Green, P.E., & Krieger, A.M. (1991). Segmenting markets with conjoint analysis. *Journal of Marketing*, Vol. 55, pp. 20-31.
- Gummesson, L., Jonsson, I., Conner, M.T., & Svensson, E. (1996). Assessing factors influencing food choice among 10–16 year-old schoolboys. A pilot study with a stacking box method. *Journal of Human Nutrition and Dietetics*, Vol. 9, pp. 219–229.
- Hair, J.F., Jr., Anderson, R.E., Tatham, R.L., & Black, W.C. (1998). *Multivariate data analysis*. Englewood Cliffs, NJ: Prentice-Hill.
- Haley, R.I. (1968). Benefit segmentation: a decision – oriented research tool. *Journal of Marketing*, Vol. 32, pp. 30-35.
- Halford, J.C.G., Boyland, E.J., Cooper, G.D., Dovey, T.M., Smith C.J., Williams, N., Lawton C.L., & Blundell, J.E. (2008). Children's food preferences: Effects of

- weight status, food type, branding and television food advertisements (commercials). *International Journal of Pediatric Obesity*. Vol. 3 No.1, pp. 31 – 38.
- Hoek, J., Gendall, P., & Esslemont, D. (1996). Market segmentation: a search for the Holy Grail, *Journal of Marketing Practice*, Vol. 2 No.1, pp.1355-2538.
- Hoelscher, D.M., Evans, A., Parcel, G.S., & Kelder, S.H. (2002). Designing effective nutrition interventions for adolescents. *Journal of the American Dietetic Association*. Vol.102, pp. 52–63.
- Honkanen, P., Olsen, S.O., & Myrland, O. (2004). Preference-based segmentation: A study of meal preferences among Norwegian teenagers. *Journal of Consumer Behaviour* Vol. 3 No. 3, pp. 235–250.
- Honkanen, P., & Frewer, L (2009). Russian consumers' motives for food choice. *Appetite*, Vol. 52, pp. 363–371.
- Honkanen, P. (2010). Food preference based segments in Russia. *Food Quality and Preference*, Vol. 21, pp. 65–74.
- Horwath, C.C. (1990). Food frequency questionnaires: a review. *Australian Journal of Nutrition and Dietetics*, Vol. 47, pp. 46–71.
- Kara, A., & Kaynak, E. (1997). Markets of a single customer: exploiting conceptual developments in market segmentation. *European Journal of Marketing*, Vol. 31 Nos.11/12, pp. 873-95.
- Kardes, F.R. (1999). *Consumer behaviour: managerial decision making*. Addison-Wesley, Reading, MA.
- Kee, Y.H., & Wang, J.C.K. (2008). Relationships between mindfulness, flow dispositions and mental skills adoption: a cluster analytic approach. *Psychology of Sport and Exercise*, Vol. 9 No. 4, pp. 393-411.
- Kelder, S.H., Perry, C.L., Klepp, K.I., & Lytje, L.L. (1994). Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviors. *American journal of Public Health*, Vol. 84 No. 7, pp.1121-1126.



- Kim, J.O., Forsythe, S., Gu, Q., & Moon, S.J. (2002). Cross-cultural consumer values, needs and purchase behavior. *The Journal of Consumer Marketing*, Vol. 19 No. 6, pp. 481-503.
- Kotler, P., Armstrong, G., Saunders, J., & Wong, V. (2002), *Principles of Marketing*, Pearson Education, Prentice-Hall Europe, London.
- Kucukemiroglu. O, (1999). Market segmentation by using consumer lifestyle dimensions and ethnocentrism: an empirical study. *European Journal of Marketing*, Vol. 33 Nos.5/6, pp. 470-487.
- Jaccard, J., & Blanton, H. (2005). The origins and structure of behaviour: conceptualizing behavioural criteria in attitude research. In Albarracín, D., Johnson, B.T., & Zanna, M.P. (Eds.), *The Handbook of Attitudes* (pp.125-172). Lawrence Erlbaum Associates.
- Letarte, A., Dubé, L., & Troche, V. (1997). Similarities and differences in affective and cognitive origins of food likings and dislikes. *Appetite*, Vol. 28, pp. 115–129.
- Lin, C.F. (2002). Segmenting customer brand preference: Demographic or psychographic. *Journal of Product and Brand Management*, Vol. 11 No. 4, pp. 249–268.
- Logue, A.W., & Smith, M.E. (1986). Predictors of food preferences in adult humans. *Appetite*, Vol. 7, pp. 109-125.
- McCarthy, M., & Henson, S. (2005). Perceived risk and risk reducing strategies in the choice of beef by Irish consumers. *Food Quality and Preference*, Vol.16 No. 5, pp. 435–445.
- Mesías F.J., Gaspar, P., Pulido, A.F., Escribano, M., & Pulido, F. (2009). Consumers' preferences for Iberian dry-cured ham and the influence of mast feeding: An application of conjoint analysis in Spain. *Meat Science* Vol. 83, pp. 684–690.
- Myrland, O., Trondsen, T., Johnston, R. S., & Lund, E. (2000). Determinants of seafood consumption in Norway: lifestyle, revealed preferences, and barriers to consumption. *Food Quality and Preference*, Vol. 11, pp.169-188.
- Ngapo, T.M., Martin, J.F., & Dransfield, E. (2007). International preferences for pork appearance: Consumer choices. *Food Quality and Preference*, Vol. 18, pp. 26–36.

- Neumark-Sztainer, D., Story, M., Perry, C.L., & Casey, M. (1999). Factors influencing food choices of adolescents: findings from focus-group discussions with adolescents. *Journal of the American Dietetic Association*. Vol. 99, pp. 929–937.
- Nielsen, N.A., Bech-Larsen, T., & Grunert, K.G. (1998). Consumer purchase motives and product perceptions: A laddering study on vegetables oil in three countries. *Food Quality and Preference*, Vol. 9 No. 6, pp.455–466.
- Olsen, S.O. (2001). Consumer involvement in seafood as family meals in Norway: an application of the expectancy-value approach. *Appetite*, Vol. 36 No. 2, pp. 173-186.
- Olsen, S.O. (2003). Understanding the relationship between age and seafood consumption: the mediating role of attitude, health involvement and convenience. *Food Quality and Preference*, Vol.14, pp.199–209.
- Olsen, S.O. (2004). Antecedents of seafood consumption behaviour: an overview. *Journal of Aquatic Food Product Technology*, Vol. 13 No. 3, pp. 79-91.
- Olsen, S.O., & Ruiz, S. (2008). Adolescents' influence in family meal decisions. *Appetite*, Vol. 51 No. 3, pp. 646-653.
- Olsen, S.O., Prebensen, N., & Larsen, T.A. (2009). Including ambivalence as a basis for benefit segmentation: A study of convenience food in Norway. *European Journal of Marketing*, Vol. 43 Nos. 5/6, pp. 762-783.
- Pérez-Rodrigo, C., Ribas, L., Serra-Majem, L.I., & Aranceta, J. (2003). Food preferences of Spanish children and young people: the enKid study. *European Journal of clinical nutrition*, Vol. 57 No. Suppl 1, pp. 45-48.
- Prescott, J., & Bell, G. (1995). Cross-cultural determinants of food acceptability: Recent research on sensory perceptions and preferences. *Trends in Food Science and Technology*, Vol. 6, pp. 201–205.
- Punj, G., & Steward, D.W. (1983). Cluster analysis in marketing research: review and suggestions for applications. *Journal of Marketing Research*, Vol. 20, pp.134-148.

- Quinn, L., Hines, T., & Bennison, D. (2007). Making sense of market segmentation: a fashion retailing case. *European Journal of Marketing*, Vol. 41 Nos. 5/6, pp. 439–465.
- Raats, M.M., Shepherd, R., & Sparks, P. (1995). Including moral dimensions of choice within the structure of the theory of planned behaviour. *Journal of Applied Social Psychology*, Vol. 25, pp. 484–494.
- Roininen, K., Lähteenmäki, L., & Tourila, H. (1999). Quantification of consumer attitudes to health and hedonic characteristics of foods. *Appetite*, Vol. 33 No. 1, pp. 71-88.
- Rolls, B. (1988). Food beliefs and food choices in adolescence. *Medical Journal of Australia*, Vol. 48 No. Suppl, pp. 9-13.
- Rozin, P. (1995), Thinking about and choosing food: biological, psychological, and cultural perspectives, in Dubé, L., Le Bel, J.L., Tougas, C., Troche, V. (Eds), *Contemporary Challenges in Food and Food Service Marketing: Health and Pleasure on the Table* (pp.173-196). EAMAR, Montreal.
- Rozin, P. (1996). The socio-cultural context of eating and food choice. In Meiselman, H.L., & MacFie H.J.H. (Eds.), *Food choice acceptance and consumption* (pp. 83–104). London: Blackie Academic and Professional.
- Shepherd, R. (1989). Factors influencing food preferences and choice. In Shepherd, R (Ed.), *Handbook of the psychophysiology of human eating* (pp. 3-24). New York; John Wiley.
- Shepherd, R., and Raats, M.M (1996). Attitudes and beliefs in food habits. In Meiselman, H.L., & MacFie, H.J.H. (Eds.), *Food choice acceptance and consumption* (pp. 346-364). London: Blackie Academic and Professional.
- Shim, S., Gehrt, K.C., & Holikova, S. (1999). Shopping orientation-based segmentation of U.S. grocery shoppers. *Journal of Food Products Marketing*, Vol. 5 No. 2, pp.1 -19.
- Skinner, J.D., Carruth, B.R., Bounds, W., & Ziegler, P.J. (2002). Children's food preferences: a longitudinal analysis. *Journal of the American Dietetic Association*. Vol. 102, pp.1638–1647.

- Smith, W.R. (1956). Product differentiation and market segmentation as alternative marketing strategies, *Journal of Marketing*, Vol. 21 No.3, pp. 3-8.
- Steptoe, A., Pollard, T., & Wardle, J. (1995). Development of a measure of the motives underlying the selection of food: the food choice questionnaire. *Appetite*, Vol. 25, pp. 267–284.
- Story, M., Neumark-Sztainer, D., & French, S. (2002). Individual and environmental influences on adolescent eating behaviors. *Journal of the American Dietetic Association*, Vol. 102 No.3, pp. 40–51.
- Sukalakamala, S., & Brittin H.C. (2008). Food practices and preferences of Thais in the United States. *Journal of the American Dietetic Association*, Vol. 103, pp. 20-21.
- Ton Nu, C., MacLeod, P., & Barthelemy, J. (1996). Effects of age and gender on adolescents' food habits and preferences. *Food Quality and Preference*, Vol. 7 Nos. 3/4, pp.251-262.
- Tuu, H. H., Olsen, S.O., Thao. D.T., & Kim Anh, N.T. (2008). The role of norms in explaining attitudes, intention and consumption of a common food (fish) in Vietnam. *Appetite*, Vol. 51, pp. 546-551.
- Tynan, A.C., & Drayton, J. (1987). Market Segmentation, *Journal of Marketing Management*, Vol. 2 No. 3, pp. 301-335.
- Verbeke, W., & Vackier, I. (2005). Individual determinants of fish consumption: application of the theory of planned behaviour. *Appetite*, Vol. 44 No. 1, pp. 67-82.
- Verbeke, W., & Lopez, G. (2005). Ethnic food attitudes and behavior among Belgians and Hispanics living in Belgium. *British Food Journal*, Vol. 107 Nos. 10/11, pp. 822–840.
- Verbeke, W., Vermeir, I., & Brunsø, K. (2007). Consumer evaluation of fish quality as basis for fish market segmentation. *Food Quality and Preference Food*, Vol. 18, pp. 651–661.
- Wang, C.K.J., Chatzisarantis, N.L.D., Spray, C.M., & Biddle, S.J.H. (2002). Achievement goal profiles in school physical education: differences in self-determination, sport

- ability beliefs, and physical activity. *British Journal of Educational Psychology*, Vol. 72, pp. 433–445.
- Wedel, M., & Kamakura, W.A. (1998). *Market segmentation: conceptual and methodological foundations*. Kluwer Academic Publishers, London, UK
- Wedel, M., & Desarbo, W.S. (2002). Market segment derivation and profiling via a finite mixture model framework. *Marketing Letters* Vol. 13 No. 1, pp.17–25.
- Wells, W., & Tigert, D. (1977), Activities, interests, and opinions. *Journal of Advertising Research*, Vol. 11 No. 4. pp. 27-35.
- Williams, P.R.D., & Hammit, J.K. (2001). Perceived risks of conventional and organic produce: pesticides, pathogens, and natural toxins. *Risk Analysis*, Vol. 21 No. 2, pp. 319–330.
- Wind, Y. (1978). Issues and advances in segmentation research. *Journal of Marketing Research*, Vol. 15, pp. 317-338.
- Wycherley, A., McCarthy, M., & Cowan, C. (2008). Speciality food orientation of food related lifestyle (FRL) segments in Great Britain. *Food Quality and Preference*, Vol. 19, pp. 498–510.
- Xuan, B.B (2009). The role of perceived quality, ambivalence and health involvement as a basis for clustering – A study of fish consumption in Vietnam. *NOMA-FAME Master thesis*, 2009.
- Yudkin, J.J. (1956). Man's choice of food. *The Lancet* 270(6924): 645-9.
- Web-addresses:
- Website of Vietnam Association of Seafood Exporters and Producers: VASEP  
<http://www.vasep.com.vn/vasep/Potention.nsf/eVietNamSeafoodIndustry>. Accessed:  
January 7, 2010



**Appendix 1.** Six food groups studied using for calculation of mean food consumption

---

**1. Shellfish:**

Shrimp  
Crab  
Scallops, snail  
Squid

**2. Fish:**

Pangasius- Tra  
Pangasius- Basa  
Snake- head  
Tilapia  
Carp  
Mackerel  
Tuna  
Round Scad  
Anchovy  
Amberjack  
Grouper  
Skate  
Snapper

**3. Meat**

Beef/Veal  
Pork  
Chicken  
Duck

**4. Eggs**

Chicken eggs  
Duck eggs  
Bird eggs

**5. Vegetables**

Green vegetables  
Peas  
Green beans  
Potatoes  
Tomatoes

**6. Rice**

---

**Appendix 2.** Eight meal classes studied using for calculation of mean meal consumption

---

**1. Shellfish meals:**

Steamed shellfish

Fried shellfish

Grill shellfish

Shellfish soup

**2. Fish meals**

Grill fish

Fish soup

Steamed fish

Fried fish

Fish dipped

Fish cooked with brine

**3. Beef meals**

Fried beef/veal

Grilled beef/veal

Beef/veal dish make of raw beef/veal  
and vegetables**4. Pork meals**

Grilled pork

Pork soup

Steamed pork

Roast pork

Boiled pork

Pork cook with brine

Stew pork

**5. Poultry meals**

Roast poultry

Fried poultry

Boiled poultry

Steamed poultry

Grilled poultry

**6. Eggs meals**

Boiled eggs

Fried eggs

Omelet eggs

Egg cook with brine

**7. Vegetables**

Salad

Boiled vegetables

Soup vegetables

Raw vegetables

Fried vegetables

**8. Rice**

Cooked rice

Fried rice