

ATTITUDES, PREFERENCES, AND CONSUMPTION BEHAVIOR OF CONSUMERS  
FIFTY-FIVE AND OLDER FOR FISH AND SHELLFISH

By

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To Far Far

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Abstract of Thesis Presented to the Graduate School  
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FIFTY-FIVE AND OLDER FOR FISH AND SHELLFISH

By

Kathryn Olson

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Our purpose was to identify the attitudes and consumption behavior of consumers 55 years old and older for fish and shellfish. Focus group studies were conducted in Miami-Dade, Palm Beach, and Hillsboro counties. These focus groups consisted of 7 to 11 people with varying levels of fish and shellfish consumption. Preliminary results were used to construct a telephone survey that enabled a wider sampling of individuals in these counties.

Education level of the respondent and trust in their local grocer both positively affected the decision to consume seafood. However, respondents who said they trusted their doctor, were of Hispanic decent, or had been a resident in Florida from 31 to 60 years were less likely to be seafood consumers.

Variables that positively affected the frequency of consumption included willingness to buy seafood from grocery stores, preparing seafood at home, willingness to try new seafood, and Hispanic decent. Conversely results showed that people who catch some of their own seafood consume seafood less frequently than those who do not. In addition, consumers who have lived in Florida over 60 years consume less seafood than those who have resided there for less time. The information obtained from the focus groups and the subsequent telephone survey was used

to determine the method and content required to positively influence purchasing decisions and determine the best educational and marketing plan for reaching these goals.

## CHAPTER 1 OLDER AMERICANS AND U.S. SEAFOOD CONSUMPTION

### **Introduction**

The composition of the United States population is changing due to the growing number of Americans age 55 and older. This expansion is due to the aging “Baby Boomer” generation, a term meant to represent the unusual spike in birth rates following World War II. Though the exact range is under dispute, most authorities agree that the Baby Boomer generation started in 1946 with the end of WWII and ended in 1965 after millions of women started using birth control (Baby Boomer Generation, 2004; The Boomer Initiative; Welcome to It Seems Like Yesterday, 1998).

As of July 1, 2005 the U.S. Census Bureau estimated the number of Baby Boomers to be 78.2 million (U.S Census Bureau, 2006). At this rate, 96 million Americans will be age 50 or older in the next three years. Sloan (2006) studied the population trends and found when the last “baby boomer” turns 65 in 2030, this segment of the population will control 40 percent of the nation’s disposable income. Housing, transportation, and food are their largest expense categories. While this segment of the population is already significant in terms of purchasing power, the predicted trends in growth will only serve to increase their impact.

The demographic composition of the U.S. population over the age of 55 has many unique characteristics. For instance, the ratio of men to women for the entire U.S. population is almost equal, 49.1% male and 50.9% female; however, for the population over 55 only 44.75 % are male while 55.25% are female. This gap continues to widen as the population ages (Figure 1-1). This can be partially explained by the longer life span of women relative to men. “As a corollary to the declining gender ratios with age, the age distribution of women was older than for men among the population aged 55 and over” (Smith, 2002).

Over the age of 55 more men are likely to be married than women owing in part to the shorter life span of men. Similarly, 31% percent of women and 9% of men are widowed (Smith, 2002).

The 2002 Census showed that diversity decreases amongst the older segment of the population, due to variations in life span. While 81% of people over 55 were non-Hispanic whites, only 69% of those under 55 fell into this category (Smith, 2002).

Men in the 55 and over age group are more likely to have bachelor's degrees than women. In general, the number of high school, bachelors, and professional degrees drop as the population gets older. In the civilian labor force the number of men and women working declined with age, however men were more likely than women to be working (Smith, 2002). Reported household income also decreases with age. (Smith, 2002).

### **Expenditures**

In 2005, the three largest areas of spending for consumers 55 and older were housing, transportation, and food (Figures 1-2, 1-3, 1-4). While total spending, housing, and healthcare expenditures rose from 1985 to 2005; spending on food, transportation, apparel and services fell during the same period (Figures 1-2, 1-3, 1-4) (Purcell, 2007). Age distribution has a greater effect on food expenditures than income, gender, and race. Per capita food expenditures are expected to increase only 1% over the next 20 year period; away-from-home consumption will decline 1% and at-home consumption will increase 2%. The categories of food predicted to change the most are fruit (increase 3.7%), vegetables (increase 3.6%), fish (increase 3.1%), and pork (increase 3.1%) (Blisard, 2002).

## **Food Consumption**

It is projected by the U.S. Department of Agriculture that individuals 55 and older will increase their consumption of fruits, vegetables, fish, eggs and pork; while reducing their consumption of fried potatoes, cheese and sugar through 2020 (Sloan, 2006). Consumers aged 55 to 64 spent an average of \$1,077 per person in restaurants in 2005 (Sloan, 2006). On the other hand, older consumers do not frequent restaurants as often as other age groups (Sloan, 2006). Consumers 65 and older have the lowest spending in restaurants with \$770 per person spent in 2005. Historically restaurant visits decline with age but a report by the NPD group found that boomers aged 50 and older are returning to restaurants as their children leave home (Sloan, 2006).

Nearly 50% of adults aged 45 to 64 ate fewer comfort foods (less healthy food alternatives) in 2004 than in the previous year (Sloan, 2006). Health concerns and guilty feelings were the primary reasons for cutting back (Sloan, 2006).

## **Health Concerns**

The increasing availability of health information and the requirements for nutritional labeling are paralleling an increase in consumer health awareness (Baltas, 2001). Individuals aged 55 and older are especially concerned with the health attributes of their food, and as such, are inspiring a more healthful nutritional landscape (Functional Food and Drink Consumption Trends, 2007; Helm, 2008). Research has shown this group has a desire to prepare and consume nutritious and healthy meals with the aim of preventing heart disease, high blood pressure, and dementia (D. Mozaffarian & E. B. Rimm, 2006).

There may be much to gain from nutritional promotions directed toward this age group, However, some of these consumers can be “skeptical of efficacy of health related claims” (Functional Food and Drink Consumption Trends, 2007). In addition, the “senior” demographic

cannot be targeted as one group. “Early Seniors” will lead increasingly healthy, active lives, while, older seniors will be less likely to change their habits (Functional Food and Drink Consumption Trends, 2007).

## **Seafood**

### **Seafood Consumption**

Total seafood consumption in the United States, 4.9 billion pounds in 2007, is the third largest behind Japan and China (Damassa, 2007; National Oceanic and Atmospheric Administration, 2008). However, per capita seafood consumption “remains below many other countries due to geographic, socio-economic, and/or cultural reasons” (Damassa, 2007). In 2007, Americans consumed 16.3 pounds of fish and shellfish per person, a 1 percent decrease from 2006 (National Oceanic and Atmospheric Administration, 2008). Despite the decrease in 2007, there has been an upward trend in seafood consumption over the past five years (Figure 1-5) (National Oceanic and Atmospheric Administration, 2008). The average per capita consumption of 16.3 pounds of seafood per person was composed of 12.1 pounds of fresh and frozen finfish and shellfish and 3.9 pounds of canned seafood (National Oceanic and Atmospheric Administration, 2008). The amount of canned seafood consumed did not change between 2006 and 2007; however, the amount of fresh and frozen seafood consumed dropped from 12.3 in 2006 to 12.1 pounds per person in 2007. Shrimp continues to be the top seller in the seafood industry with 4.1 pounds per person in 2007, however, this is down 0.3 pounds from 2006 (National Oceanic and Atmospheric Administration, 2008).

### **Health**

Seafood is a nutrient rich food that provides high quality protein which is low in saturated fat and rich in polyunsaturated fats. Contaminants present in seafood, however, may pose a risk to susceptible groups (Institute of Medicine , 2007).

The most notable nutrient found in seafood is Omega-3 fatty acids. The effect and benefits of Omega-3 fatty acids have been thoroughly studied. Omega-3 fatty acids, particularly eicosapentaenoic acid (EPA) and docosapentaenoic acid (DPA), are found in the highest concentrations in oily fish such as salmon, sardines, and herring. Seafood is the source of most Omega-3, EPA and DPA in the American diet. In adults, fish has been linked to numerous benefits, including the prevention of cardiovascular disease, myocardial infarction, arrhythmia, and decreases in serum triglyceride levels, blood pressure, and platelet aggregation (Levenson & Axelrad, 2006). It has also been linked to a lower incidence of stroke, depression, Alzheimer's disease and dementia, and has even been linked to the reduction in general inflammation and lower risk of cancer (Helm, 2008). The case for these benefits is strong enough that many of the United States premiere health organizations recommend the consumption of seafood as a preventative for disease. The American Heart Association recommends the consumption of seafood at least twice a week to help prevent heart disease and benefit those who already have heart disease (American Heart Association, 2007)

Although the benefits are widely documented in literature, fish can also contain contaminants such as chemicals, metals, and microbes; although the amount and type depends on the species, size, geographic source, age and diet of the fish (Institute of Medicine , 2007). Some fish also contain the organic compound methylmercury (MeHg), a neurotoxic compound. Methylmercury can cause adverse effects, though the amount and long term consequences are unknown. (Myers & Davidson, 2007; Institute of Medicine , 2007). There have been very few proven cases of methylmercury poisoning in infants, and those that have been recorded are over 40 years old. In these cases however, poisoning was linked to massive industrial pollution of nearby water sources (Myers & Davidson, 2007). In addition, new studies by Dr. Nicholas

Ralston, a researcher at the Energy and Environmental Research Center at the University of North Dakota, are showing that selenium, also common in seafood, has the capability to counteract the harmful effects of methylmercury (seafoodsource, 2007). Dioxins and polychlorinated biphenyls (PCBs) are found in fish but at low levels similar to meat and dairy products (Torpy, 2006). The number of reported illnesses from seafood-born microbes has been steady over the past decade. One such microbe is *Vibrio*; a bacterium that occurs naturally in raw oysters and other molluscan shellfish. By avoiding raw shellfish and properly cooking all seafood, one can greatly limit the risk of seafood-borne illness.

“For major health outcomes among adults, based on both the strength of the evidence and the potential magnitudes of effect, the benefits of fish intake exceed the potential risks” (Mozaffarian & Rimm, 2006).

### **Research Problem**

Even with the wealth of information on “baby boomers” and seafood consumption, we still do not understand exactly what this age group knows about seafood. Information is needed to understand their level of knowledge, what impact this information has on their food choices, and what the determinants of their seafood consumption behavior are. This knowledge is imperative to the seafood industry because of this group’s potential economic impact now and in the future.

Likewise, the health benefits of seafood are well documented; however, it is unknown how this knowledge reaches consumers 55 and older and how it influences their consumption decisions. The seafood industry needs to understand the motives of this age group when it comes to the consumption of seafood. Results provided from this research could shed light on a potentially profitable market segment for the seafood industry. For consumers, it could mean

changes to the industry to make seafood more consumer-friendly and help improve their overall health.

### Objectives

The goal of this research is to identify the attitudes and consumption behavior of consumers age 55 and older for fish and shellfish and to develop marketing messages that best utilizes this information. The following are four specific objectives of this research:

- Identify the consumption behavior of consumers age 55 and older for fish and shellfish.
- Identify what, if any, demographic variables influence the decision to consume seafood and frequency of consumption.
- Identify current perceptions of health benefits and concerns regarding seafood, and the ways these influence eating habits.
- Use information gathered to determine a marketing message suited to positively influence buying decisions for seafood.

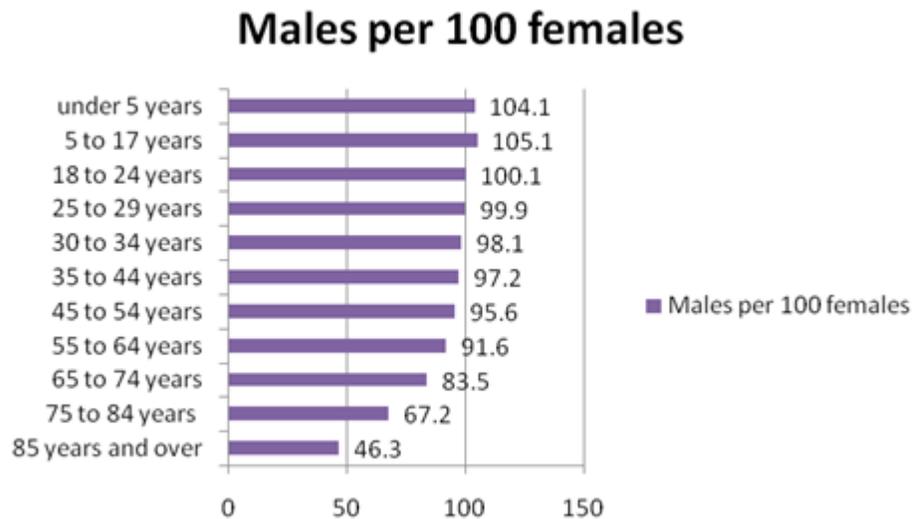


Figure 1-1. Males per 100 females by age, United States, 2000.

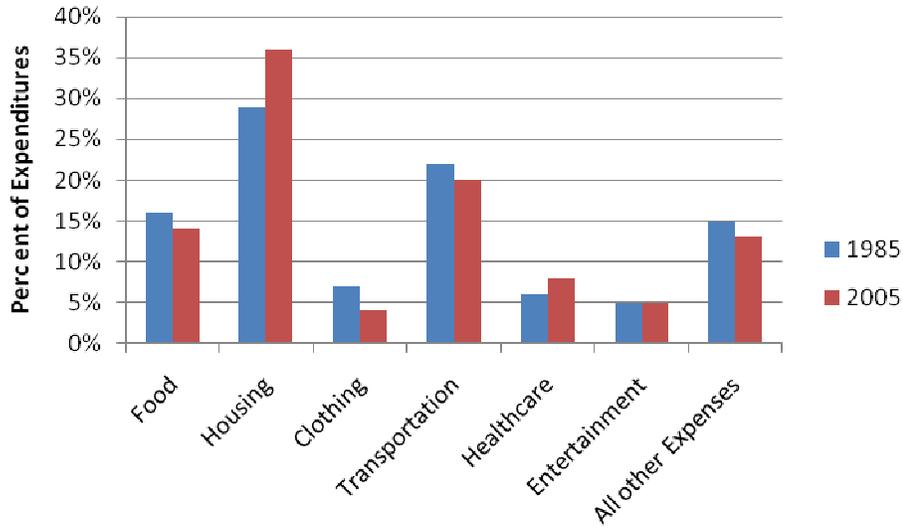


Figure 1-2. Expenditure changes from 1985 to 2005 for households with family head aged 55 to 64 years of age.

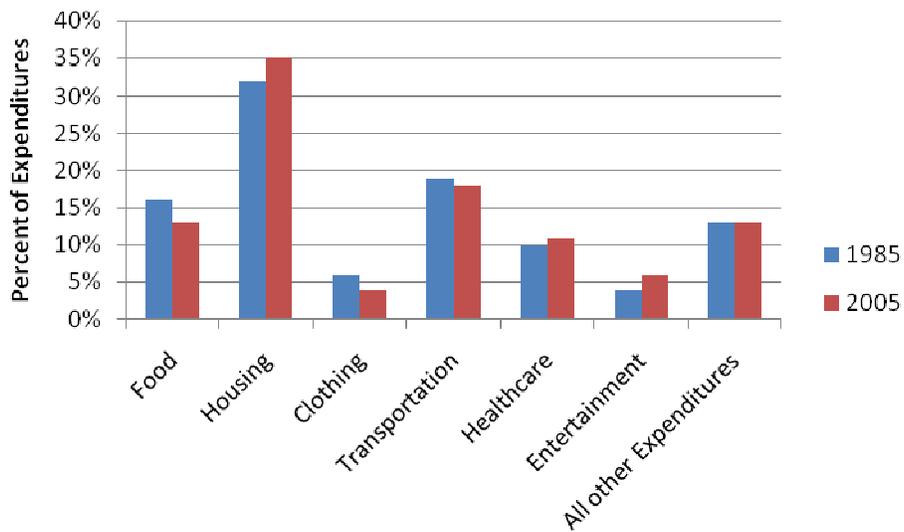


Figure 1-3. Expenditure changes from 1985 to 2005 for households with family head aged 65 to 74 years of age.

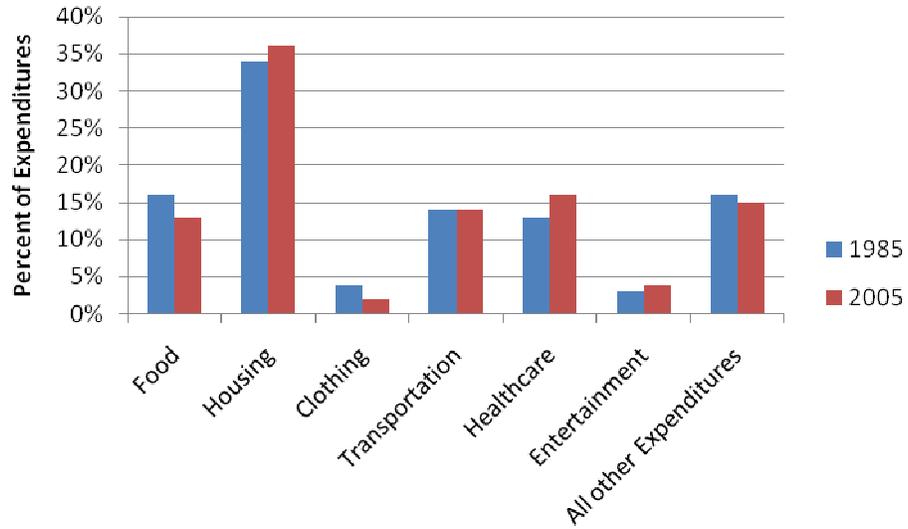


Figure 1-4. Expenditure changes from 1985 to 2005 for households with family head aged 74 years of age and above.

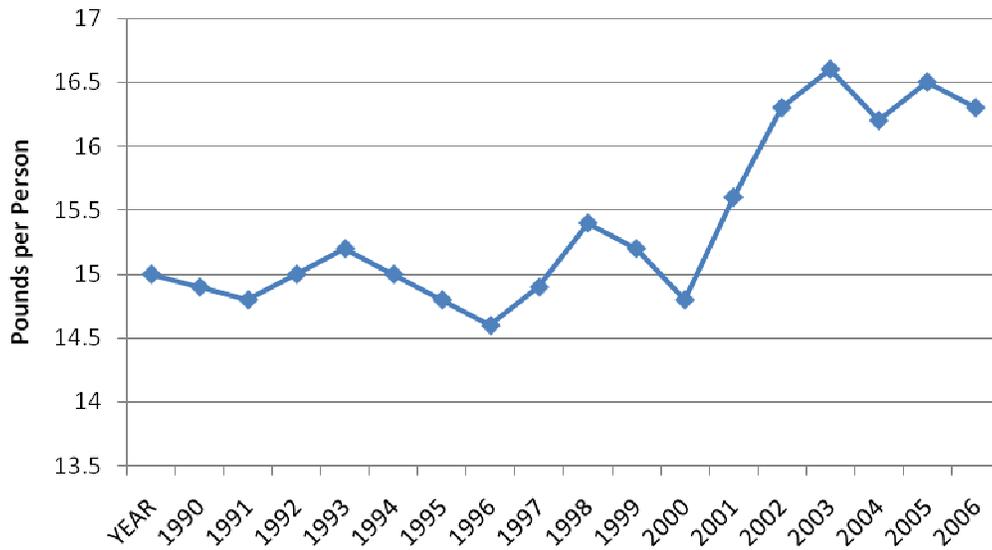


Figure 1-5. Seafood consumption in the United States in pounds per person.

## CHAPTER 2 LITURATURE REVIEW

### **Seafood Consumption**

In the 1980s the seafood industry projected seafood consumption would reach 20 pounds per person by 2000 (Hanson, Herrmann, & Dunn, 1995). Unfortunately for the industry, that projection has not come to fruition and the consumption stands at 16.3 pounds per person as of 2007 (National Oceanic and Atmospheric Administration, 2008). Hanson et al. suspects that most of seafood's demand issues arise from its high cost when compared to beef, chicken, and pork. Between 1985 and 1993, the consumer price index for seafood rose 46%, while poultry and beef only rose 29% and 27%, respectively. Their research goes on to suggest that this increase in price might be secondary to a decrease in supply, due to over fishing and warmer temperatures. The study by Hanson et al. found price perceptions to be a key factor in differentiating consumers who hold favorable attitudes toward fish (Hanson, Herrmann, & Dunn, 1995). In 1988 they performed a cluster analysis including national and northeastern US data. Two of the five clusters found fish highly favorable, however, one cluster (25%) liked everything about fish while the other (22%) viewed seafood as highly favorable but expensive. Hanson et al. noted, "our contention is that high seafood prices are negatively affecting seafood demand, offsetting the nutritional advantages associated with fish" (Hanson, Herrmann, & Dunn, 1995). Reinforcing this finding is a study completed for the National Fish and Seafood Promotional Council by the Data Development Corporation which found that rising prices are a factor in inhibiting frequent purchases of seafood (Hanson, Herrmann, & Dunn, 1995).

These findings contrast with two earlier studies done by Cheng and Capps (1988) and Wellman (1992). The 1988 study by Cheng and Capps (1988) found that finfish and shellfish had inelastic own-price elasticity for at-home consumption. Wellman (1992) found that fish

products, with the exception of shellfish, have a relatively inelastic demand. Although the case for price affecting demand may be contested, many contemporary studies have concluded that price does have some effect on seafood consumption.

Many studies have investigated the effect income has on seafood consumption. A study by Edwards (1992) found income to have an unclear effect on seafood consumption, while two other studies by Cheng and Capps (1988) and Rauniyar et al. (1995) found income to be positively related to fish consumption. Rauniyar et al. found the probability of being a frequent (three or more times per month) restaurant purchaser of seafood rose from .42 for incomes of \$30,000 to \$40,000 per year, to .51 for individuals with incomes over \$40,000 a year (Rauniyar, Herman, & Hanson, 1995). Using an almost ideal demand system approach, Wellman (1992) found a positive and significant price/income interaction for fish products. Simply put, the higher a person's income, the more he/she is willing to spend on seafood products per pound.

As well as income, research has shown that attitudinal factors have a significant effect on seafood consumption. A focus group study by the Data Development Corp identified three distinct attitudinal groups; positive, neutral, and negative (DataDevelopmentCorporation, 1980). The positive group said seafood was light, less filling and added dietary variety. The negative group said they disliked its appearance, taste and odor. Another study by Hermann et al.(1992) found a total of six attitudinal categories in the northeastern United States; very favorable, favorable but expensive, nutrition and convenience focused, availability-nutrition-quality focused, indifferent, and do not like fish. Hermann et al. conducted another study including the entire US and found five categories: totally favorable, favorable but expensive, favorable but dislike odor and boniness, moderately favorable and not favorable. Both studies identified two "favorable" groups with very different ideas about the price of seafood. It is this perception

about price that Hanson et al. contends constrains the seafood consumption of even those favorable to seafood (Hanson, Herrmann, & Dunn, 1995).

Flavor was also identified as having an important attitudinal effect (Hamilton & Bennett, 1983). A six month investigation published in Consumer Reports showed that consumers relate flavor to freshness and both are vitally important to frequent purchasers of fish and seafood. A study by Kinnucan et al. (1993) used the “evoked set” developed by consumer researchers to show that flavor, nutrition, and cost, while at times important in the decision to purchase seafood, were not as important when deciding among different types of seafood. Their findings showed that for catfish, quality and flavor were important factors, while convenience was important to the consumption of lobster. Nutrition and health were important only in determining whether shrimp and cod entered the evoked set. This reveals an interesting trend suggesting just how little the role of health and nutritional considerations play in forming a preference for seafood (Hanson, Herrmann, & Dunn, 1995). Along these lines, Sioen et al. (2007) found that in terms of health benefits and risks there is a vast amount of inconsistencies and misinformation available to the consumer (Sioen, Henauw, Verdonck, Thuyne, & Camp, 2007). Even with these problems, Hanson concludes that while nutrition has not yet had a great impact on seafood consumption, in the near future the nutritional message will be of “paramount importance to the industry” (Hanson, Herrmann, & Dunn, 1995).

Some studies took different approaches to the seafood consumption problem. Studies by Graul (1991), Mason-Jenkins (1991) and the Data Development Corporation (1980) showed that stores and markets with a wide variety of seafood, an attractive presentation, proper lighting, and a knowledgeable staff had an impact on whether or not consumers purchased seafood (Graul, 1991; Mason-Jenkins, 1991; DataDevelopmentCorporation, 1980). Cheng and Capps (1988),

Dellenbarger et al. (1992), Hanson et al.(1994), Herman et al.(1994), and Wellman(1992) have all shown in their research that household size has a positive correlation with at-home dining, while the presence of small children has a negative correlation with restaurant consumption.

While some studies had a broad focus on seafood consumption, others concentrated on select types of seafood. Yen and Huang (1996) found several key variables that affected both the probability and level of household finfish consumption in the United States. These variables included price of finfish, shopping frequency, geographic region, race, and life-cycle. In another study using a double-hurdle model, House et al. (2003) found “source of seafood for consumption, enjoyment of flavor, availability, price, allergies, male consumers, and geographic reasons to be significant in determining probability of participation in oyster consumption”. The level of consumption of oysters was also affected by similar variables: source of seafood for consumption; enjoyment of flavor; tradition; price; product safety; geographic region; income and age (House, Hanson, & Sureshwaran, 2003). In a study conducted in 2000-2001 by Zhang et al., at-home seafood (shrimp, oysters, and catfish) consumption in the United States was analyzed. Their results showed that the probability and frequency of consumption was negatively affected if a consumer felt they lacked preparation knowledge, product preparation was too time consuming, or the smell was unattractive.”

Researchers of past studies, Edwards (1992) and Wessells and Anderson (1992), point out that there are some limitations to their studies; namely the instability of seafood supplies and breakdowns in the marketing chain (Edwards, 1992; Wessells & Anderson, 1992). Yet, the majority of studies have concluded that price, income level, region of residence, family size and presence of children are all important in determining restaurant consumption. Flavor, freshness,

ease of preparation and other sensory/attitudinal variables are significant to at-home consumption.

### **Seafood Consumption of People 55+ Years**

Many studies that have been conducted to date have not looked at the effect of age on seafood consumption, or have merely included it as one in a long list of demographic variables. Olsen's (2003) research on Norway's seafood consumption, however, is an exception to this norm. Olsen (2003) examined "the relationship between the consumer's chronological age and frequent consumption of seafood, and how this relationship is mediated by three psychological variables: Attitudes/preferences towards eating seafood, involvement in healthy eating, and perceived time used to prepare meals (convenience)" (Olsen, 2003). This is contrary to normal economic analysis where socio-economic and demographic variables are kept separate from psychological constructs (Olsen, 2003).

The study was done by using cross-sectional data under the assumption that the path a person's life takes (including, experiences, family environment, etc) is important in modeling his or her food consumption behavior (Olsen, 2003). Olsen was able to estimate the strength and direction of direct and indirect relationships between external, internal, and behavioral variables as proposed in general attitude theory using structural equation modeling (Olsen, 2003). He did this using maximum likelihood estimation (Olsen, 2003). Confirmatory factor analysis including Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), and Comparative Fit Index (CFI) was performed to find correlations between variables (Olsen, 2003). The results showed that age was positively related to the frequency of seafood consumption (Olsen, 2003). In addition, his research showed that there is a highly positive relationship between health involvement and attitudes toward seafood. This indicates that health involvement has an influence on attitudes toward eating seafood. Convenience and age also had

a positive significant relationship (Olsen, 2003). This indicated that any inconvenience incurred from eating or preparing seafood does not deter the older population from consuming seafood as happens among the younger population (Olsen, 2003). The core finding of Olsen's (2003) study is that the external variable (age) and the consumption of seafood is "mediated by attitudinal and motivational variables" (Olsen, 2003).

While the research done by Olsen correlates with the objectives of our research, there are several limitations that prevent his work from being directly used to understand the age 55 and above seafood market in the United States. First, the research for that study was conducted five years ago. This time sensitive type of research needs to be updated for current trends because people's habits and preferences change. Most importantly, however, is the location in which his research took place. Olsen's survey data was collected in Norway and it is unclear whether or not his findings translate to the American market and people. In addition, Norway did not experience a "baby boom" as the United States did and therefore does not have the same population characteristics.

## CHAPTER 3 METHODS AND DATA

### **Focus Group Methods**

A telephone survey was used to collect the data for this study (Appendix B). In preparing the script for the survey, focus groups were conducted in Hillsborough, Palm Beach, and Miami-Dade counties in the state of Florida to gain insight into consumption patterns and to facilitate construction of the telephone survey (Appendix A). A total of six focus groups were held: four in Palm Beach and Miami-Dade county on October 25 and 26, 2007 and two in Hillsborough on November 14, 2007. Each group consisted of 7 to 11 participants over the age of 55. The participants were recruited by the private market research firm, Plaza Research, and were screened to meet the age criteria for the study.

### **Focus Group Data**

Preliminary results of the focus groups showed consumers can be classified as passionate, lukewarm, or having a strong distaste for seafood. For the passionate consumers, seafood is a regular part of their diet, much like milk. These consumers are willing to experiment with new seafood species. For the lukewarm consumers, there is potential to increase consumption, but the industry must clearly address their concerns. For the non-consumers, life experiences reinforced their distaste for seafood and it may be that little can be done to increase their consumption. However, these non-consumers can still provide insight into why they don't purchase and consume seafood that could be useful for the passionate and lukewarm consumers.

Terminology such as aquaculture, finfish and sustainability are not widely understood by consumers over the age of fifty five. This group also had an overall negative view of processed seafood products, though their definition of processed seemed to vary. A majority of the respondents consumed seafood both at and away from home but said the choice of product might

depend on the location of consumption. Respondents categorized as serious fish consumers often opted to buy their seafood at fish markets.

Top concerns related to fish and shellfish consumption were identified by respondents to be: odor, appearance, health, food safety, and flavor. Interestingly, price was always mentioned last on the list of concerns with seafood. Focus group respondents recommended that the industry work on better packaging, promotion of beneficial health effects, increased advertising, and the availability of recipes and preparation materials.

### **Survey Methods**

After completion of the focus groups, a telephone survey instrument was developed and pre-tested (appendix B). The telephone survey was conducted in April and May 2008. The telephone numbers for the survey were selected from a random list of individuals 55 and above. This list was purchased from a private market research firm, USA Data. In total, 8,962 households were contacted in the three counties that are the focus of this study: Miami-Dade, Hillsborough, and Palm Beach. Of the 8,962 contacted, 1,796 were invalid numbers (i.e. disconnected, no resident under the age of 55 available, incorrect county, etc.), leaving 7,166 true attempts. This large number of calls was necessary to reach the study's goal of 600 completed surveys. Although 600 surveys were initially thought to be completed, three were later thrown out due to inconsistencies in the age data provided by these respondents. Therefore a total of 597 surveys were successfully completed, creating a response rate of 8.3%. The original goal was to complete 200 responses per county (a total of 600 surveys), however, response rates in Miami-Dade County were lower than the others so targets were readjusted, leading to more responses from the other two counties (Table 3-1).

The survey was conducted at the Bureau of Economics and Business Research's survey research lab by trained personnel. The survey begins with a standard introduction of the research

to the respondent followed by a series of qualifier questions to make sure he/she met our needs. The first true question asked by the interviewer was whether or not the respondent consumed seafood. Even though this is ultimately a survey aimed at seafood consumers, much can be learned by those who choose not to consume seafood. The next section of questions was asked of both the seafood consumers and the non-consumers to find out their nutritional behavior. This section was followed by questions to discover the respondent's knowledge about the seafood category. Those respondents who indicated they were seafood consumers were asked numerous questions to find information about their seafood consumption, while non-seafood consumers were asked questions about their reasons for not consuming seafood. Both groups were then asked questions about seafood safety, seafood health effects, information source, and seafood sustainability. The last set of questions was for typical demographic information.

## **Survey Data**

### **Demographic Profile of Respondents**

Respondents, by design, were aged 55 and above. Figure 3-1 shows the distribution of age of respondents. As age increased, the number of respondents in the category generally decreased (Figure 3-1). The largest number of respondents, 31.7%, fell in the between the ages of 60 to age 64. The majority of respondents reported they were the only resident of their household age 55 and above (56.3%), while 40.5% indicated there were 2 people in the household in this age group.

Respondents were asked to identify their racial background. This information was compared to the 2005 Census data for these counties to check for representativeness of the sample (Table 3-2). Results from the telephone survey closely reflect the census data. The major exception is in the case of Asian respondents. In this case, only two respondents, or 0.4%, of our survey indicated Asian descent. The Census, however, indicated that 4.0% of the

population was of Asian descent. Due to the use of both Spanish and English versions of the telephone survey, response rates from Hispanic respondents were good, with slightly more respondents in the survey than census data indicate.

Gender of respondents was more frequently female. In our case, 415, or 69.0% of respondents, were female. Data were also collected on education and income levels (Tables 3-3 and 3-4). Education levels varied widely, and income was spread amongst the categories, with less people in the higher income categories. It is worth noting that 30.0% of the respondents either refused to answer the question on income or indicated they did not know the answer.

One reason for conducting the survey in Florida was the belief that many respondents would be from different regions of the U.S., having moved to Florida for retirement. Indeed, many of the respondents did not live in Florida their entire life, of the 597 respondents, only 40 indicated they had lived in Florida their entire life. Twenty-five percent had lived in Florida since they were children, and 20.0% moved to Florida after turning 55 years of age (Figure 3-2.).

### **Seafood Consumption**

Data were collected both from seafood consumers and non-seafood consumers. As with prior studies, approximately 87.0% of respondents (n=521) indicated they consumed some type of seafood. Seafood consumers were then asked a series of questions about the frequency of their consumption, type of seafood consumed, and the issues that were important to them in choosing seafood.

To identify seafood consumption patterns, respondents were asked to identify how often they ate seafood products for breakfast, lunch, and dinner (Table 3-5). As expected, people were more likely to consume seafood for lunch and dinner than for breakfast; however, a substantial number of consumers did indicate they ate seafood for breakfast. A total of 97 consumers indicated they ate seafood for breakfast at least occasionally, 402 indicated they ate seafood for

lunch, and 510 indicated they ate seafood for dinner. This indicates that demand for seafood items typically consumed for dinner, such as filets and steaks, will have higher consumption rates than, say, canned tuna (a lunch item), and lox (a breakfast item).

Responses to these three questions were used to generate the frequency of consumption for each respondent. Frequency of consumption was calculated by summing the responses for the breakfast, lunch and dinner questions (with the following numerical conversions used: if the respondent consumed seafood daily then they were said to consume seafood 365 times a year, if the individual chose that they consumed 4-6 times/week then an average of 5 was chosen and they were said to consume 260 times per year; if the individual chose that they consumed 2-3 times/week then an average of 2.5 was chosen and they were said to consume 130 times per year; if the individual chose that they consumed seafood weekly then they were said to consume 52 times per year, if the individual chose that they consumed 2-3 times/month then an average of 2.5 was chosen and they were said to consume 30 times per year, if the individual chose to consume seafood monthly they were said to consume seafood 12 times a year, 6 if consumed less than 1 time/month, and 0 if never). Respondents who refused to answer this question were eliminated from this calculation. Using this methodology, consumers could eat from 0 times per year to 1,095 times (if they ate seafood at each meal every day). Results are shown in Figure 3-3. We found that four people indicated they ate seafood, but not for meals. This could be the result of someone occasionally eating seafood as an appetizer, but never for a meal. Twenty respondents (4.0% of consumers) only eat seafood once/month or less. Forty-six respondents (9.0% of consumers) eat seafood more than once/month, but less than once/week. Consumers who ate seafood between one time per week and two times per week made up 20.5% of the sample (107 respondents). Fifty-nine (or 11.0%) indicated eating seafood at least one time per

day. These results show that consumers aged 55 and above tend to be frequent seafood consumers.

### **Location of Consumption/Purchase**

In addition to asking how often consumers ate seafood, they were asked where they typically ate seafood. This was achieved by asking respondents to indicate the product source the last ten times they consumed seafood. This included seafood purchased from restaurants, specialty stores, fish markets, grocery stores, shipping companies, or caught on their own (Table 3-6). Results indicate most consumers eat seafood at home which was purchased in grocery stores or less commonly at fish markets. Restaurants were also a common source of seafood. Only 17(3.3%) of consumers indicated purchasing seafood from a shipping company, while 79 (15.2%) ate seafood they had caught. One hundred two (19.6%) respondents purchase their seafood exclusively at grocery stores, but only 48 (9.2%) purchased exclusively at restaurants, 41 (7.9%) at fish markets, and one person only purchased seafood exclusively through a shipping company. In addition, ten people only ate seafood which they caught on their own. Conversely, 115 (22.1%), 149 (28.6%), and 266 (51.1%) did not make any of their last ten purchases at a grocery store, restaurant, or fish market, respectively.

Probing further into the reasons for the location of purchase, respondents who purchased fish from fish markets or specialty stores were asked why they made purchases at these locations over grocery stores. Sixty-nine point five percent (n=164) of those who purchased seafood at fish markets said that this was due to the freshness of the seafood found at fish markets. Quality (n=106, 44.9%) and selection (n=85, 36.0%) were also common answers for why people chose fish markets over grocery stores (Figure 3-4). Consumers who purchased at grocery stores were asked what form of seafood they purchased. The most common answer was fresh, with 73.0% (n=277) of the respondents indicating they purchased fresh seafood at the grocery store. In

addition to purchasing fresh seafood these consumers also purchased frozen seafood (56.6% of grocery shoppers, n=218). Another, 20.4% (n=73) purchased prepared seafood and 8.9% (n=56) purchased canned seafood.

### **Preparation Methods**

In addition to asking about location of purchase, consumers were asked if they ever prepared seafood in the home. Over 86.0% indicated they did prepare seafood at home. Those that did not were asked why (Table 3-7). The most common response from respondents was that either they did not cook, only eat out, or thought seafood was hard to prepare for just one person. The smell of seafood also deterred respondents from preparing seafood in their homes.

### **Types of Seafood Consumed**

Whether at a restaurant or at home, respondents were asked how they ate the seafood and what type of seafood they most commonly ate. Consumers ate a variety of shellfish (Table 3-8) and finfish (Table 3-9). The most commonly consumed shellfish was shrimp, with 70.0% of respondents indicating they ate shrimp, followed by lobster and crab with 39.0% and 32.0%, respectively. For finfish, many types of fish identified, however, the most common were Salmon (44.3%), Tilapia (37.8%), Grouper (24.2%), Catfish (22.1%), Tuna (21.1%), and Snapper (21.1%). Preparation methods also varied, with fried, baked, and broiled the most popular (this includes both at-home and away-from-home consumption) (Figure 3-5).

### **Willingness to Try New Types**

To gain more insight into the type of seafood consumed, respondents were asked if they would be willing to try new types of seafood they had not previously consumed. A majority (62.2%) did indicate they would be willing to try new types of seafood, 33.2% indicated they would not try new types, and 4.6% were unsure.

## **Reasons for Consumption**

Next, consumers were asked to identify why they ate seafood, as well as what criteria were important in the selection of that seafood. There were many reasons consumers ate seafood (Table 3-10), with health or nutrition reasons topping the list with over 50.0% of respondents. Thirty-seven percent indicated they ate seafood because of the flavor or taste, and another 20.9% indicated they ate it because they “liked” or “loved” it. It is possible these two categories are representative of the same sentiment, though flavor and taste were not mentioned in the other responses as the reason for liking seafood. Likewise, 15 respondents indicated they ate seafood because it was better than beef or chicken, which may correspond to those who say they ate seafood to add variety to their diet.

Respondents were then asked to identify both the most important thing they considered when selecting seafood (Table 3-11) as well as all other determinates (Table 3-12). The single-most important reason for selecting seafood was freshness, with over 54.0% of the respondents indicating this was the deciding factor. Other factors varied in importance, with 5.0-10.0% of the respondents indicating price, flavor/taste, color/appearance, smell, and/or health reasons affected their decision. When asked to list all the factors that influence purchasing, price was cited most often as one of those factors.

## **Origin**

An important piece of information for Florida producers is whether or not consumers in Florida perceive Florida seafood as high quality. To this end, seafood consumers in the survey were asked if they would purchase seafood if they did not know where it was raised or caught. Almost 50.0% said that they would buy seafood regardless of whether they knew where it was raised or caught, while 45.0% said they would not. Consumers were then asked two follow up questions rating the importance on knowing where the seafood was raised or caught, and the

importance of knowing it was raised or caught in Florida (Figure 3-6). While 70.5% (n=366) indicated it was at least slightly important to know where their seafood came from, only 52.3% (n=271) said it was just as important to know that their seafood came from Florida. On the opposite end, only 6.6% (n=34) indicated where their seafood came from was very unimportant, while nearly double that amount, 12.6% (n=65) indicated it was very unimportant to know the seafood was from Florida.

Consumers were then asked about the difference between wild-caught and farm-raised fish. A majority, 56%, said that there was a difference in taste between wild-caught and farm-raised seafood. However, the remainder was split between those who felt there was no difference (23.4%) and those who didn't know (19.7%). Interestingly, nearly half (47.9%) of those that felt there was a difference said that they did not have a preference between wild-caught and farm-raised seafood. Of those that did have a preference, 37.3% preferred wild-caught while 11.0% preferred farm-raised.

Another distinction between general seafood and Florida seafood is related to safety. Consumers were asked how confident they were in the safety of seafood they purchase in general, and how confident they were in the safety of seafood raised in Florida. Results are shown in Figure 3-7. Though results appear similar, with 74.5% (n=386) confident in the seafood they purchase, and 68.7% (n=356) confident in Florida seafood, the difference is statistically significant ( $\chi^2=454.7$ ), with respondents more confident in seafood they purchase in general than Florida seafood. Of concern for the Florida industry should be the 7.9% and 4.8% that indicated a slight and high lack in confidence in the safety of Florida seafood (compared to 10.0% and 2.5% for general seafood purchases).

Finally, consumers were asked what would increase their consumption of seafood (Figure 3-8). They were given choices between recipes, information on preparing seafood, TV commercials, talking with specialists at your local store, packaging, promotion of health advantages, and other. On their own, many respondents added price and freshness to the list. The item most likely to increase consumption is promotion of health advantages of seafood (36.0%) and recipes (35.0%). Talking with knowledgeable specialists would help 33.0% of the respondents and 31.0% indicated that more preparation information would be helpful. As was mentioned in the focus groups, packaging was significant, with 22.0% indicating packaging could lead to more purchases. Only 13.6% indicated nothing would increase consumption.

### **Non-Consumers**

In addition to asking questions of seafood consumers, the 17.0% of respondents who indicated they did not eat seafood were asked a series of questions to develop an understanding of whether or not they can be converted to seafood consumers. The initial question was the reason they don't consume seafood (Figure 3-9). Non-seafood consumers polled said that the primary reason they did not consume seafood was that they (or their spouse) didn't like it (20.0%), plus another 9.0% specifically did not like the flavor or taste. These answers can be categorized together as they portray the same sentiment. Approximately 18.0% indicated they didn't consume seafood because of health reasons, with an additional 12.7% not eating seafood due to safety concerns. Of the non-consumers 66.0% could never be enticed to eat seafood. Of the 34.0% (n=27) who could be enticed to eat seafood, 25.9% indicated it would take changes in safety standards to change their behavior, 22.2% indicated it would take a lower price, 22.2% indicated recipes would help, and 51.9% had other reasons (such as if they could get over an allergy or if there was a boneless product available).

## Seafood Safety Issues

Seafood consumers were asked to rate their confidence level in the seafood they purchase (reported earlier in Figure 3-7). Of the consumers, 12.5% had less than neutral confidence levels in safety. Among non-consumers that might be enticed to eat seafood, 66.7% indicated they were concerned about the safety of seafood. All respondents were asked to identify the fish or shellfish they believe to be the most safe and the least safe. Responses are shown in Figure 3-10. A large proportion of respondents indicated they did not know which fish was the safest (21.0%) or least safe (31.0%). Shrimp and salmon were considered the safest seafood, with 15.0% and 14.0% indicating these choices respectively. Oysters were seen as the least safe most frequently (24.0%), followed by clams (6.0%). Few respondents indicated all seafood was considered safe (3.5%) or unsafe (1.7%), indicating people do see the species differently in regards to safety.

Due to concerns about oyster safety perceptions, as verified by this survey, consumers were asked direct questions about their perception of safety in oysters. In total, 45 consumers only ate raw oysters, 111 only ate cooked oysters, 76 ate both cooked and raw, and 360 indicated they don't eat oysters (Figure 3-11). Those who didn't eat raw oysters were asked why, with 21.0% indicating safety as the reason and 42.0% indicating that they did not have an "appetite" for oysters (Table 3-13). To explore the safety issue further, consumers were asked if they would consume raw oysters if health and safety concerns were reduced or eliminated. Only 82 respondents, or 17.0%, indicated this would change their behavior. Finally, when asked if they were aware of any new processes to reduce risk in eating raw oysters, 27 (4.6%) said they were.

All respondents were also asked if they had safety concerns for seafood other than oysters. Nearly one-third (31.0%) indicated they did, while 68.0% indicated they had no other concerns (Figure 3-12). For those with concerns, they were asked to identify the concern. This

answer was hard to interpret as most people's answers were different, and included things like they just don't like seafood, religion, or other factors not really related to safety.

Next, respondents were asked whether they felt there were health benefits from eating seafood. Due to a survey administration problem, only 185 respondents answered this question. Of those, 86.0% perceived benefits. However, all respondents were asked what health benefits they perceived (Figure 3-13). Most respondents indicated there was a general health benefit, or that fish was nutritious (20.5%), while others referred directly to Omega-3 or fish oil (16.5%) or lower fat content – including “helps my diet” (19.3%). Some respondents were more focused on the direct benefit – with 14.0% interested in cholesterol, 8.0% interested in heart health, and 7.7% interested in benefits for the brain.

### **Information Source**

To target information effectively, respondents were asked where they received information about seafood and who they would trust to give them that information. People most commonly said they received information from the newspaper or news (26.8%), Television or the media (25.6%), and magazines (21.5%) (Figure 3-14). Other major sources of information included cookbooks (12.4%), word of mouth (11.6%) and asking for help at the store (7.7%).

When asked who influenced their decision to purchase seafood, nearly three-quarters (73.7%) said nobody influenced their decision. Of those who were influenced, immediate family, doctors, media, friends and extended family were mentioned (Figure 3-15). Respondents were also asked who they trusted for information about seafood (Table 3-14). Interestingly, the most frequently trusted source was the person selling the seafood (17.7%). This was closely followed by nobody influences me (15.7%), the media (14.3%), immediate family (7.6%), themselves (6.2%), doctors (5.7%), and government (4.1%). When mentioning the government, many respondents mentioned the USDA and FDA specifically (split evenly between the two).

## **Sustainable Seafood**

Only 12.4% of respondents indicated they knew what the term sustainable seafood meant.

Those who didn't know the term were read the following question:

*“Sustainable Seafood is the practice of keeping fisheries and the fish they raise healthy and productive through management and responsible harvesting.*

*Knowing this would you pay extra for it?”*

Following this statement, 56.6% of the people that did not know what sustainable seafood was indicated a willingness to pay extra for it and 48.0% felt there should be federal funding available to support sustainable production. Overall, 58.0% of people indicated a willingness to pay more for sustainable seafood.

Table 3-1. County of residence of survey respondents.

County of Residence	Number	Percent
Miami-Dade	115	19.3%
Hillsborough	250	41.9%
Palm Beach	232	38.9%

Table 3-2. Race and ethnicity of respondent.

Race	Number in survey	Percent in Survey	Census Percent
Black/African American	74	12.4%	13%
White	454	76.1%	80%
Asian	2	0.4%	4%
American Indian/ Aleut	6	1.0%	1%
Other	58	9.7%	2%
Don't know/Refused	15	2.5%	N/A
Hispanic	98	16.4%	14%

Table 3-3. Highest level of education.

Highest Level of Education	Number	Percent	Census Data
8th grade or less	30	5.0%	8.8%
Some high school	30	5.0%	9.8%
High school graduate or GED	158	26.5%	34.3%
Technical or Vocational School (some or certificate)	26	4.3%	N/A
Some college, but no degree	111	18.6%	15.9%
Associate's degree	42	7.0%	6.9%
Bachelor's degree	105	17.6%	14.3%
Some Graduate or Professional school	14	2.4%	N/A
Graduate or Professional degree	72	12.1%	10.1%
Refused/Don't Know	9	1.5%	N/A

Table 3-4. Income of respondents.

Income	Number	Percent
less than \$10,000	50	8.3%
\$10,000 to \$19,999	69	11.6%
\$20,000 to \$29,000	59	9.9%
\$30,000 to \$39,000	55	9.2%
\$40,000 to \$49,000	49	8.2%
\$50,000 to \$59,000	32	5.4%
\$60,000 to \$79,000	36	6.0%
\$80,000 to \$99,999	27	4.5%
\$100,000 to \$150,000	20	3.4%
Over \$150,000	20	3.4%
Don't know/refused	180	30.2%

Table 3-5. Frequency of consumption of seafood at breakfast, lunch, and dinner for seafood consumers

	Daily	4-6/ week	2-3/ week	1/week	2-3/ month	1/month	< 1/ month	Never	Refused
Breakfast	4 (0.8)	5 (1.0)	11 (2.1)	24 (4.6)	14 (2.7)	27 (5.2)	12 (2.3)	419 (80.4)	5 (1.0)
Lunch	5 (1.0)	30 (5.8)	133 (25.5)	126 (24.2)	49 (9.4)	48 (9.2)	11 (2.1)	109 (20.9)	10 (1.9)
Dinner	7 (1.3)	45 (8.6)	242 (46.5)	117 (22.5)	58 (11.1)	33 (6.3)	8 (1.5)	8 (1.5)	3 (0.6)

(number of respondents followed by percents in parentheses)

Table 3-6. Times out of last ten that seafood was purchased by location.

Frequency of purchase	Restaurant	Fish Market (specialty store)	Grocery Store	Shipping	Self-Caught
10	48	41	102	1	10
9	6	4	13	0	1
8	17	8	18	1	7
7	22	9	13	0	3
6	17	6	12	0	3
5	48	30	50	2	17
4	29	21	34	3	5
3	39	34	47	3	7
2	64	52	59	3	12
1	54	33	44	4	14
0	149	266	115	500	433
Don't know/refused	28	17	14	4	9

Table 3-7. Why respondents do not prepare seafood at home.

Why Not Prepare Seafood at Home	Number	Percent
Don't like the smell	14	20.6%
Don't know how	7	12.1%
Takes too much time	4	5.9%
Tradition, habit, I grew up not eating seafood at home	1	1.7%
Eat out, hard to prepare for one person, don't cook	21	36.2%
Other	23	70.59%
Refused	1	39.7%

Table 3-8. Shellfish species consumption.

Shellfish	Number	Percent
Shrimp	363	70.1%
Lobster	202	39.0%
Crab	167	32.2%
Clams	98	18.9%
Oysters	97	18.7%
Scallops	79	15.3%
None	65	12.5%
Mussels	37	7.1%
Other	25	4.8%
Don't Know/Refused	20	3.9%
Crawfish	18	3.5%
Everything	8	1.5%

Table 3-9. Finfish species consumption.

Finfish	Number	Percent
Salmon	231	44.3%
Tilapia	197	37.8%
Other	130	25.0%
Grouper	126	24.2%
Catfish	115	22.1%
Snapper	110	21.1%
Tuna	110	21.1%
Flounder/sole	93	17.9%
Cod	63	12.1%
Mahi mahi	56	10.7%
Bass	31	6.0%
Trout	28	5.4%
Halibut	25	4.8%
None	22	4.2%
Seabass	19	3.7%
Swordfish	17	3.3%
Mullet	13	2.5%
Kingfish	12	2.3%
Squid/calamari	11	2.1%
Everything	11	2.1%
Don't Know	10	1.9%
Sardines	9	1.7%
Haddock	7	1.3%
Pollock	6	1.2%

Table 3-10. Reasons for the consumption of seafood.

Reason for Consumption of Seafood	Number	Percent
Health/nutrition	304	58.3
Flavor or Taste	194	37.2
"like" or "love" it	109	20.9
Other	36	6.9
Add variety to diet	32	6.1
Tradition, habit, I grew up eating it	26	5.0
Better than beef/chicken	15	2.9
Price	5	1.0
Don't know	5	1.0
Religious beliefs	4	0.8
Refused	3	0.6

Table 3-11. Single most important factor in selecting seafood

Most Important Thing	Number	Percentage
Freshness	285	54.7
Price or Cost	51	9.8
Other	41	7.9
Flavor or Taste	34	6.5
Color or Appearance	30	5.8
Smell	27	5.2
Health Reasons	26	5.0
Don't Know/Refused	11	2.1
Location of Origin	3	0.6
Wild-caught	3	0.6
Convenience	3	0.6
Know how to Prepare	3	0.6
Availability	2	0.4
Tradition, habit I grew up eating it	2	0.4

Table 3-12. Other factors respondents consider when selecting seafood.

Things Considered	Number	Percentage
Price or cost	138	26.1
Freshness	104	19.4
Color or Appearance	95	17.9
Flavor or Taste	85	16.1
Smell	66	12.3
Don't Know/Refused	74	14.2
Health Reasons	58	10.8
Know how to Prepare	33	6.3
Other	31	8.1
Location of Origin	30	5.8
Convenience	24	4.6
Availability	23	4.4
Safety	17	3.3
Seasonality, time of the year	17	3.3
Wild-caught	15	2.9
Tradition, habit I grew up eating it	13	2.5
Farm-raised	11	2.1
Religion	5	1.0

Table 3-13. Reasons consumers don't eat raw oysters.

Why do you not eat raw oysters	Number	Percent
Personal safety concern	101	21.4
No appetite for oysters	200	42.4
Don't eat raw foods	32	6.8
Don't like the look	24	5.1
Bad experience	8	1.7
Medical advice by doctor	6	1.3
Allergic	5	1.1
Not readily available	2	0.4
Other	85	18.0
Don't know	7	1.5
Refused	2	0.4

Table 3-14. People who respondents trust for information about seafood.

Trust for Reliable Information	Number	Percentage
Grocer or Fish Guy	103	17.7%
Nobody	91	15.6%
Media	83	14.3%
Don't know	58	10.0%
Other	49	8.4%
Immediate Family (including spouse)	44	7.6%
Myself	36	6.2%
Doctore	33	5.7%
Government	24	4.1%
Friends	21	3.6%
Extended Family	13	2.2%
Refused	4	.7%
Waiter/ waitress	2	.3%

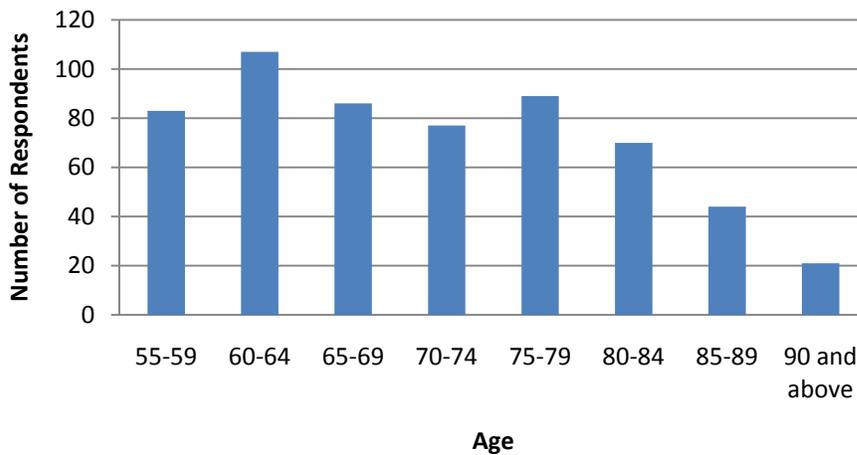


Figure 3-1. Age of respondents.

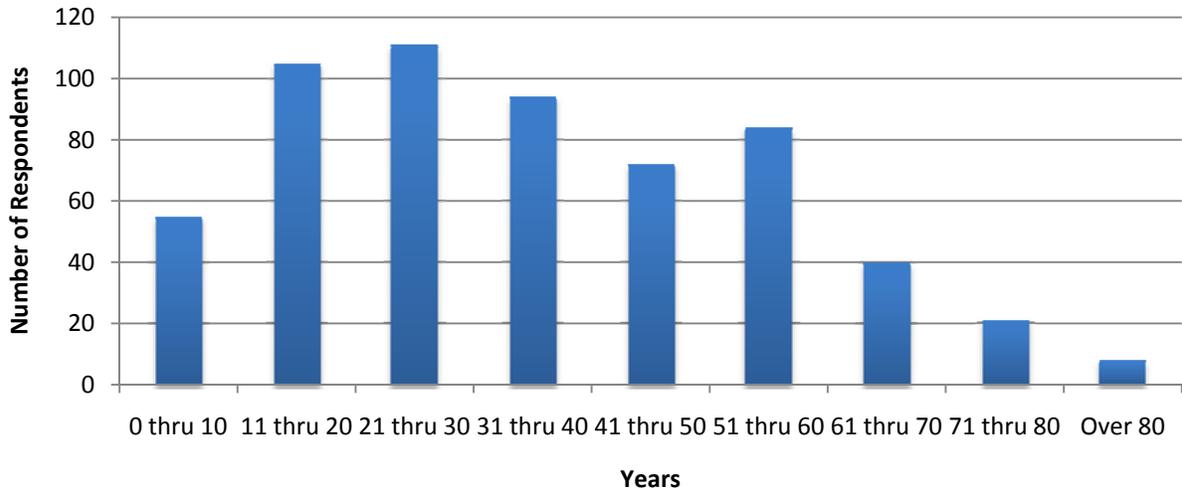


Figure 3-2. Number of years respondents have lived in the United States.

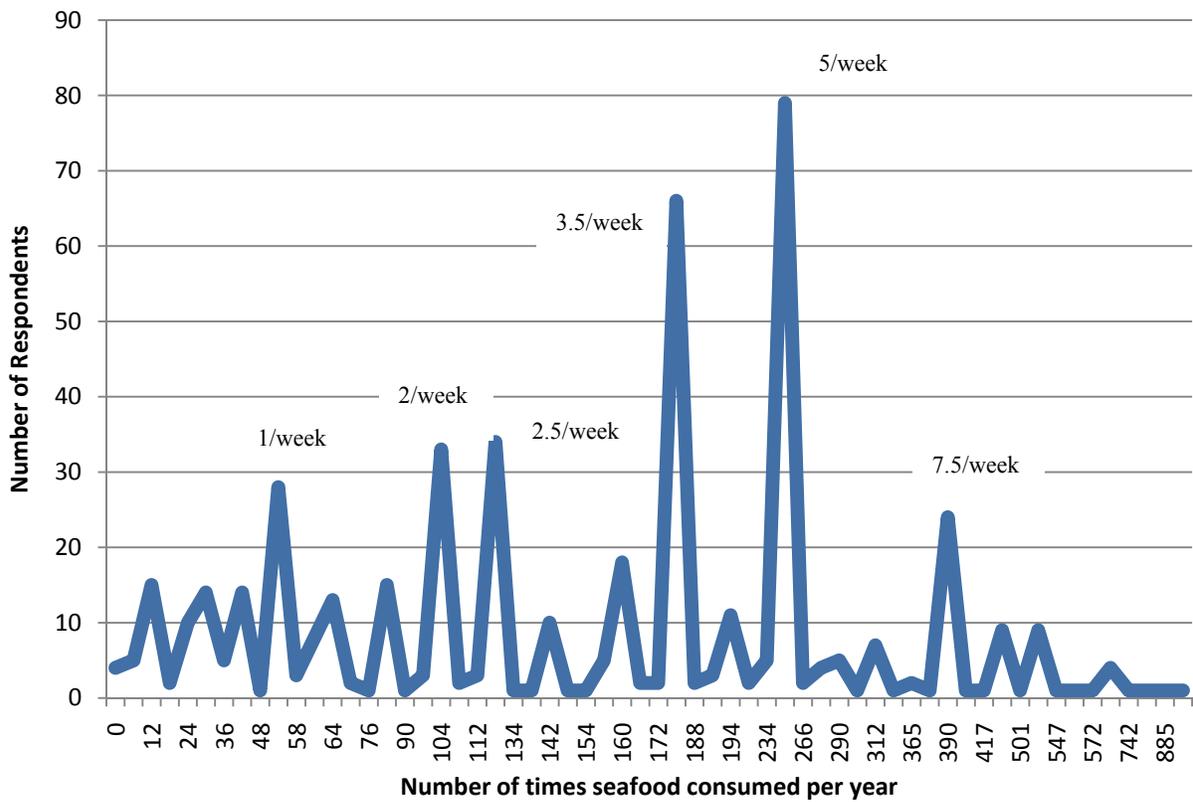


Figure 3-3. Frequency of consumption of seafood.

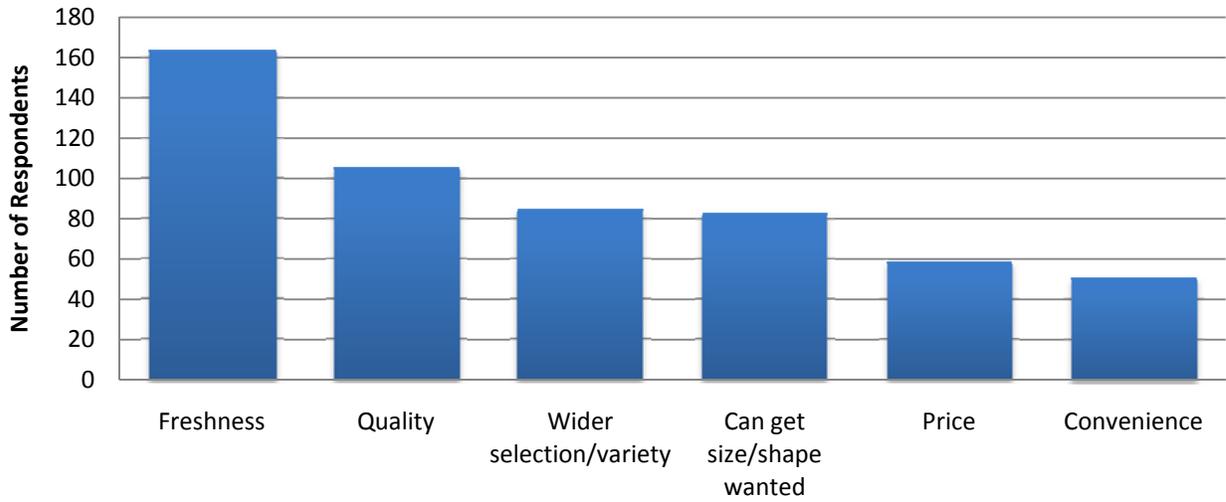


Figure 3-4. Reasons for purchasing from specialty stores or fish markets over grocery stores.

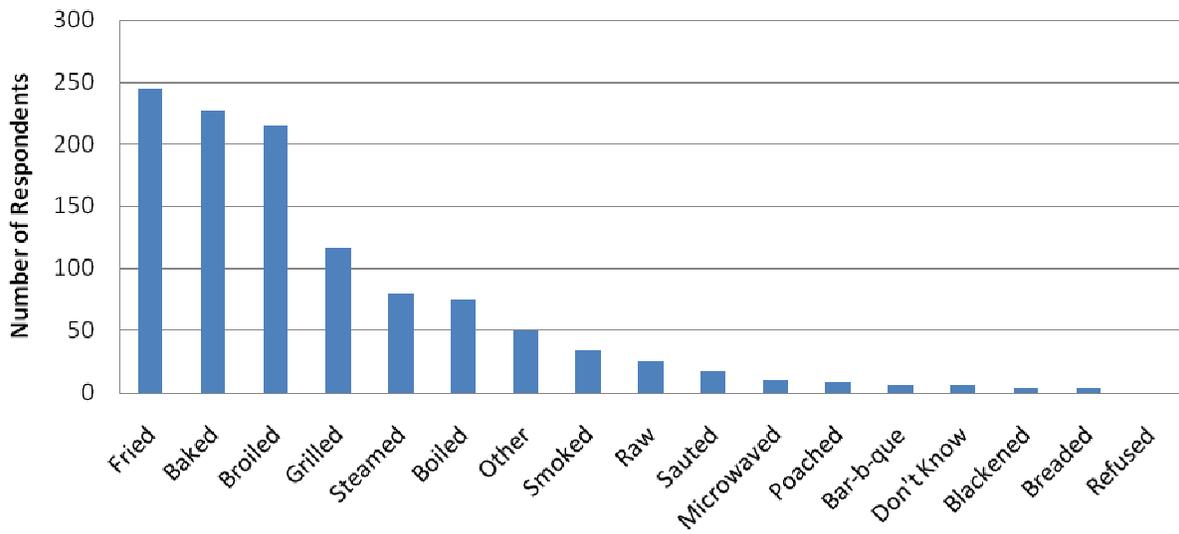


Figure 3-5. Preparation of seafood.

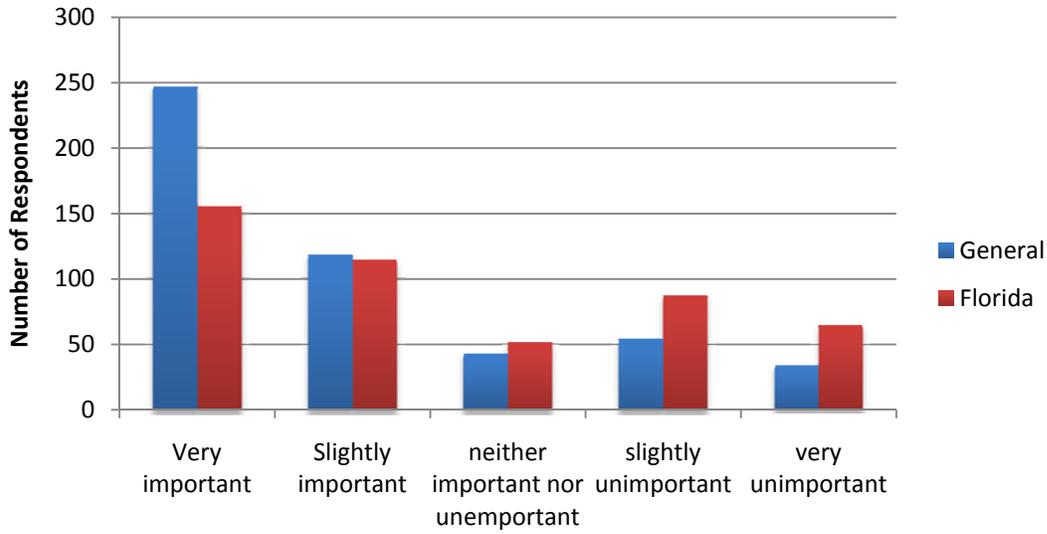


Figure 3-6. Importance of knowing whether seafood was raised or caught in general, and in Florida.

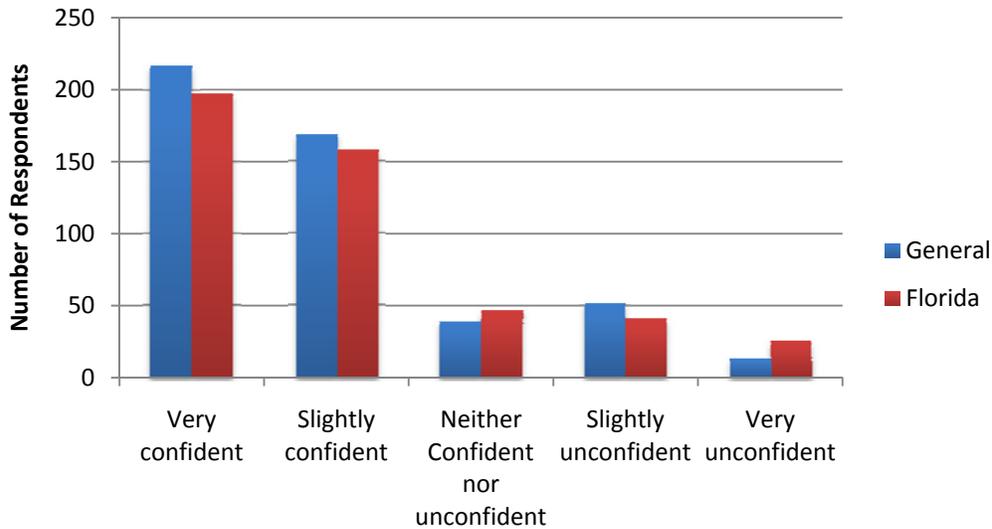


Figure 3-7. Confidence in safety of seafood in general, and that raised in Florida

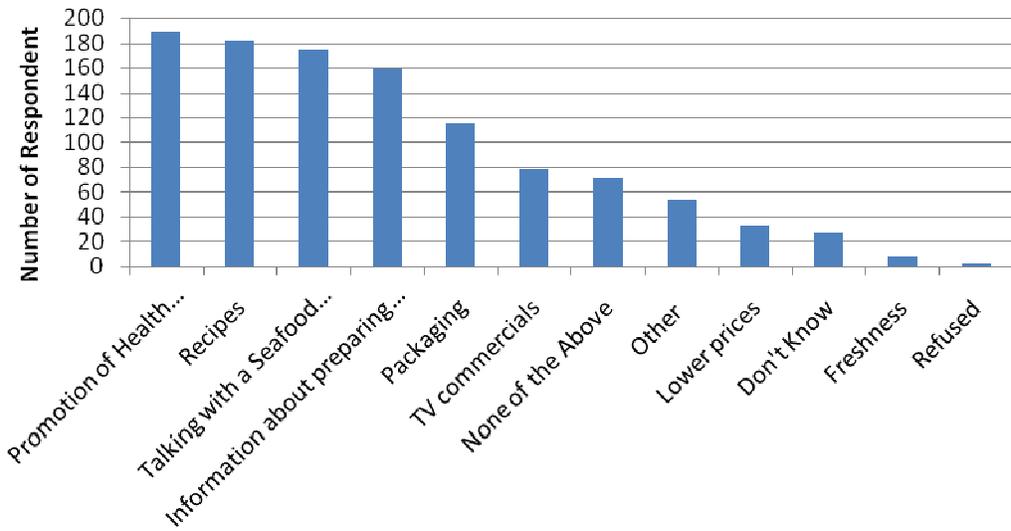


Figure 3- 8. Variables that could increase seafood consumption

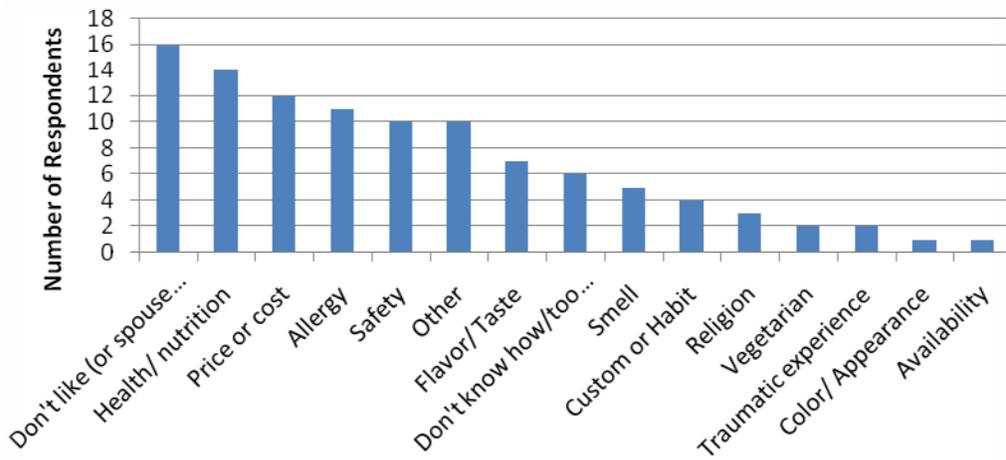


Figure 3-9. Reasons non-consumers do not consume seafood.

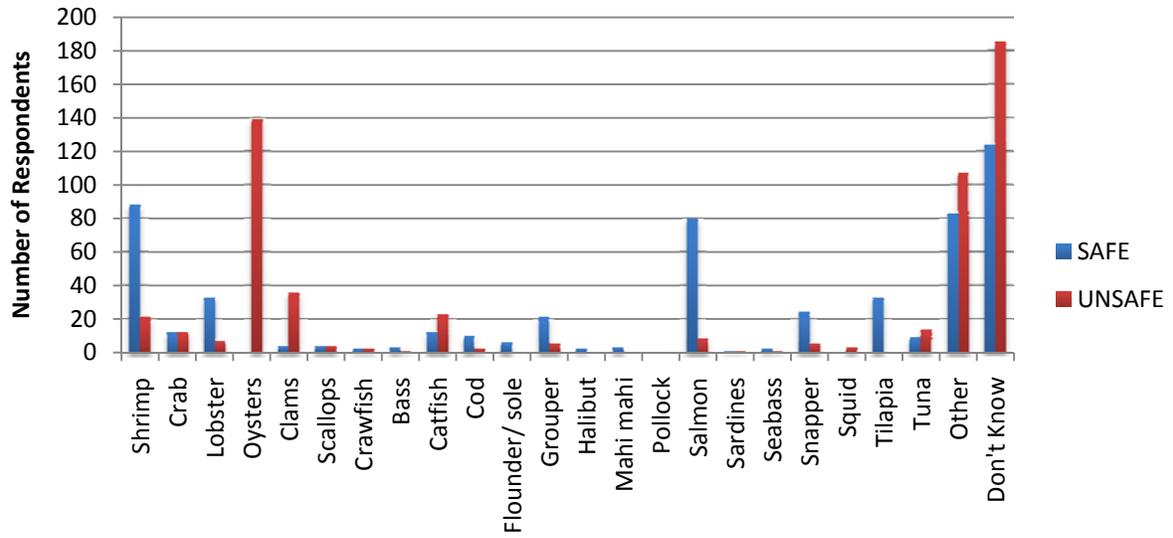


Figure 3-10. Perceptions of safest and least safe seafood.

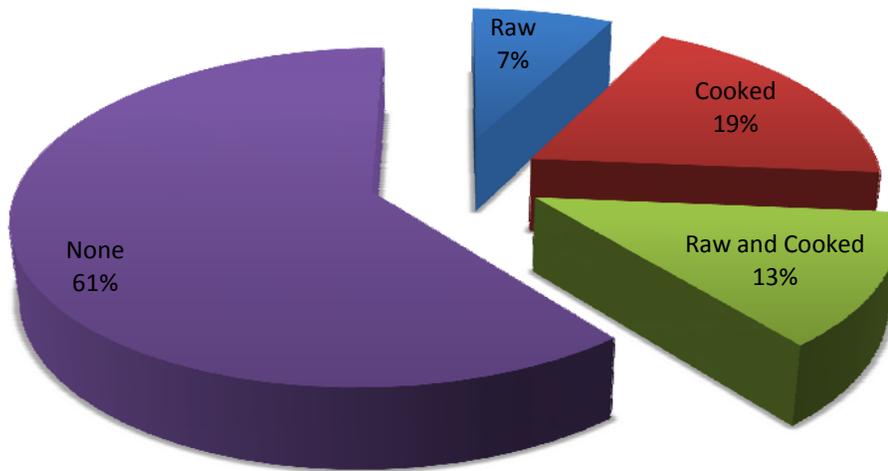


Figure 3-11. Oyster consumption.

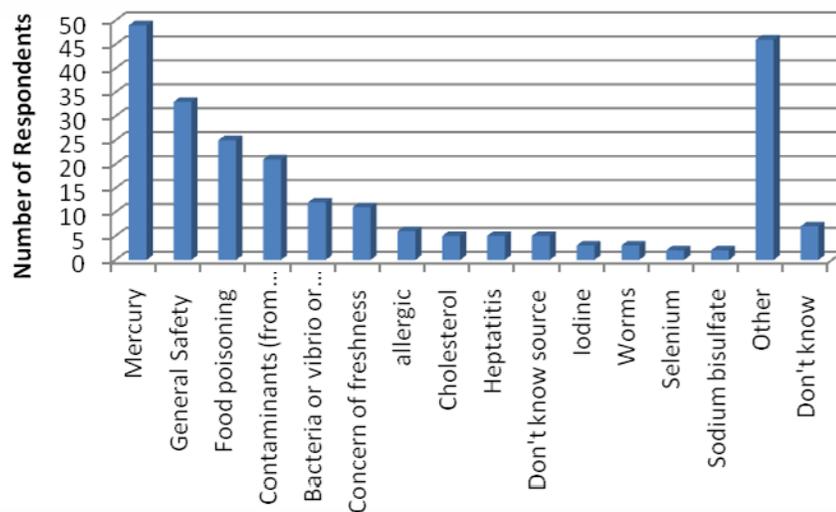


Figure 3-12. Health concerns about seafood.

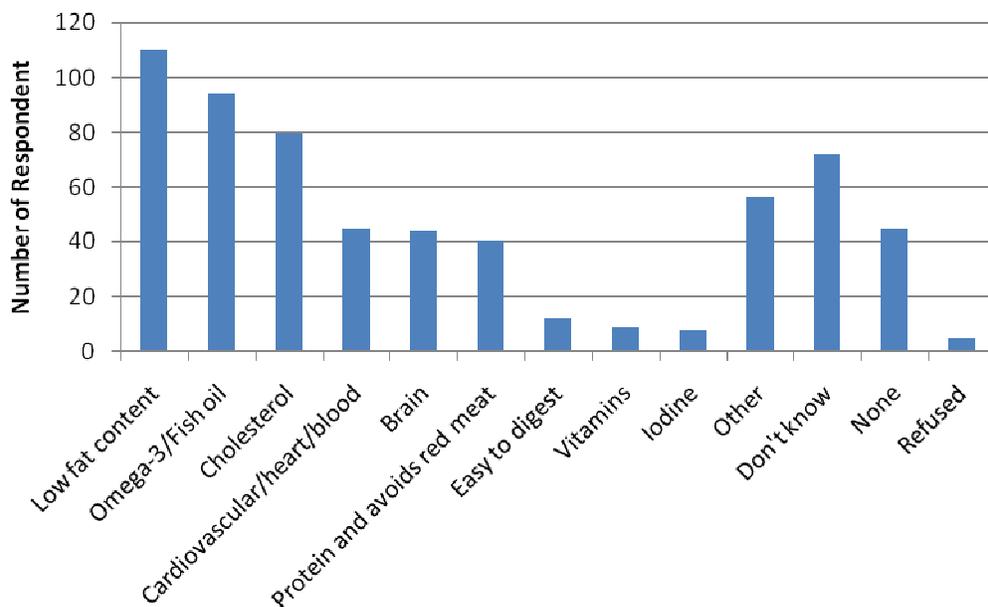


Figure 3-13. Perceived health benefits from eating seafood.

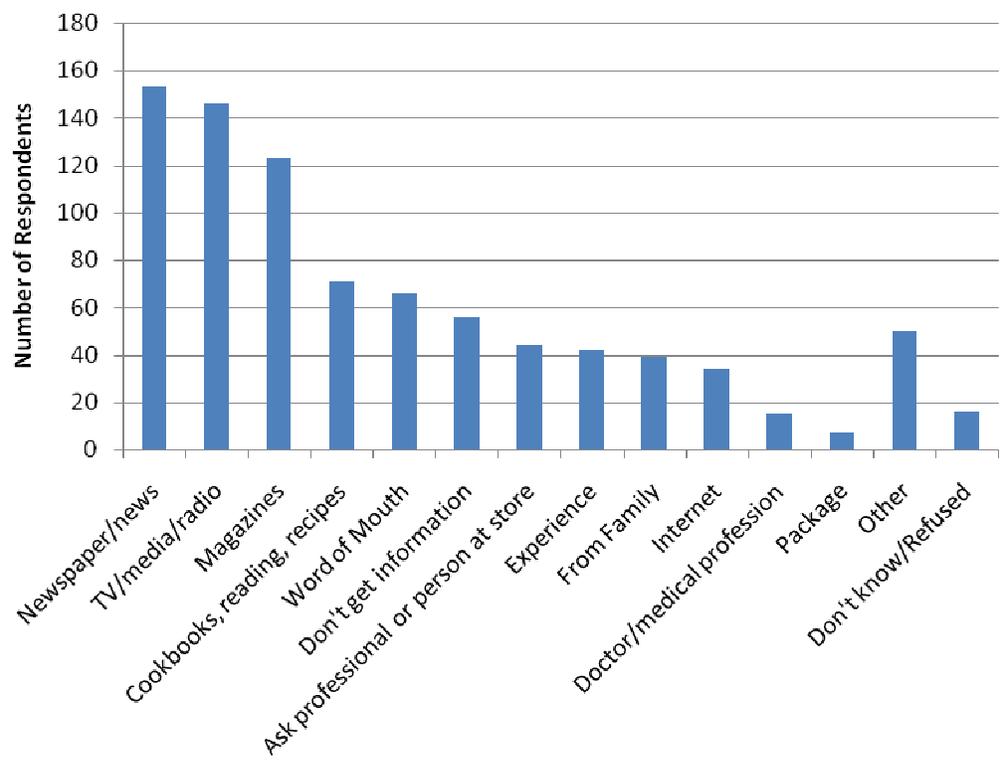


Figure 3-14. Sources of information on seafood.

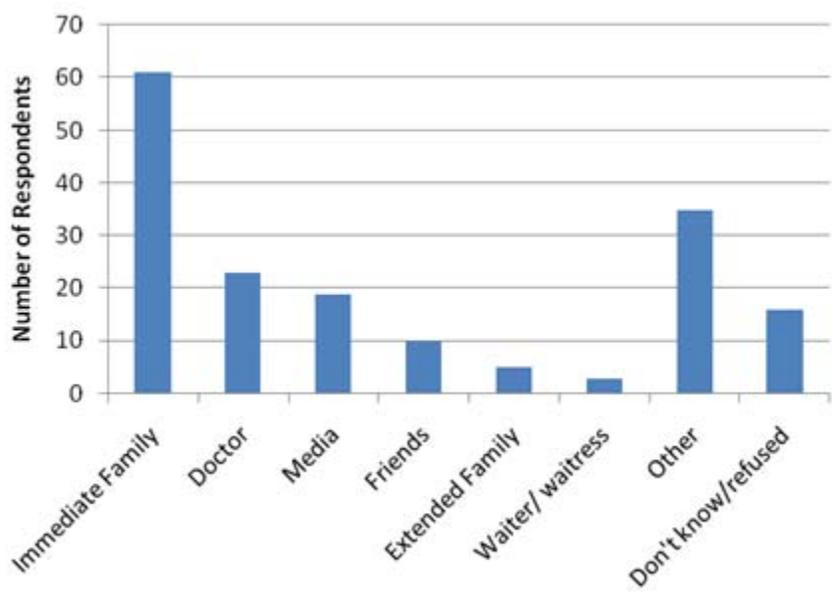


Figure 3-15. People who influence decisions on seafood consumption.

## CHAPTER 4 METHODS, THEORETICAL MODEL AND MODEL SPECIFICATIONS

### **Methods**

This research project consists of four parts: preliminary research, focus groups, telephone surveys, and data analysis. Initially, background research on seafood, consumers age 55 and older, and past studies involving focuses in health, economics, and demographics was conducted. This information was then used to aid in the creation of a moderator's guide (Appendix A) that was used to lead focus group studies in Miami-Dade, Palm Beach, and Hillsborough counties. These focus groups consisted of groups of 7 to 11 people with varying levels of fish and shellfish consumption. The results obtained from these focus groups were used to construct a telephone survey to facilitate a wider sampling in these counties. The final two steps involved conducting the telephone survey and analyzing the results through econometric modeling.

### **Theoretical Model**

Neoclassical economics is an approach to economics whose focal point is to establish price, outputs, and income distributions in markets through traditional demand and supply theory. Two general goals of this theory are to maximize the income-constrained utility of individuals while constraining cost and to maximize the cost-constrained profits of firms by employing available information and factors of production. They are formulated in accordance with rational choice theory which is the framework for understanding and modeling social and economic behavior. Further neoclassical demand theory states that demand is a function of information, own price, the prices of other goods, income, government rules and regulations, and other socio-economic and demographic variables (Perloff, 2004). It is the purpose of this study to use neoclassical theory and modeling to determine the factors that influence the demand for seafood amongst individuals aged 55 and above.

The demand for seafood was analyzed using two different approaches for collecting consumption data. In the first method the individual was simply asked whether or not to consume seafood, while the second was to record the frequency of respondent's consumption. The survey instrument used to collect the data for this research is discussed in depth in the previous chapter. The data collected from this telephone survey will be used to conduct a double hurdle model. The study first uses a probit analysis to determine the independent variables which influence a respondent's choice on whether or not to consume seafood (the dependent variable). As the second part of the double hurdle model a truncated tobit is used to determine the influences on the frequency of consumption for those respondents who do consume seafood. Many factors are used as explanatory variables to test their impact on seafood consumption and frequency of seafood consumption. These variables include information pertaining to the respondent's attitudes, perceptions and knowledge of seafood. In addition, socioeconomic, as well as, typical demographic questions will be asked to determine their impact, if any, on the dependent variables.

### **Probit Model**

Linear regression models, though popular, are often misused. These models can cause inaccurate statistical inferences when the endogenous variable is qualitative rather than continuous (Aldrich & Nelson, 1984). The regressand in the first part of this research is dichotomous because the answer can only be yes, the respondent does consume seafood, or no, the respondent does not consume seafood. This is not a continuous variable, but rather a discrete variable. In this case, another analytical model, such as a probit model, must be used.

Probit models estimate the probability of the binary dependent variable,  $y$ , which is dependent on  $k$  observable exogenous  $X$  values. These exogenous variables are assumed to account for the variation in the variable of probability ( $P$ ). It is also assumed that the data are

generated from a random sample size  $N$ , with the sample point  $i=1, \dots, N$  and that the observations are statistically independent from one another, negating serial correlation. In this research the independent variables are random and not fixed as in an experiment, although either is acceptable for a probit model. The model does require that there be no linear correlation between the  $X$  values, this implying that  $N > K$  or that the number of observations exceeds the explanatory variables. Also, variation must exist among the  $X$  variables and no two can be perfectly correlated (Aldrich & Nelson, 1984). The expected outcomes of the dependent variable are mutually exclusive and exhaustive.

Dummy variables are nominal scale variables used to classify data into mutually exclusive categories. In this research the first dependent variable is a dummy variable classified into two categories, the respondent does consume seafood or does not consume seafood. For the purpose of the probit model the dependent variables are recoded as  $Y=1$  if the respondent does consume seafood and  $Y=0$  if the respondent does not consume seafood (Gujarati, 2004).

$$y_i = \beta_1 + X_i' \beta_2 + \mu_i, \mu_i \sim \text{NID}(0, \sigma^2)$$

$$y_i = \beta_1 + X_i' \beta_2 + X_i' \beta_3 + \dots + X_i' \beta_7 + \mu_i, \mu_i \sim \text{NID}(0, \sigma^2)$$

In the probit model the dependent variable depends on an unobservable utility index also known as a latent variable  $I_i$ . This variable is determined by one or more explanatory variables. The larger the value of the index  $I_i$ , the greater the probability that  $Y$  takes on the value of one.

$$I = \beta_1 + \beta_2 X_i$$

$X_i$  would be the value of the  $i$ th observation for that specific independent variable. There is a critical level of the index  $I_i^*$  where if  $I_i$  exceeds  $I_i^*$  then  $Y=1$ . This threshold index is also not observable, but assumed to be normally distributed with the same mean and variance. Here the

standardized normal cumulative distribution function, CDF, can be used to compute the probability that  $I_i^*$  is less than or equal to  $I_i$ . (Gujarati, 2004)

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

Here  $P(Y = 1|X)$  refers to the probability of an even occurring given values of  $X$ . The standard normal variable is represented with  $Z_i$ , while  $F$  is the standard normal CDF.

Probit parameters are commonly estimated through the method of maximum likelihood, or MLE. The MLE is the estimation of the unknown parameters,  $\beta$ , so that the probability of observing the given  $Y$ 's is as great as possible. MLE involves nonlinear and asymptotically unbiased equations. As the sample size increases the bias factor moves toward zero, and as such, produces better results (Gujarati, 2004). In large sample sizes the MLE parameters are nonbiased (close to the true values), efficient, and normal (sampling distribution known and statistical testing possible) (Aldrich & Nelson, 1984). The likelihood function yields a probability between zero and one of observing a particular sample of  $Y$  if the estimate of  $b$  was the exact value of  $b$ .

$$L(Y|X, b) \equiv P(Y | X)$$

The object, therefore for maximum likelihood is to find the  $b$  value that gives the greatest probability.

$$L(Y | X, b) = \prod_{i=1}^N [\Phi(\Sigma \hat{b}_k X_{ik})]^{y_i} [1 - \Phi(\Sigma b_k X_{ik})]^{1-y_i}$$

It is now necessary to take the log of this equation.

$$\log L(Y|X, b) = \sum_{i=1}^N [Y_i \log P_i + (1 - Y_i) \log (1 - P_i)]$$

It is then possible to take the first derivative of the log likelihood function with respect to each coefficient  $b_k$  and set equal to zero to find the parameter estimates (Aldrich & Nelson, 1984).

The goodness of fit measure looks at how well the regression line fits a set of data. There will be positive and negative estimated  $\mu_i$ , however, it is hoped that these residuals are as close to the regression line as possible. The coefficient of determination  $R^2$  is a summary measure that tests the fit of the data to the regression line. This value shows the portion of variation in the regressand that is explained by the regressor and lies somewhere between zero (no relationship) and 1 (perfect fit) (Gujarati, 2004; Aldrich & Nelson, 1984).

### **Tobit**

The tobit model, created by Tobin (1958), is an extension of the probit model that is used to test whether or not certain demographic or socioeconomic variables have an effect on the dependent variable (Tobin, 1958). For the probit model the concern was for whether or not the individual consumed seafood. However, the second equation is used to see which variables affect the frequency of seafood consumption. Information is available about seafood consumers and non-seafood consumers; however, data on seafood consumption frequency was only collected from seafood consumers. This is known as a censored sample. To deal with this, two groups are defined,  $n_1$ , where people consumed seafood and data are therefore available on the regressand and  $n_2$ , where there is no information about frequency of consumption because the respondent did not consume seafood. The tobit model can be expressed by the following equation.

$$Y_i = \beta_1 + \beta_2 X_i + u_i \quad \text{if } RHS > 0$$

$$= 0 \quad \text{otherwise}$$

In the above equation RHS stands for right-hand side and additional X variables can be added to the model (Gujarati, 2004).

The nature of this research led to a large amount of ‘zero’ observations. This problem was observed in other seafood consumption studies as well (Keithly, 1985; Lin & Milon, 1993; Yen & Huang, 1996; House, Hanson, & Sureshwaran, U.S. Consumers: examining the Decision to Consume Oysters and the Decision of How Frequently to Consume Oysters, 2003). Fortunately, this can be solved through a truncated-at-zero tobit model. These zero observations cannot be treated as non-consumption observations due to the probability that the zero observations could represent infrequency of consumption or conscientious abstention, or other behavioral reasons. Any and all ‘zero’ observations, therefore, are truncated to deal with the problem.

The tobit model has a critical flaw for use in this research, however, in that the variable that increases the probability of consumption also increases the quantity or frequency of consumption at the same time. This is not, however, always true. An independent variable that affects the probability may or may not affect the frequency or may affect it in a contradictory manner. For this reason a typical tobit model cannot be used for this research. Instead a Double-Hurdle model is utilized.

### **Double-Hurdle Model**

In the double-hurdle model, first proposed by Cragg (1971), the probability of an event occurring is independent of the model to determine effects on quantity or frequency of consumption (Cragg, 1971). Many studies have used variations on the double hurdle model to analyze seafood consumption (Cheng & O. Capps, 1998; Yen & Huang, 1996; Lin & Milon, 1993; Drammeh, House, Sureshwaran, & Selassie, 2002; House, Hanson, & Sureshwaran, 2003). The standard double hurdle model created by Cragg (1971) is shown below:

Individuals  $i$ 's participation equation can be expressed as

$$d_i^* = z_i a + v_i \quad \text{with } d_i = 0 \text{ or } 1$$

Individuals  $i$ 's consumption equation can be expressed as

$$y_i^* = x_i \beta + u_i$$

Where  $y_i^*$  stands for the latent consumption decision, and  $d_i^*$  is a latent variable describing participation. The vectors of exogenous variables are  $z_i$  and  $x_i$  while  $a$  and  $\beta$  are parameter vectors. Random errors,  $u_i$  and  $v_i$ , are assumed to be independent and normally distributed as  $N(0, 1)$  and  $N(0, \sigma^2)$ , respectively.

The separate participation and consumption equations of the double-hurdle model are as follows:

$$y_i = \begin{cases} y_i^* , & \text{if } y_i^* > 0 \text{ and } d_i^* > 0 \\ =0 & \text{Otherwise} \end{cases}$$

The observed  $y_i$  explains the latent consumption  $y_i^*$ , only if  $y_i^* > 0$  and  $d_i^* > 0$  and is the conditional decision on whether or not to consume the product, seafood in this case.

The use of two equations in the double-hurdle model allows the two dependent variables to be determined separately. In this way the same independent variables can be used for both equations because they affect each differently. This is due to differences in parameter coefficients ( $\alpha$  and  $\beta$ ).

### **Model Specification**

The model used for this study is a Double-Hurdle model comprised of a probit model to determine probability of consumption and a truncated tobit to determine frequency of consumption. The probit model's dependent variable is whether or not the respondent consumes seafood (SEA1), while the dependent variable for the truncated tobit is the frequency of seafood consumption (TSFC). Both used various socioeconomic, demographic, index, and habit

variables as the independent variables. SAS and LIMDEP are used to compute these models.

Specification for the probit is as follows:

$$Y_{ki}^* = \beta_{k1}HILLS + \beta_{k2} PALMB + \beta_{k3}HETHCON + \beta_{k4} Q58_7 + \beta_{k5} Q58_10 + \beta_{k6}Q59_1 + \beta_{k7} Q59_4 + \beta_{k8}Q59_5 + \beta_{k9} Q59_8 + \beta_{k10} q59_11 + \beta_{k11}Q59_12 + \beta_{k12} Q59_13 + \beta_{k13}HABCHAN + \beta_{k14}KNSUST + \beta_{k15} YRFL2 + \beta_{k16} YRFL3 + \beta_{k17}EDU2 + \beta_{k18}EDU3 + \beta_{k19}EDU4 + \beta_{k20}AGE + \beta_{k21}BLACK + \beta_{k22}WHITE + \beta_{k23}HISP + \beta_{k24}MALE$$

$$Y = \begin{cases} 1 & \text{if they consume seafood} \\ 0 & \text{if they do not consume} \end{cases}$$

The specification for the truncated tobit model is as follows:

$$y_i = \begin{cases} Y_{ji}^* = \beta_{j1}HILLS + \beta_{j2}PALMB + \beta_{j3}RETSOME + \beta_{j4} RESTALL + \beta_{j5} FISHMARK + \beta_{j6}GROCSOME + \beta_{j7}GROCALL + \beta_{j8}FISHSHIP + \beta_{j9}FISHCAT + \beta_{j10}PREPHOME + \beta_{j11}NEWSEA + \beta_{j12}RES2 + \beta_{j13}RES3 + \beta_{j14}RES4 + \beta_{j15}RES5 + \beta_{j16}NOTIMP + \beta_{j17}NUETRL + \beta_{j18}YESIMP + \beta_{j19}CONFNOT + \beta_{j20}CONFYES + \beta_{j21}HETHCON + \beta_{j22}Q58_1 + \beta_{j23}Q58_7 + \beta_{j24}Q58_10 + \beta_{j25}Q59_1 + \beta_{j26}Q59_4 + \beta_{j27}Q_5 + \beta_{j28}Q59_6 + \beta_{j29}Q59_8 + \beta_{j30}Q59_11 + \beta_{j31}Q59_12 + \beta_{j32}Q59_13 + \beta_{j33}HABCHAN + \beta_{j34}KNSUST + \beta_{j35}YRFL2 + \beta_{j36}YRFL3 + \beta_{j37}EDU2 + \beta_{j38}EDU3 + \beta_{j39}EDU4 + \beta_{j40} AGE + \beta_{j41}BLACK + \beta_{j42}WHITE + \beta_{j43}HISP + \beta_{j44}MALE + \beta_{j45}LAMBDA \\ \text{if } y_{ji}^* > 0 \\ \text{if } y_{ji}^* \leq 0 \end{cases}$$

The variables are described in Table 4-1.

The model is expressed more simply below:

Frequency of Seafood Consumption = f(County, Influences, Trust, Location of Purchase,

Home preparation, Willingness to try new products,

Reasons for consumption, Importance of knowing source, confidence in seafood, health concerns, habits, Years in Florida, Education, Age, Race, Gender)

## **Expected Results**

### **Respondent's Choice to Consume Seafood**

The variables that are expected to have an effect on the decision to consume seafood include: health concerns, who influences the respondent and who the respondent trusts about seafood. These variables were chosen due to findings of past research and preliminary results of the focus groups and survey. It is believed that if an individual has health concerns associated with the consumption of seafood they will be less likely to be consumers of seafood. The last two variables that are believed to have a statistically significant effect on the decision to consume seafood involve the individuals who influence the consumption of seafood and the individuals the respondents trust to give them reliable information about seafood. It is not known how these variables will affect the decision to consume seafood, but it is reasonable to expect that they will have an impact on the respondent's decision.

### **Respondent's Frequency of Consumption**

It is expected that many more variables will affect the frequency of consumption than will affect the choice to consume seafood. It would be reasonable to assume that respondents who purchase seafood at fish markets or catch their own seafood consume seafood more frequently than those who do not. Also those who are confident in the safety of seafood are expected to consume seafood more frequently than those who are not confident in seafood's safety. It is expected that the more a person trusts and/or is influenced by other people when it comes to the consumption of seafood, the more frequently they will consume seafood. County of residence,

gender, and race are less likely to affect the consumption frequency. However, individuals who have changed their eating habits as they have gotten older will likely consume more seafood because it is assumed they are changing their habits for the better and thus eating healthier. It is also expected that if individuals are willing or able to prepare seafood at home, then they will consume seafood more frequently. Likewise, respondents willing to try new types of seafood are also expected to have a higher consumption rate.

Table 4-1. Explanation of variable coding.

<b>Variables</b>	<b>Explanation of Variable</b>
SEA1	Respondent Consumes Seafood
TSFC	Total Seafood Consumption
HILLS	Respondent lives in Hillsborough County
PALMB	Respondent lives in Palm Beach County
DADE	Respondent lives in Miami-Dade County
NINDEX	Nutrition Index
SFINDEX	Seafood Index
NPINDEX	Neophobia Index
RESTZERO	Consume zero percent of seafood at restaurants
RESTSOME	Consume some seafood at restaurants
RESTALL	Consume all seafood at restaurants
FISHZERO	Zero percent of seafood consumed was bought from fish markets or specialty stores
FISHSOME	Some seafood consumed was bought from fish markets or specialty stores
FISHALL	All seafood consumed was bought from fish markets or specialty stores
GROCZERO	Zero percent of seafood consumed was bought at grocery stores
CROCSOME	Some seafood consumed was bought at grocery stores
CROCALL	All seafood consumed was bought at grocery stores
SHIPZERO	Zero percent of seafood consumed was shipped to respondent
SHIPSOME	Some seafood consumed was shipped to respondent
SHIPALL	All seafood consumed was shipped to respondent
CATZERO	Zero percent of seafood consumed was caught by respondent
CATSOME	Some seafood consumed was caught by respondent
CATALL	All seafood consumed was caught by respondent
PREPHOME	Respondent prepares seafood at home
NEWSEA	Respondent was willing to try new types of seafood
RES1	Reason they consume seafood: health and safety
RES2	Reason they consume seafood: freshness
RES3	Reason they consume seafood: color, smell, appearance, flavor and taste
RES4	Reason they consume seafood: price
RES5	Reason they consume seafood: other
IMP_1	How important is it to know where seafood raised or caught: very unimportant
IMP_2	How important is it to know where seafood raised or caught: slightly unimportant
IMP_3	How important is it to know where seafood raised or caught: neither important nor unimportant
IMP_4	How important is it to know where seafood raised or caught: slightly important
IMP_5	How important is it to know where seafood raised or caught: very important
WVSF	Respondent believed that there is a difference between wild caught and farm raised
CONFNOT	Respondent was not confident in safety of seafood
CONFNEU	Respondent was neutral about seafood being safe
CONFYES	Respondent was confident in safety of seafood
HETHCON	Have health concerns with eating seafood

Table 4-1 Continued.

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BELHLTH	Believe health benefits exist from eating seafood
Q58_1	Who influences your decision to buy seafood: Immediate family
Q58_2	Who influences your decision to buy seafood: Friends
Q58_3	Who influences your decision to buy seafood: Extended family
Q58_4	Who influences your decision to buy seafood: Media
Q58_5	Who influences your decision to buy seafood: waiter/waitress
Q58_6	Who influences your decision to buy seafood: Other
Q58_7	Who influences your decision to buy seafood: Nobody
Q58_8	Who influences your decision to buy seafood: Don't Know
Q58_9	Who influences your decision to buy seafood: Refused
Q58_10	Who influences your decision to buy seafood: Myself
Q58_11	Who influences your decision to buy seafood: Doctor
Q59_1	Who do you trust to give information on seafood: Immediate family
Q59_2	Who do you trust to give information on seafood: Friends
Q59_3	Who do you trust to give information on seafood: Extended family
Q59_4	Who do you trust to give information on seafood: Media
Q59_5	Who do you trust to give information on seafood: Government, Universities, or Health agencies.
Q59_6	Who do you trust to give information on seafood: waiter/waitress
Q59_7	Who do you trust to give information on seafood: Other
Q59_8	Who do you trust to give information on seafood: Nobody
Q59_9	Who do you trust to give information on seafood: Don't know
Q59_10	Who do you trust to give information on seafood: Refused
Q59_11	Who do you trust to give information on seafood: Myself
Q59_12	Who do you trust to give information on seafood: Doctor
Q59_13	Who do you trust to give information on seafood: Grocer
HABCHAN	Eating habits have changed as gotten older
KNUST	They say they know what sustainable seafood is
YRFL1	Lived less than 31 years in Florida
YRFL2	Lived from 31 to 60 years in Florida
YRFL3	Lived over 61 years in Florida
EDU1	High school or GED
EDU2	Vocational or Technical College
EDU3	College degree
EDU4	Graduate or Professional school
AGE	Age of individual
BLACK	Identified themselves as black
WHITE	Identified themselves as White
OTHRACE	Identified themselves as some other race
HISP	Identified themselves as from Hispanic decent
MALE	Respondent was Male
FISHMARK	Do you Shop at fish markets

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Table 4-1 Continued.

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FISHSHIP	Do you have seafood shipped to you
FISHCAT	Do you catch your own seafood
NOTIMP	It is not important to know where my seafood was raised or caught
NUETRL	I do not care where my seafood has been raised or caught
YESIMP	It is important to know where my seafood was raised or caught

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## CHAPTER 5 EMPIRICAL MODEL

### **Probit Results**

The probit analysis examined the factors that influence a person's willingness to consume seafood and as such the dependent variable was whether or not the respondent consumed seafood. The study had 516 usable responses, 443 (or 86.7%) of which said they at least infrequently consumed seafood.

The results of the probit analysis were explanatory, with the model making correct predictions 88% of the time compared to the naïve prediction of 86.7%. The naïve prediction is how often you would be correct if you simply selected the most common outcome. The results of the probit analysis revealed interesting information (results shown in Table 5-1).

Variables are reported as statistically significant at a confidence level of 90% or greater. Table 5-1 lists all variables in the probit regression analysis and indicates whether they are statistically significant with a 90%, 95%, or 99% confidence level.

### **Demographics**

The regression results revealed that education, ethnicity, and number of years spent in Florida are all significant demographic variables in the decision to consume seafood. Education was the only demographic variable to have a positive effect on the consumption of seafood. The results showed that individuals with a vocational or technical school degree, college degree, and graduate degree were 5.61%, 6.74%, and 7.31% more likely to consume seafood than those individuals who had a High School diploma (or equivalent) or less. The other two demographic variables to have a statistically significant effect on the decision of whether or not to consume seafood both had negative effects. People who have lived in Florida 31 to 60 years are 5.74% less likely to consume seafood than those who have lived there for a shorter time period

(however, residence in Florida over 61 years was not significant). Similarly, those of Hispanic decent were 17.37% less likely to consume seafood than those of non-Hispanic descent. None of these variables were ones predicted to have a statistically significant impact on the decision to consume seafood.

The regression results also revealed that several demographic variables were not statistically significant to the decision to consume seafood. These variables were: county of residence, age (amongst 55 and above age group), race, and gender.

### **Influence/Trust**

In the survey, respondents were asked who influenced their decision to buy or consume seafood. Possible answers included immediate family, friends, extended family, media, waiter/waitress, nobody, myself and doctor. None of these variables had a statistically significant effect on the respondents' choice to consume seafood.

Respondents were also asked who they trust to give them information on seafood. Immediate family, friends, extended family, the media, government, waiter/waitress, nobody and myself were all insignificant to the decision to consume seafood. Doctor and grocer variables were statistically significant. People who said they trusted their grocer for information were 10.36% more likely to consume seafood, while those who trusted their doctors were 11.6% less likely to consume seafood.

### **Safety/Health**

None of the variables that deal with safety and health have any statistically significant impact on the decision of whether or not to buy or consume seafood. This was unexpected as it was predicted that individuals confident in the safety of seafood would be more likely to be seafood consumers. It is, however, consistent with a previous study of shellfish consumption (House, Hanson, & Sureshwaran, 2003).

## **Sustainability**

Knowledge of sustainability did not have an impact on the decision to consume seafood.

## **Tobit Results**

The second model investigated the decision of how often to consume seafood. Frequency of consumption was calculated by a series of three questions that asked the respondent how often they ate seafood for breakfast, lunch, and dinner. Any observations in which the individual did not consume seafood were truncated, leaving 447 usable observations. In addition, observations with missing information were dropped leaving 369 usable observations.

Table 5-2 shows the variables that were found to be statistically significant. The marginal effects were calculated as the amount the frequency of consumption would increase (or decrease if negative) compared to the base case. The conditional mean (base case for frequency of seafood consumption) in this model was 176 times per year. This is the average times a year the respondents of the study consumed seafood. A person who consumed seafood around 176 times a year is therefore an average seafood consumer.

Variables are reported as statistically significant when at a confidence level of 90% or greater. Table 5-2 lists all variables in the tobit regression analysis and reports whether they are statistically significant with a 90%, 95%, or 99% confidence level.

## **Demographics**

The regression analysis showed that the demographic variable pertaining to people who have lived in Florida more than 60 years had a statistically significant effect on the frequency of seafood consumption. This group consumed seafood 46 times less frequently per year (around 130 times a year) than those who have lived in Florida less time (or 26.1% less than the average yearly consumption).

Education and county of residence, on the other hand, did not have a statistically significant effect on the frequency of consumption. Likewise, age and gender were not statistically significant at or above a 90% confidence level.

An individual of Hispanic decent was likely to consume seafood 47 times more frequently per year than those of non-Hispanic decent. Thus, respondents of Hispanic decent are likely to consume seafood 176+47 or 223 times per year (26.7% more frequently than average). However, race did not have a significant effect on the frequency of consumption.

### **Influence/Trust**

In contrast with what was expected, the regression results indicated that none of the influence or trust variables had a statistically significant impact.

### **Safety/Health**

The only variable related to seafood safety and health behavior that was significant was whether or not an individual changed their eating habits as they aged. These individuals consumed seafood 207 times a year as opposed to the average of 176 times a year (17.6% more frequently than average).

### **Sustainability**

Knowledge of sustainability was not a statistically significant variable.

### **Source of Purchase**

Individuals who buy at least some of their seafood from grocery stores are likely to eat seafood 35 times per year more than those who do not buy seafood from grocery stores (19.9% more than average). This means they consume seafood 176+35 or 211 times per year. (The variable indicating that all of the respondent's seafood is bought at grocery stores was not significant.) When compared to those who do not catch some of their fish, those who do catch fish only consume seafood 122 times compared to the base of 176 times a year (30.7% less

frequently than average). (The variable indicating that the respondent catches all their seafood was not significant.) While these variables showed significance, other variables involved in seafood purchase location (such as restaurant or fish market purchases) were not significant. These results are contrary to previous studies which estimated that individuals who purchased seafood from fish markets would have higher consumption frequencies (Drammeh, House, Sureshwaran, & Selassie, 2002).

### **Seafood Consumption**

While the reason for consumption was not significant, the willingness to prepare seafood at home and to try new seafood did have statistically significant effects on the frequency of seafood consumption. Individuals who are willing to prepare seafood at home are likely to consume seafood 76 times more (43.2% more frequently) often than those who do not prepare seafood at home. If the respondent is willing to try new types of seafood their consumption frequency is 265 times a year, compared to the base of 176 times a year (50.6% more frequently). These results are congruent with expected results.

Table 5-1. Probit analysis results

PROBIT						
Variable	Coefficient	Std. Error	T-stat	P-value	Mean	Marginal Effect
Constant	0.8455	0.7330	1.1540	0.2487		0.1362
<b>DEMOGRAPHICS</b>						
Hillsborough County Resident	0.1437	0.2199	0.6530	0.5135	0.4225	0.0228
Palm Beach County Resident	0.1623	0.2295	0.7070	0.4795	0.3837	0.0255
Lived in FL 31-60 YRS**	-0.3443	0.1753	-1.9640	0.0495	0.4322	-0.0574
Lived in FL > 60 YRS	-0.0696	0.2789	-0.2490	0.8030	0.1298	-0.0116
Vocational or Technical College***	0.4071	0.2287	1.7800	0.0750	0.2151	0.0561
College Degree**	0.4898	0.2195	2.2310	0.0257	0.2558	0.0674
Graduate or Professional School**	0.6064	0.2852	2.1260	0.0335	0.1473	0.0731
Age	-0.0010	0.0082	-0.1200	0.9042	70.8101	-0.0002
Black	0.1072	0.3395	0.3160	0.7521	0.1221	0.0164
White	-0.1702	0.2521	-0.6750	0.4995	0.7636	-0.0258
Male	0.2723	0.1853	1.4700	0.1417	0.3062	0.0409
Hispanic *	-0.7831	0.2181	-3.5900	0.0003	0.1686	-0.1737
<b>INFLUENCE/TRUST</b>						
Influenced: Nobody	0.2378	0.1951	1.2190	0.2230	0.5194	0.0386
Influenced: Myself	0.2014	0.2373	0.8480	0.3962	0.2345	0.0302
Trust: Immediate family	0.2956	0.3013	0.9810	0.3265	0.0950	0.0404
Trust: Media	0.0561	0.2442	0.2300	0.8184	0.1667	0.0088
Trust: Government, Universities, or Health agencies	-0.0966	0.2734	-0.3530	0.7238	0.1066	-0.0164
Trust: Nobody	-0.1821	0.2332	-0.7810	0.4348	0.1570	-0.0319
Trust: Myself	0.2193	0.3770	0.5820	0.5608	0.0601	0.0309
Trust: Doctor***	-0.5358	0.3201	-1.6740	0.0942	0.0543	-0.1160
Trust: Grocer*	0.9533	0.3511	2.7150	0.0066	0.1822	0.1036
<b>SAFETY/HEALTH</b>						
Health Concerns with Seafood	-0.0435	0.1762	-0.2470	0.8048	0.3198	-0.0071
Habits Changed	0.2057	0.1761	1.1680	0.2429	0.7744	0.0355
<b>SUSTAINABILITY</b>						
Know what Sustainability is	0.0555	0.2695	0.2060	0.8369	0.1279	0.0087

(\*variable is significant with a 99% confidence level, \*\* variable is significant with a 95% confidence interval, \*\*\* variables is significant with a 90% confidence interval)

Table 5-2. Tobit analysis results.

<b>TOBIT</b>						
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T-stat</b>	<b>P-value</b>	<b>Mean</b>	<b>Marginal Effect</b>
Constant	-418.0948	180.3807	-2.3180	0.2050		-211.8132
<b>DEMOGRAPHICS</b>						
Hillsborough County Resident	-40.0082	39.9512	-1.0010	0.3166	0.4344	-20.2688
Palm Beach County Resident	52.0816	40.5337	1.2850	0.1988	0.4126	26.3853
Lived in FL 31-60 YRS	-6.7078	27.8079	-0.2410	0.8094	0.4071	-3.3983
Lived in FL > 60 YRS***	-91.4667	50.4350	-1.8140	0.0697	0.1202	-46.3384
Vocational or Technical College	-6.3816	36.9138	-0.1730	0.8627	0.2322	-3.2330
College Degree	37.2719	35.4469	1.0510	0.2930	0.2705	18.8825
Graduate or Professional School	30.5457	43.4547	0.7030	0.4821	0.1639	15.4749
Age	1.4762	1.4207	1.0390	0.2988	69.9481	0.7479
Black	3.4494	56.3639	0.0610	0.9512	0.1284	1.7475
White	-52.9012	44.8835	-1.1790	0.2386	0.7705	-26.8006
Hispanic**	92.4368	45.4112	2.0360	0.0418	0.1202	46.8299
Male	-23.5264	31.1821	-0.7540	0.4506	0.3279	-11.9188
<b>INFLUENCE/TRUST</b>						
Influence: Immediate Family	26.2661	53.6365	0.4900	0.6243	0.1066	13.3068
Influence: Nobody	-45.5016	42.0562	-1.0820	0.2793	0.5109	-23.0518
Influence: Myself	8.5747	47.0071	0.1820	0.8553	0.2568	4.3441
Trust: Immediate Family	-49.3663	49.6277	-0.9950	0.3199	0.1011	-25.0097
Trust: Media	-55.7032	38.2584	-1.4560	0.1454	0.1776	-28.2201
Trust: Government, Universities, or Health agencies	-44.9018	45.0202	-0.9970	0.3186	0.1202	-22.7480
Trust: Nobody	-5.6239	45.9239	-0.1220	0.9025	0.1202	-2.8492
Trust: Myself	-73.1903	58.5835	-1.2490	0.2115	0.0656	-37.0793
Trust: Doctor	24.7198	57.2298	0.4320	0.6654	0.0546	12.5234
Trust: Grocer	-23.2866	37.3710	-0.6230	0.5332	0.2104	-11.7973
Trust: Waiter/Waitress	-44.9018	45.0202	-0.9970	0.3186	0.1202	-22.7480
<b>SAFETY/HEALTH</b>						
Not Confident in Seafood Safety	64.1113	65.0888	0.9850	0.3246	0.1393	32.4798
Confident in Seafood Safety	60.9922	58.5149	1.0420	0.2973	0.7814	30.8996
Health Concerns with Seafood	-4.1220	29.2460	-0.1410	0.8879	0.3415	-2.0883
Habits Changed***	62.0925	33.8957	1.8320	0.0670	0.7760	31.4570
Important to know where seafood is caught or raised**	123.6527	50.4169	2.4530	0.0142	0.7322	62.6444
Not important to know where seafood is caught or raised	85.3464	56.3094	1.5160	0.1296	0.1639	43.2378
<b>SUSTAINABILITY</b>						
Know what Sustainability is	-6.4370	36.6987	-0.1750	0.8608	0.1448	-3.2611
<b>SEAFOOD ACQUISITION</b>						
Catch Seafood**	-107.0875	41.8454	-2.5590	0.0105	0.1557	-54.2522
Some Seafood Consumed in Restaurants	-15.9675	31.0174	-0.5150	0.6067	0.6257	-8.0894
All Seafood Consumed in Restaurants	32.0779	58.3778	0.5490	0.5827	0.0956	16.2511
Seafood bought at Fishmarkets	16.6742	31.1837	0.5350	0.5929	0.4617	8.4474
Some Seafood Bought at Grocery Stores***	69.7488	37.6135	1.8540	0.0637	0.5738	35.3358
All Seafood Bought at Grocery Stores	25.4127	45.9065	0.5540	0.5799	0.2131	12.8744
Seafood Shipped	62.1170	64.2929	0.9660	0.3340	0.0355	31.4694
<b>SEAFOOD CONSUMPTION</b>						
Prepare Seafood at Home*	149.0194	56.6300	2.6310	0.0085	0.8907	75.4955
Willing to Try New Seafood*	175.6044	33.4343	5.2520	0.0000	0.6639	88.9639
Reason for Consumption: Health and Safety	69.1442	66.0207	1.0470	0.2950	0.0683	35.0295
Reason for Consumption: Freshness	-5.7270	47.1474	-0.1210	0.9033	0.5574	-2.9014
Reason for Consumption: Color, Smell, Appearance, Flavor and Taste.	5.8657	53.3208	0.1100	0.9124	0.1858	2.9716
Reason for Consumption: Price	12.6015	61.5938	0.2050	0.8379	0.1038	6.3841

(\*variable is significant with a 99% confidence level, \*\* variable is significant with a 95% confidence interval, \*\*\* variables is significant with a 90% confidence interval)

## CHAPTER 6 CONCLUSIONS

### **Summary**

The purpose of this research was to discover the attitudes and perceptions of people 55 and older toward fish and shellfish. To accomplish this, focus groups were conducted in Miami-Dade, Palm Beach, and Hillsborough Counties. The results of these focus groups were then used to construct a telephone survey. The results showed that 86.7% of this age group does consume seafood and those who do, consume it an average 176 times per year. Regression analysis was performed to determine statistical significance of selected variables.

### **Discussion of Statistical Results**

The regression results for the demographic variables revealed that education, ethnicity, and number of years in Florida were all significant factors affecting seafood consumption and the level of that consumption. The results of this study were consistent with the findings of many similar studies which showed that education had a positive impact on whether or not the respondent was a seafood consumer (Senhui He, 2003). This result is likely due to their ability or propensity to seek out correct information due to their higher level of education. For instance, they may be more aware of the health benefits of seafood. In addition, higher education leads to higher paying jobs and therefore these individuals may simply be able to afford more seafood than those of lower incomes. These results led us to believe that income itself is also positively related to seafood consumption. This cannot be confirmed as income was excluded from the model due to the high percentage number of responses that were either refused or did not know, however it is supported by previous studies (Degner, 1995). The reasoning for this is probably the makeup of the respondent group, a large percentage of which was reluctant to reveal their

income level, or may not know how to answer the question as they are retired. The lack of responses led the regression results to be insignificant.

The variable indicating how long a person has lived in Florida did not behave in the manner expected. One could expect people living in Florida to increase their consumption the longer they live in Florida, or you might expect there to be no difference. However, results showed that individuals who have lived in Florida 31 to 60 years are less likely to consume seafood than those who have lived in Florida for a shorter time period. In addition, individuals who have resided in Florida 60 years or more consume less seafood. This is a result that cannot be explained and further research may be warranted.

Another interesting finding is that respondents of Hispanic decent were less likely to be seafood consumers than non-Hispanics, but likely to consume more seafood than average if they did consume seafood. This may be explained by the fact that many Hispanics do not include seafood as a primary part of their cultural diet. For example, Mexican Americans consume a diet composed mostly of corn, beans, chili peppers and tomatoes (Mitchel 2008). However, other Hispanics, such as Puerto Ricans, Dominicans, and Cubans (second largest subgroup of Hispanics in America), consume large amounts of fish due to the culture of island nations (Mitchel 2008). Therefore, it stands to reason that Hispanics in general may be less likely to consume seafood, but those who do, may consume it in large amounts. The results of the tobit analysis, however, contradicted a 1995 Florida Agricultural Marketing Research Center (FAMRC) report which showed that Hispanics had lower seafood consumption frequency than non-Hispanics. One potential explanation for the difference between the two studies might be the makeup of the Hispanic groups within each study. As this data was not collected, it is not possible to prove, however, it is an area for future research.

Two sets of variables that were largely found to be insignificant related to who the respondent trusted to get information about seafood from and who influenced their decision to purchase seafood. Among this group, only two variables were significant: trust in doctors and trust in grocers. People over the age of 55 who indicated they trust their doctor for information about seafood are significantly less likely to consume seafood as frequently as those who trusted “other” sources. These seafood consumers’ doctors may recommend the consumption of only certain species or to stay away from fried seafood, both of which could decrease their seafood consumption. Further research on doctor’s perceptions and recommendations about seafood would be useful to test this theory. Interestingly, individuals who trusted their grocer for information about seafood had a higher than average level of seafood consumptions. This suggests that a person that can trust the person selling seafood is be more likely to seek information or listen to recommendations to purchase seafood products.

Another category of variables that was studied relates to the location of purchase of seafood products. Individuals who buy at least some of their seafood from the grocery store consume seafood more frequently than those who do not buy seafood from the grocery store. This demonstrates that these individuals are heavy seafood consumers because they are willing to purchase their seafood from multiple locations and therefore have more opportunities to buy seafood. The results also indicated that if an individual catches some of his or her seafood he/she is likely a light seafood consumer. This, however, may be due to the fact that many of these individuals prefer only to consume seafood they have caught themselves, thus limiting the amount they eat.

Closely related to where a person purchases their seafood is whether or not the person prepares seafood at home and their willingness to try different seafood products. It is reasonable

that people who prepare seafood at home are heavy seafood consumers because they have more opportunities and less expense when consuming seafood than those who only eat seafood at restaurants. Additionally, individuals who are willing to try new seafood or seafood dishes consume seafood more often. This also makes sense as these people are more adventurous and less likely to get bored with limited seafood choices that are prepared the same way all the time.

Finally, after the focus groups, based on the large amount of people who talked about health and safety and the indication that safety is a factor for many people in the survey, the expectation was the individual's level of concern about safety and belief about health properties of seafood would be significant. However, this did not prove to be the case and all variables related to health concerns, safety and changing eating habits were insignificant.

### **Marketing Messages**

From the results of this research it is possible to suggest marketing messages and actions that could help the industry to improve sales to people 55 and above. Since over 86% of this population indicates they eat seafood, which is similar to studies of other age groups, it doesn't appear there is a 'prejudice' for or against seafood in this group in general. Also due to the high percentage of people who do eat seafood, resources should be spent on market penetration (targeting existing consumers) rather than market development (finding new consumers). This is supported by the 66% of non-consumers who said that nothing would convince them to consume seafood. Similarly, people who indicated a willingness to try new seafood products were likely to consume seafood more frequently than those who are not willing to try new seafood products. This indicates efforts in product development to this group would be successful in increasing consumption, not just in displacing other consumption.

Results show that there should be emphasis on nutrition and health benefits. Although the regression results did not show health factors as statistically significant in determining the

decision to consume seafood or the frequency of consumption, the survey and focus results demonstrated their importance. For example, 50% of respondents indicated they eat seafood because of nutrition and health, 36% indicated that promotion of health benefits would cause them to consume more seafood. Thus, the industry should focus advertising for consumers 55 and older on the nutritional aspects of seafood and the potential health benefits from the consumption of seafood. In addition, the significance of changing nutritional habits increasing seafood consumption showed that these consumers are consuming more seafood as they get older. This is most likely a result of the increase of nutritionally conscious eating habits. Many of the individuals in the focus groups were aware that seafood had health benefits, however, they generally did not have specifics and most were not aware of the central nervous system benefits that seafood can have. Continuing emphasis of seafood's health benefits is likely to be effective as the aging population becomes increasingly more concerned about nutrition. In addition, efforts need to be made to dispel incorrect information and hype about the risks of seafood. Many individuals did not consume more seafood because they were worried about the risks associated with the consumption of seafood. The disturbing factor was how many individuals had incorrect information about these risks. Therefore along with the promotion of health benefits it would be effective to work on dispelling risk factor myths and providing correct and easy to understand information about the risks associated with the consumption of seafood.

Although a large number of respondents did not know the meaning of sustainability, they did indicate a willingness to pay a premium for it once they were read the definition. Further information is needed about the costs of sustainable production, and the specific willingness to pay premium prices. However, the ability to market sustainable seafood appears to be an advantage. This fact may be used in future advertising campaigns to increase sales without

specials on pricing, or by changing consumption over to these higher priced items. However an education program would also be necessary to help the public understand sustainability, or use terms that are easier understand such as eco-friendly.

Many respondents in both the focus groups and the survey indicated they would consume more seafood if recipes (35% in survey) and preparation information (31% in survey) were available to them. It would therefore be advantageous to make recipes and preparation brochures available at the point of sale in grocery stores as well as information that could be made available through other outlets such as the Internet.

Finally 33% of respondents said that they would consume more seafood if they had knowledgeable seafood specialists to talk to. Training seafood sellers to be more knowledgeable could be a very expensive proposition. However, it may be worth investigating the possibility of having trained personnel visit grocery stores occasionally to talk with consumers and answer questions.

The results of this research show several opportunities for the industry to increase the frequency of consumption among this age group. More research is needed on the impacts of health, safety, influence, trust, and sustainability determine the effect they could have on future marketing promotions.

APPENDIX A  
FOCUS GROUP MODERATORS GUIDE

**MODERATOR'S GUIDE**  
**FOCUS GROUP INTERVIEW – SEAFOOD CONSUMPTION**

**FISH/SEAFOOD/ – 2007**  
**Location: Ft. Lauderdale, FL and Tampa, FL**

**Introduction**

**Have Participants sign release/waiver form.**

**Group process (explain) and purpose:** We are interested in a general discussion of nutrition, foods, specific food categories, how they are purchased and consumed, and various issues, concerns and perceptions you might have.

We are interested in talking with each of you because you have indicated an interest in the topic and answered the qualifying question indicating that you (don't) consume the food item of interest: Fish and Shellfish. We will ask a question or make a statement and then ask that you respond. I hope that everyone will feel comfortable and feel free to participate.

There is no particular order for the responses. There are no right or wrong answers to any of the questions. Each of you has a valid perspective that we ask you to share. For the sake of clarity, we do ask that you speak one at a time.

**Introduction of Focus Group participants** and others in attendance (name, age, occupation) – establishing rapport. (find out marital status and if they live in a home, apartment, retirement home

Fill out name cards: just first name and place in front of each participant for ease of identification.

**Objective of Focus Group**

**Exploratory Focus Groups:** these groups aid in the precise definition and understanding of the topic under investigation. Our primary purpose here is to understand the topic and to generate a useable questionnaire for later research.

**Goal:** to learn and understand the perceptions, knowledge, and preferences of people fifty five and older who purchase and consume seafood and other foods.

Focus groups are much more than mere question-answer interviews.

**“Ice Breaker” – Rapport building (5 minutes)**

**BEFORE WE PROCEED, LET'S TALK ABOUT FIRST IMPRESSIONS OF THE FOLLOWING WORDS (A WORD GAME), OR WHAT YOU THINK THEY MEAN:**

Fish	Farm-raised
Shellfish	Wild-caught
Catfish	Aquaculture
Finfish	Sustainable
Seafood	Organic

Processed

Fresh

## **DISCUSSION OF SEAFOOD AND FISH CONSUMPTION (Approximately 30 minutes)**

### **Fish:**

Seafood (from the ocean) – fish and other  
Fresh water fish (farm raised)  
Fresh water fish (wild-caught)

### **Are you the Primary Shopper for the household?**

If you are not who does the primary shopping?  
Does that influence the amount of seafood consumed by your household?

### **Consumption sites:**

Home or restaurant? Both?  
Occasions? Traditions?  
Prepared how? (Fried? Grilled? Baked/Broiled? Other?)  
When?  
How often do you eat fish? shellfish?

### **Forms of fish/Seafood consumed:**

Canned (Tuna) Do you see this as a Seafood?  
Caught Locally/Self caught  
Fillet  
Fresh  
Frozen  
Nuggets  
Steaks  
Whole

### **Types of Fish/Seafood**

Alligator	Oysters
Amberjacks	Pompano
Blue Crab	Porgies
Catfish	Shark
Clams	Shrimp
Flounder	Snapper
Golden Tile	Spanish Mackerel
Grouper	Spiny Lobster
Grunts	Stone Crab
Jack Crevalle	Swordfish
King Mackerel	Tilapia
Mahi Mahi	Tuna
Mullet	Whiting

### **Food/Nutrition/Concerns**

**What are you concerned about when buying and consuming fish and seafood?**

Quality?  
Freshness?  
Price  
Chemicals?  
Convenience?  
Taste?  
Flavor?  
Appearance?  
Sustainable?  
Local?  
Organic?

**Criteria: Most Important? Discussion**

Flavor  
Health (switching to fish from other protein choices)  
Cost  
Habit (Custom/Religion)  
Convenience  
Appearance  
Form: fresh, frozen, whole, fillet, nuggets  
Freshness  
Safety issues  
Packaging  
Other issues related? Any other?

**Factors that influence fish consumption:**

Price  
Processing (e.g., precooked, cleaned, frozen, fresh)  
Exposure/previous experience with preparing fish  
Knowledge of farm-raised concept  
Wild-caught  
Cultural or Religious affiliations (as influence)  
Seasonality  
Social groups (friends' tastes and preferences)  
Availability: at restaurants  
    What are your top three seafood restaurants?  
Availability: in grocery stores  
Availability: in fish markets  
    Where do you typically purchase seafood?  
Varieties available  
Relevant information: (e.g., recipes, benefits, image)  
Other

**NOW I WOULD LIKE TO KNOW SOMETHING ABOUT WHERE YOU ARE FROM? (10 min)**

**Do you visit Florida Seasonally?**

If so do you consume seafood more while you're in Florida?  
Does your consumption vary with season?

**If not how long have you lived in Florida?**

Where did you live before you moved to Florida?

Did your consumption of Seafood increase when you moved?

**FINALLY, DO YOU PAY ATTENTION TO WHERE YOUR FOOD COMES FROM? (10 min)**

Do you make your decision to buy based on the location the seafood was harvested from? Is country of origin important to you?

Do you consider Florida seafood to be better than other types of seafood?

Is this more or less important when ordering seafood in a restaurant?

Have you changed your eating habits substantially in the last 5 years? 10 years?

Has your seafood consumption changed in this time? If so, how?

Do you use the internet?

**GENERAL DISCUSSION OF FOODS, SOURCES, ISSUES, AND CONCERNS (GENERAL)**

[Approximately 15 minutes]: a brief discussion of “recent” issues and behaviors in food consumption; generally things that are considered in deciding, buying, preparing, or consuming various foods (ex: safety, chemicals, price, etc.)

Protein sources/Health concerns, for foods generally, and for meats, poultry and fish Brief discussion of meat/fish/poultry and other protein sources and the how’s and why’s of purchase and consumption: general concerns, issues, perceptions

Proportion of protein in diet?

Proportion of Meats (red?), Poultry, Fish/Seafood as protein sources?

**“Wrap-Up”**

**Thanks!**

Debriefing (What the information will be used for )

Questions, comments? Evaluation?

**Questionnaire completion (demographics, etc)**

APPENDIX B  
SURVEY

**Question Hello:** Hello, my name is \_\_\_\_\_. I'm calling from the University of Florida. (This is not a sales call.)

[Interviewer:press 1 to continue with survey  
press 3 to survey in Spanish  
press ctrl/end to terminate call

(int: this could be a partial complete. Please ask for the person we spoke to previously. Press 1 to continue)]

**Question Lang:** [Interviewer: you coded this survey as a \*Spanish\* case. If this is not correct, use mouse to click on back key in the lower left hand of the screen and re-code this case correctly. Do not press ctrl-end if this is a Spanish case

Interviewer: press 1 to continue with survey in Spanish  
press 2 to terminate call]

**Question ER:** The University is conducting research for the Florida Dept of Agriculture and Consumer Services on the attitudes of people age 55 and older toward SEAFOOD, (and your eating habits). (According to the research method being used by the university,) We need to speak to the person age 55 and older who buys most of the food for your household. (The reason we need to speak to the person (55 and older) who buys most of the food is only so that we can speak with the person who would best be able to answer our questions. We are not trying to sell anything.)

[Int: if person on phone says that food buying is shared equally among two or more people age 55 or older ask to speak with the one that is available now

Int: if there is at least one person in the household age 55 or older, but the person in the household that buys most of the food is under age 55, enter 3

Int: if er is not home schedule a call back

Int: do not read choices

1 er is on the phone

2 phone is passed to er

3 no one in the household is 55 or older or person who buys most of the food is under 55]

**Question Exit:** Thank you for your time, but we are only interviewing households that meet our selection criteria.

[Int: press any key to continue, case will be auto-coded as no one 55 or older \*\*leave note\*\*]

**Question Hello2:** Hello, my name is \_\_\_\_\_. I'm calling from the University of Florida. (This is not a sales call.) The University is conducting research for the Florida Dept of Agriculture and Consumer Services on the attitudes of people age 55 and older toward seafood, (and your eating habits). (According to the research method being used by the university,) We need to speak to the person age 55 and older who buys most of the food for your household. (The reason we need to speak to the person (55 and older) who buys most of the food is only so that we can speak with the person who would best be able to answer our questions. We are not trying to sell anything.)

[Int: do not read choices

1 ER is on the phone

2 Phone is passed to ER

3 No one in the household is 55 or older OR person who buys most of the food is under 55]

**Question Intro:** Your opinions are important to our research. Your identity and comments will remain confidential. You don't have to answer any question you don't want to. You don't have to participate in the survey. This should only take about 20 minutes. Is now a good time?

[Int: press 1 to continue]

**Question County:** Do you live in.

1 Hillsborough

2 Palm Beach

3 Dade (miami)

4 Or some other county

**Question Exit2:** Thank you for your time, but we are only interviewing households that meet our selection criteria.

[Int: press any key to continue, case will be auto-coded as wrong county. \*\*leave note\*\*]

**Question Sea:** We are conducting a survey about seafood consumption.

Do you eat seafood?

1 Yes

2 No

**Question Intro:** Your opinions are important to our producers, and your identity and comments will remain confidential. You don't have to participate in the survey, and you don't have to answer any question you don't want to. This should only take about 20 minutes. Is now a good time?

[Int: press any key to continue]

**Question Q2:** On a scale of 1 to 7 with 1 being none of the time and 7 being all of the time, indicate how much you engage in the following activities: reduce my sodium intake (One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q3:** On a scale of 1 to 7 with 1 being none of the time and 7 being all of the time, indicate how much you engage in the following activities: watch the amount of fat I consume (One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q4:** On a scale of 1 to 7 with 1 being none of the time and 7 being all of the time, indicate how much you engage in the following activities: moderate my sugar intake One is none of the time and seven is all of the time

-8 Don't know

-9 Refused

**Question Q5:** On a scale of 1 to 7 with 1 being none of the time and 7 being all of the time, indicate how much you engage in the following activities: moderate my red meat consumption (One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q6:** On a scale of 1 to 7 with 1 being none of the time and 7 being all of the time, indicate how much you engage in the following activities: cut back on snacks and treats

One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q7:** On a scale of 1 to 7 with 1 being none of the time and 7 being all of the time, indicate how much you engage in the following activities: avoid foods with additives and preservatives

(One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q8:** On a scale of 1 to 7 with 1 being strongly disagree and 7 being strongly agree, please answer the following three statements: I am knowledgeable about the nutritional aspects of seafood.

(One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q9:** On a scale of 1 to 7 with 1 being strongly disagree and 7 being strongly agree, please answer the following three statements: in general, I know a lot about seafood.

(One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q10:** On a scale of 1 to 7 with 1 being strongly disagree and 7 being strongly agree, please answer the following three statements: I am very interested in the seafood product category.

(One is none of the time and seven is all of the time)

-8 Don't know

-9 Refused

**Question Q11:** Please answer yes or no to the following statements: I am constantly sampling new and different foods

[Int: read choices if necessary]

1 Yes

2 No

-8 Don't know

-9 Refused

**Question Q12:** Please answer yes or no to the following statements: I don't trust new foods

[Int: read choices if necessary]

1 Yes

2 No

-8 Don't know

-9 Refused

**Question Q13:** Please answer yes or no to the following statements: If I don't know what a food is, I won't try it

[Int: read choices if necessary]

1 Yes

2 No

-8 Don't know

-9 Refused

**Question Q14:** Please answer yes or no to the following statements: I like foods from different cultures

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q15:** Please answer yes or no to the following statements: At dinner parties, I try new foods

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q16:** Please answer yes or no to the following statements: I am afraid to eat things I have never had before

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q17:** Please answer yes or no to the following statements: I am very particular about the foods I eat

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q18:** Please answer yes or no to the following statements: I like to try new ethnic restaurants

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q19:** For the purpose of this survey, seafood is any fish with fins or shellfish and can also include edible freshwater species. Examples of seafood include catfish, lox, canned tuna, salmon, oysters, crab, shrimp, and others.

How many times a week do you eat seafood for dinner?

- 1 Daily
- 2 4-6 times/week
- 3 2-3 times/week
- 4 1 time/week
- 5 2-3 times/month
- 6 1 time/month
- 7 Less than 1 time per month

- 8 Never
- 8 Don't know
- 9 Refused

**Question Q20:** How many times a week do you eat seafood for lunch?

[Int: read if necessary]

- 1 Daily
- 2 4-6 times/week
- 3 2-3 times/week
- 4 1 time/week
- 5 2-3 times/month
- 6 1 time/month
- 7 Less than 1 time per month
- 8 Never
- 8 Don't know
- 9 Refused

**Question Q21:** How many times a week do you eat seafood for breakfast?

[Int: read if necessary]

- 1 Daily
- 2 4-6 times/week
- 3 2-3 times/week
- 4 1 time/week
- 5 2-3 times/month
- 6 1 time/month
- 7 Less than 1 time per month
- 8 Never
- 8 Don't know
- 9 Refused

**Question Q22:** Of the last ten times you ate seafood, how many were at restaurants or were take home from a restaurant?

- (0-10)
- 8 Don't know
- 9 Refused

**Question Q23:** Of the last ten times you ate seafood, how many times did you purchase the seafood from a fish market or specialty store?

(Please do NOT include grocery stores.)

- (0-10)
- 8 Don't know
- 9 Refused

**Question Q23A:** Why do you purchase seafood at a fish market or specialty store instead of the grocery store?

- Quality
- Wider seafood selection
- Freshness
- Price
- Can get the size, shape or cut I want
- Other (Please specify)

Refused  
Don't know

**Question Q24:** Of the last ten times you ate seafood, how many times did you purchase the seafood from a grocery store?

(0-10)  
-8 Don't know  
-9 Refused

**Question Q24A:** When shopping at the grocery store do you buy?

Frozen seafood  
Fresh seafood  
Prepared seafood  
Other (Please specify)  
Don't know  
Refused

**Question Q25:** Of the last ten times you ate seafood, how many times did you purchase the seafood and have it shipped to your home?

(0-10)  
-8 Don't know  
-9 Refused

**Question Q26:** Of the last ten times you ate seafood, how many times did you catch the seafood yourself?

(0-10)  
-8 Don't know  
-9 Refused

**Question Q27:** Do you prepare seafood at home?

[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q27A:** Why not?

[Int: do not read choices]

Don't like the smell  
Don't know how  
Takes too much time  
Tradition, habit, I grew up NOT eating seafood at home  
Costs too much  
Other (Please specify)  
Don't know  
Refused

**Question Q28:** What types of shellfish do you eat?

[Int: do not read choices]

Shrimp  
Crab  
Lobster  
Oysters

Clams  
Scallops  
Crawfish  
Other (Please specify)  
None  
Don't know  
Refused

**Question Q29:** Besides shellfish, what other types of fish do you eat?

[Int: do not read choices]

Bass  
Catfish  
Cod  
Flounder/sole  
Grouper  
Halibut  
Mahi mahi  
Pollock  
Salmon  
Sardines  
Seabass  
Snapper  
Squid/calamari  
Tuna  
Tilapia  
Other (Please specify)  
None  
Don't know  
Refused

**Question Q30:** How is the seafood you eat prepared?

[Int: read choices if necessary]

Baked  
Boiled  
Broiled  
Grilled  
Fried  
Raw  
Smoked  
Steamed  
Other (Please specify)  
Don't know  
Refused

**Question Q31:** Are you willing to try new types of seafood that you have not previously eaten?

[Int: read choices if necessary]

1 Yes  
2 No

-8 Don't know

-9 Refused

**Question Q32:** What are the main reasons you eat seafood?

[Int: do not read choices]

Tradition, habit, I grew up eating it.

Flavor or taste

Price

Health/nutrition

Add variety to diet

Religious beliefs

Other (Please specify)

Don't know

Refused

**Question Q33:** When you are selecting seafood to purchase, what is the ONE most important thing that you consider?

[Int: read choices if necessary]

1 Health reasons

2 Safety

3 Freshness

4 Smell

5 Color or Appearance

6 Flavor or Taste

7 Price or cost

8 Availability, how hard it is to get at the store

9 Location of origin

10 Tradition, habit, I grew up eating it

11 Farm-raised

12 Wild-caught

13 Convenience

14 Religion

15 Know how to prepare

16 Seasonality, time of the year

17 Other (Please specify)

18 None of these

-8 Don't know

-9 Refused

**Question Q34:** What other things do you consider?

[Int: read choices if necessary]

Health reasons

Safety

Freshness

Smell

Color or Appearance

Flavor or Taste

Price or cost

Availability, how hard it is to get at the store

Location of origin  
Tradition, habit, I grew up eating it  
Farm-raised  
Wild-caught  
Convenience  
Religion  
Know how to prepare  
Seasonality, time of the year  
Don't know  
Refused  
Other (Please Specify)

**Question Q35:** Do you purchase seafood if you do not know where it was raised or caught?  
[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q36:** How important is it for you to know where your seafood was raised or caught?

1 Very unimportant  
2 Slightly unimportant  
3 Neither important nor unimportant  
4 Slightly important  
5 Very important  
-8 Don't know  
-9 Refused

**Question Q37**

How important is it for you to know your seafood was raised or caught in Florida waters?  
[Int: read choices if necessary]

1 Very unimportant  
2 Slightly unimportant  
3 Neither important nor unimportant  
4 Slightly important  
5 Very important  
-8 Don't know  
-9 Refused

**Question Q38:** Is there a difference in taste between wild-caught and farm-raised seafood?  
[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q39:** Which do you prefer, wild-caught or farm-raised fish, or no preference?  
[Int: read choices if necessary]

1 Wild-Caught  
2 Farm-Raised  
3 No preference (prefer equally)

-8 Don't Know

-9 Refused

**Question Q40:** How confident are you in the safety of seafood you purchase?

1 Very unconfident

2 Slightly unconfident

3 Neither confident nor unconfident

4 Slightly confident

5 Very confident

-8 Don't know

-9 Refused

**Question Q41:** How confident are you in the safety of seafood raised in Florida?

[Int: read choices if necessary]

1 Very unconfident

2 Slightly unconfident

3 Neither confident nor unconfident

4 Slightly confident

5 Very confident

-8 Don't know

-9 Refused

**Question Q42:** Which of the following would increase your consumption of seafood:

Recipes

Information about preparing seafood

TV commercials

Talking with a seafood specialist at your local store

Packaging

Promotion of health advantages

Other (Please specify)

None of the above [Int: do not read]

Don't know

Refused

**Question Q43:** Why don't you buy or eat seafood?

[Int: do not read choices]

Safety

Texture

Smell

Color/Appearance

Flavor/Taste

Price or cost

Availability

Custom or Habit

Religion

Don't know how to prepare

Too time consuming to prepare

Traumatic experience (got sick, bone stuck in the throat, etc.)

Allergy

Health/nutrition

Other (Please specify)  
Don't know  
Refused

**Question Q44:** Is there anything that would entice you to eat seafood?

[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q45:** What would lead you to eat seafood?

Lower price  
Changes in safety standards  
Having Recipes  
Other (Please specify)  
Don't know  
Refused

**Question Q46:** Are you concerned with the safety of seafood?

[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q47:** What one type of fish or shellfish do you believe is the safest one to consume?

[Int: read choices if necessary]

1 Shrimp	14 Mahi mahi
2 Crab	15 Pollock
3 Lobster	16 Salmon
4 Oysters	17 Sardines
5 Clams	18 Seabass
6 Scallops	19 Snapper
7 Crawfish	20 Squid
8 Bass	21 Tilapia
9 Catfish	22 Tuna
10 Cod	23 Other (Please specify)
11 Flounder/sole	24 All are safe (INT: DO NOT READ)
12 Grouper	25 All are unsafe (INT: DO NOT READ)
13 Halibut	-8 Don't know
-9 Refused	

**Question Q48:** What one type of fish or shellfish do you believe is the least safe to consume?

[Int: read choices if necessary]

1 Shrimp	14 Mahi mahi
2 Crab	15 Pollock
3 Lobster	16 Salmon
4 Oysters	17 Sardines
5 Clams	18 Seabass
6 Scallops	19 Snapper

- 7 Crawfish
- 8 Bass
- 9 Catfish
- 10 Cod
- 11 Flounder/sole
- 12 Grouper
- 13 Halibut
- 9 Refused
- 20 Squid
- 21 Tilapia
- 22 Tuna
- 23 Other (Please specify)
- 24 All are safe (INT: DO NOT READ)
- 25 All are unsafe (INT: DO NOT READ)
- 8 Don't know

**Question Q49:** Do you eat oysters:

- Raw
- Cooked
- Don't eat oysters
- Don't know
- Refused

**Question Q50:** Why do you not eat raw oysters?

[Int: do not read choices]

- 1 Medical advice by doctor
- 2 Personal safety concern
- 3 Not readily available
- 4 No appetite for oysters
- 5 Other (Please specify)
- 8 Don't know
- 9 Refused

**Question Q51:** Would you eat raw oysters more often if health and safety concerns were reduced or eliminated?

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q52:** Are you aware of any new processing methods for oysters that keep the taste of raw oysters but reduce the health risk?

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q53:** Do you have any health concerns about eating seafood other than oysters?

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q54:** What health concerns do you have associated with eating seafood?

[Int: do not read choices]

- General safety

Iodine  
Mercury  
Selenium  
Food poisoning  
Neurological problems in children  
Sodium bisulfate  
Phosphates  
Bacteria or vibrio or oyster bacteria or vibriovulnificus  
Worms  
Other (Please specify)  
Don't know  
Refused

**Question Q55:** Do you think there are health benefits from eating seafood?

[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q56:** What health benefits do you expect from eating seafood?

[Int: do not read choices]

Cholesterol  
Cardiovascular/heart  
Brain  
Low fat content  
More nutritious  
Easy to digest  
Other (Please specify)  
Don't know  
Refused

**Question Q57:** How do you get your information about seafood?

[Int: do not read choices]

TV  
Newspaper  
Magazines  
Internet  
Word of mouth  
From family  
Other (Please specify)  
Don't get information  
Don't know  
Refused

**Question Q58:** Who influences your decision on whether or not to eat seafood?

[Int: do not read choices]

Parents, siblings, children, brothers, sisters, immediate family  
Friends  
Extended family - inlaws, aunts, uncles, cousins, grandparents

Media  
Waiter/waitress  
Other (Please specify)  
Nobody  
Don't know  
Refused

**Question Q59:** Who do you trust to give you reliable information about seafood?

[Int: do not read choices]

Parents, siblings, children, brothers, sisters, immediate family  
Friends  
Extended family - inlaws, aunts, uncles, cousins, grandparents  
Media  
Government  
Waiter/waitress  
Other (Please specify)  
Nobody  
Don't know  
Refused

**Question Q60:** Have your eating habits changed as you have gotten older?

[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q61:** How have your eating habits changed?

[Int: press 1 to record answer verbatim]

-8 Don't know  
-9 Refused

**Question Q62:** Do you know what sustainable seafood is?

[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q63:** Would you pay extra to have sustainable seafood?

[Int: read choices if necessary]

1 Yes  
2 No  
-8 Don't know  
-9 Refused

**Question Q64:** Sustainable Seafood is the practice of keeping fisheries and the fish they raise healthy and productive through management and responsible harvesting. Knowing this would you pay extra for it?

[Int: read choices if necessary]

1 Yes  
2 No

- 8 Don't know
- 9 Refused

**Question Q65:** If having sustainable seafood were an added cost, do you believe there should be federal funding to support it?

[Int: read choices if necessary]

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

**Question Q66:** What advice would you give the seafood industry to improve marketing efforts?

[Int: press 1 to record answer verbatim]

- 8 Don't know
- 9 Refused

**Question Q67:** How many years have you lived in Florida?

[Int: if under one year enter 0]

- 8 Don't know
- 9 Refused

**Question Q67A:** What state (or country) did you come from?

[Int: press 1 to record answer verbatim]

- 8 Don't know
- 9 Refused

**Question Q68:** Including yourself, how many adults age 55 or older live in your household?

- 8 Don't know
- 9 Refused

**Question Q69:** What is the highest level of education that you have completed?

[Int: read choices if necessary]

- 1 8th grade or less
- 2 Some high school
- 3 High school graduate or GED
- 4 Some Technical or Vocational School
- 5 Vocational or Technical certificate or license
- 6 Some College, but no degree
- 7 Associate's degree
- 8 Bachelor's degree
- 9 Some Graduate or Professional School
- 10 Graduate or Professional degree
- 8 Don't know
- 9 Refused

**Question Q70:** In what year were you born?

[Int: enter four digit year]

- 8 Don't know
- 9 Refused

**Question Q71:** Just for statistical purposes, please tell me your family's total yearly income before taxes. As I read a list, stop me when I get to the income level that best describes your household income in 2007/(Before Taxes)

[Int: read choices. Stop when respondent indicates answer]

- 1 less than \$10,000
- 2 \$10,000 to \$19,999
- 3 \$20,000 to \$29,999
- 4 \$30,000 to \$39,999
- 5 \$40,000 to \$49,999
- 6 \$50,000 to \$59,999
- 7 \$60,000 to \$79,999
- 8 \$80,000 to \$99,999
- 9 \$100,000 to \$150,000
- 10 Over \$150,000
- 8 Don't Know
- 9 Refused

**Question Q72:** What is your race?

[Int: read choices if necessary]

- Black / African American
- White
- Asian
- American Indian / Aleut
- Other (Please specify)
- Don't know
- Refused

**Question Q73:** Would you say that you are of Hispanic ancestry or not?

[Int: read choices if necessary]

- 1 Yes (Hispanic or Latino)
- 2 No (Not Hispanic or Latino)
- 8 Don't know
- 9 Refused

**Question Q74:** [Int: record gender of resp. Ask if you don't know:]I have to ask, are you male or female?

- 1 Male
- 2 Female
- 8 Don't know
- 9 Refused

**Question END:** That completes our survey. Thank you very much for your time. Press g to complete

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## BIOGRAPHICAL SKETCH

I wasn't exactly born to be an agricultural economist, nor did I wake up one night and realize it was my life's ambition. My path to becoming an agricultural economist was subtle and has taken the majority of my life so far. I grew up in the city, went to school in the city, and made my friends in the city. My school did not have 4-H and most of my friends had never seen a cow. Even though it was in the city that I gained my formal education, it was in the country where I gained my heart.

My grandfather was a dentist and a cowboy. He was a regular man, with regular dreams, a loving heart, and crazy spirit; to me he was simply Far Far (the term for dad's dad in Swedish). Of all my family I think, I am most like him and I miss him dearly. He too grew up in the city but he gave me something he never had and that was a country home. Long ago, before I was born, he had a crazy idea: he was going to be cowboy. (He did look good in cowboy hats after all.) I don't know if it was a lifelong dream, if he grew up playing cowboy, or if it was a dream he found later; in life but it was a dream and one he was determined to see through.

So he purchased about 700 acres in the middle of no-where (that was then, now its not so in the middle of no-where as people slowly encroach on even the most deserted places, but then it could have been on the moon for all the civilization the area possessed.) He named his dream "Circle O Citrus" and it became both a citrus operation and a limousine cattle ranch. He never lived there full time: as with many dreams, he had to work to support his, and so he continued to work as a dentist, spending time down on the ranch whenever possible. When he retired, he spent even more time down there. While he never lived there full-time that was where his heart was, down among the citrus, cattle, and cyprus trees. And that is were I grew to know him best.

Ever since I can remember, my very city family would pack up and drive down to the farm. My dad would play cowboy, my mom would become as country as Dixie chicken, and my

sister and I would run around with wild abandon, children of nature. I never felt more myself than when I spent time down on that ranch and it is still the place my heart calls home.

When I entered high school, the undercurrent of problems that dwelled in my family became a raging river and life as I knew it would never be the same. But as everything I ever knew changed and people I thought I could always rely on let me down, the one thing that never changed, never let me down was Circle O. It was there that I gained the first tendrils of agricultural knowledge.

When I entered college, I started as a business major, simply because it was what my father told me to do. Although I was good at it, it never struck a chord or inspired me. It simply was; I simply was! I tried to combine it with something I loved and therefore I started a dual degree in business and animal science but it still wasn't exactly the right fit. In all this time, I never lost my love and passion for the farm. I still went to it whenever I could. One day an advisor in the Animal Science Department, knowing how much the ranch inspired me and my need to find that passion at school, put me in touch with someone in the Food and Resource Economics Department (FRED). I never knew it existed: I never knew there was even such a thing as a degree based on agricultural business and I never knew that that was where I belonged. It did not take me long, however, to find out. I transferred over to FRED and have been happy there ever since. The teachers gave me knowledge and advice, the students gave me companionship and competition, and the department gave me structure and stability. It became my second home; one combining both my innate business skills and my love of everything agricultural.

After I finished my undergraduate degree, I wasn't ready to stop learning; I wasn't ready to give up my academic home. I took the next logical step for someone who is both willing to learn more and disinclined to enter the mysterious "real world." I applied for the Master of

Agribusiness program. While I admit it may have started partly because of my reluctance to get a real job, it has evolved into a quest to understand why people do what they do, why the economy works as it does, and how exactly these two interact. And as I learned more I wanted to know more, so I worked hard and I did well. That would be the end of the story except for a certain professor and the National Needs Fellowship I received. This fellowship, while helping to finance my education and allowing me to travel to conferences, provided an unexpected friendship with a professor in the department who became my supervisory committee chair: Dr. Lisa House. As I worked closely with her, I realized an important thing: I loved her job!

I loved the research, I loved finding answers to questions, but could I do the teaching part? I didn't know. So I took the opportunity to teach Introduction to Economics for Non-Majors. It wasn't easy and I made mistakes, but I did it. I, the girl who before had trouble giving in-class presentations, managed to get up in front of thirty students twice a week and lecture. And so I made the decision that I would work to become a professor of agricultural economics and that is what leads me here this moment writing this essay. It's been a long road, and not always an easy one. I would not change a thing, however, because it's the sum of these experiences that has made me who I am and led me to where I am.

After all this time, the place that gave me a footing into the world of agriculture is still there! I can no longer expect to see my grandfather waving as I turn around the barn. Time has taken its toll on the land, barns, and tractor. The citrus trees are older and we no longer raise purebred Limousin, but the essence is the same. In the end, even though Circle O has changed, it still remains part home, part dream, and all heart.