MULTI-LEVEL INFLUENCES ON SEAFOOD CONSUMPTION AMONG SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM PARTICIPANTS IN NEW ORLEANS, LOUISIANA

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# DEDICATION

"Children have never been very good at listening to their elders, but they have never failed to imitate them." – James Baldwin

I am dedicating this dissertation to my son, Cyril Causey. You blessed me with your presence during this doctoral program, and while it was challenging balancing everything, I vowed not to give up. I want you to know the road ahead may not be easy, but you can do anything you set out to accomplish. I see your brilliance – and do not ever let anyone dim your bright light.

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#### ABSTRACT

## TRACI CAUSEY

# MULTI-LEVEL INFLUENCES ON SEAFOOD CONSUMPTION AMONG SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM PARTICIPANTS IN NEW ORLEANS, LOUISIANA

## MAY 2023

Seafood is a lean, nutrient dense protein source that is recommended for weekly consumption based on the benefits for human health, yet only 10% of Americans meet the recommendation. The purpose of this study was to explore social-ecological factors associated with seafood consumption among Supplemental Nutrition Assistance Program (SNAP) participants in New Orleans, Louisiana using a quantitative cross-sectional research design and survey instrument. Results showed only 50% of study participants (N = 238) consumed at least two weekly servings of seafood. Logistic regression analyses were conducted to assess the relationship between participants' sociodemographics characteristics, knowledge of the health and environmental benefits of seafood, social support and group norms, and the influence of policies, public health campaigns, and media and seafood consumption. Race (p = .037, OR= .371) and children in household (p = .007, OR = .565) were statistically significant sociodemographic characteristics. Relative to the participants' knowledge of the health and environmental benefits of seafood, the model was not statistically significant,  $\chi^2(1) = .000$ , p =1.00, Nagelkerke  $R^2 = .000$ . Families that consume seafood (p < .001, OR = 3.694) and local New Orleans culture (p = .008, OR = 1.962) were significant intrapersonal predictors. At the societal level, the significant predictors included awareness of seafood-related policies and messaging through Eat Fit Nola (p < .001) and an unawareness through LiveWell Louisiana (p =.030), SNAP-Ed (p = .005), family/friends (p = .015), and social media (p = .039).

Crosstabulations using Pearson's chi-square and Cramer's V tests were conducted to examine participants' perceptions relative to 15 statements and the influence of accessibility, availability, and cost and seafood consumption. There was a significant relationship between the statement "I worry about mercury when eating seafood" and seafood consumption,  $\chi^2(1) = 6.183$ , p = .013, Cramer's V = .191. There was no statistically significant relationship between all other factors. Based on the findings from this study, comprehensive health promotion and education is needed to address low levels of seafood consumption among SNAP participants. Further exploration is needed to understand the potential role of family engagement to increase seafood consumption.

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## CHAPTER I

# INTRODUCTION

Heart disease is the primary cause of death in the United States, disproportionately affecting racial and ethnic minority groups and low-socioeconomic status (SES) populations (Centers for Disease Control and Prevention [CDC], 2020; Graham, 2015). Heart disease risks include uncontrollable factors such as age, race and ethnicity, and genetics. However, individuals can modify their behaviors to reduce the risk of heart disease. Approximately one in three Americans experience the key risk factors of heart disease, including high blood pressure, high cholesterol, and smoking (CDC, 2019). Increased saturated fat, trans fat, cholesterol, and sodium intake correlate with high blood pressure, heart disease, and other conditions. To reduce the risk of heart disease, individuals can engage in certain lifestyle choices, such as consuming healthy foods and beverages, regularly exercising, and quitting smoking. Healthy dietary habits are critical to reducing the risk of heart disease and other chronic diseases.

To explore how diet impacts noncommunicable disease prevalence, Micha et al. (2017) focused on 10 dietary factors and mortality from heart disease, diabetes, and stroke among U.S. adults. Their study was a comparative risk assessment over 10 years using data from the National Health and Nutrition Examination Surveys. The results showed an increased correlation between cardiometabolic deaths and excess sodium intake, insufficient nut and seed intake, high processed meat intake, and low seafood intake (Micha et al., 2017). Although scholars have studied fruit, vegetable, nut, and whole grain consumption in the United States, there is limited research on the factors in seafood consumption among Americans.

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#### **Seafood Consumption**

Seafood, including fish and shellfish, is a lean protein with essential health and nutritional benefits. Most seafood contains B vitamins and vitamin D, iron, zinc, choline, and long-chain omega-3 fatty acids, specifically docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA; U.S. Department of Agriculture [USDA] & U.S. Department of Health and Human Services [DHHS], 2020). Humans do not produce adequate amounts of omega-3 fatty acids, and DHA and EPA are primarily derived from marine sources (Hosomi et al., 2012; Mozaffarian & Rimm, 2006), such as seafood and dietary supplements. Good sources of omega-3 fatty acids include fatty fish, such as salmon and trout; Pacific oysters; sardines; and anchovies (Hosomi et al., 2012; USDA & DHHS, 2020).

Despite abundant seafood options and nutritional guidance regarding recommended intake, approximately 90% of Americans do not consume 8 ounces (the equivalent of two servings) of seafood weekly as suggested in the Dietary Guidelines for Americans (DGA; Terry et al., 2018; USDA & DHHS, 2020). On average, Americans consume 16.1 pounds of seafood annually (USDA Food & Nutrition Service [FNS], 2020). In comparison, the average per capita consumptions of beef, poultry, and pork are 54.3, 108.6, and 50.9 pounds, respectively.

Seafood has health benefits across the human lifespan (Dietary Guidelines Advisory Committee [DGAC], 2020). The U.S. Food and Drug Administration (FDA) recommends that women who are pregnant or breastfeeding or who might become pregnant eat a minimum of 8 to 12 ounces (or 2 to 3 servings) of seafood low in methylmercury weekly to support fetal growth and brain and eye development before birth and in early infancy for breastfed infants (Quam & Casavale, 2017). The 2020 USDA and DHHS DGAC suggested introducing seafood high in omega-3 fatty acids to infants as early as 6 months (DGAC, 2020). In addition to DGA recommendations for regular seafood consumption by the general public, the 2020–2025 DGA recommendations indicate that infants and toddlers should consume 2 to 3 ounces of seafood low in methylmercury weekly (USDA & DHHS, 2020).

Researchers and prominent organizations like the American Heart Association have similar recommendations as the DGA. The American Heart Association suggests that Americans eat one to two servings of nonfried seafood weekly for heart health (Rimm et al., 2018) and showed seafood beneficial for individuals with or seeking to prevent heart disease (Van Horn et al., 2016). The risk of heart disease drops by 36% with two seafood servings weekly (Mozaffarian & Rimm, 2006). In addition to heart health, seafood is also beneficial for mental health, respiratory health, and cognitive development (Hosomi et al., 2012; Li et al., 2016; Mozaffarian & Rimm, 2006).

Despite recognition of seafood's health benefits, seafood remains a controversial and complicated subject for many consumers (Hicks et al., 2008). Unlike beef, poultry, and pork, a wide variety of seafood species are available for human consumption. There are over 1,000 available species of seafood, wild-versus-farmed options, import and export considerations, and environmental effects. Excluding food allergies, factors impacting low seafood consumption include consumer messaging, confidence in purchasing and preparing seafood, affordability, perceptions, and acceptability (Bloomingdale et al., 2010; Hicks et al., 2008; Oken et al., 2012; Pieniak et al., 2010; Uchida et al., 2017).

### The Supplemental Nutrition Assistance Program and Seafood

Members of low-SES populations often have poor dietary practices due to economic hardships and barriers to accessing and affording healthy foods and beverages (Drewnowski, 2009; Schultz et al., 2018). Individuals and families of low SES often rely on federal nutrition assistance programs to purchase food and beverages. However, researchers, policymakers, and health advocates have debated whether federal nutrition assistance programs contribute to health or poor dietary behaviors (Pomeranz & Chriqui, 2015).

The Supplemental Nutrition Assistance Program (SNAP), formerly the Food Stamp Program, is a safety net program administered by the USDA FNS (USDA FNS; 2021c) that provides eligible individuals and families with monetary benefits for food and beverages. Individuals must apply for SNAP in the state where they reside and meet the eligibility criteria, such as residency or citizenship requirements, categorical eligibility or set income limits, work requirements, and other nonfinancial standards. Categorical eligibility enables individuals to qualify for SNAP based on their participation in other assistance programs, such as Supplemental Security Income or Temporary Assistance for Needy Families. Otherwise, an applicant must show proof of a household income at or below 130% of the federal poverty level (USDA, 2021c).

The purpose of SNAP is to help individuals and families supplement their monthly food budgets. The program does not cover food expenses for an entire month; however, in some cases, individuals and families rely solely on the monthly benefits to purchase food (Gearing et al., 2021). Although SNAP benefits have outlined restrictions, participants can purchase allowable foods based on preference and retailer availability. Allowable foods under SNAP fall under the following staple food categories (USDA FNS, 2021a):

- Fruits and vegetables
- Meat, poultry, and fish
- Dairy products
- Bread and cereals

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- Snack foods
- Nonalcoholic beverages

Participants can also use their SNAP benefits to purchase seeds and plants that produce food for consumption (USDA FNS, 2020). Participants cannot purchase vitamins or supplements, pet food, or dry goods. Live animals are not allowable purchases, except for shellfish such as lobster, crabs, clams, and mussels. Although legislators have debated whether to set restrictions regarding the purpose of seafood, such as lobster, which some consider a luxury food item (Pomeranz & Chriqui, 2015), no restrictions are in place currently.

According to the USDA FNS (2021b), there are approximately 246,000 SNAP store locations in the United States. Authorized SNAP retailers must meet one of two USDA standards for selling staple foods (USDA FNS, 2021a). Criterion A, which focuses on staple food inventory, requires retailers to stock at least three staple food varieties from each category and provide perishable foods from at least three categories. Focused on staple food sales, Criterion B requires retailers to ensure that 50% of their gross profits come from staple foods. Staple foods are not prepared, heated, or accessory foods. However, several states provide waivers enabling participants to purchase hot and prepared foods with SNAP benefits following natural disasters, including the COVID-19 pandemic (USDA FNS, 2021a).

The DGAC (2020) found the lowest seafood consumption exists among low-SES populations. Most large grocery stores provide canned, fresh, and frozen seafood, which are allowable SNAP purchases (USDA FNS, 2021a). Convenience and small stores often have seafood cans or pouches and frozen seafood. A USDA expenditure report showed that meat/poultry/fish was the most common food category among participants in SNAP (Garasky et al., 2016). However, in the top 100 commodities purchased, seafood appeared twice on the list

with low rankings. Shrimp ranked 76 out of the 100 reported commodities, and canned seafood ranked 81 out of 100. The top purchases from the meat/poultry/fish category were chicken (fresh and frozen), lunch meat, bacon, dinner and breakfast sausage, beef and pork loins, and hot dogs; these foods also fell within the top 50 commodities by expenditure (Garasky et al., 2016). Processed foods such as lunch meat, sausage, and hot dogs have more saturated fat and sodium than seafood (USDA & DHHS, 2020).

# **Statement of the Problem**

Louisiana consistently ranks low in terms of health outcomes compared to other states. According to America's Health Rankings, Louisiana ranked 50th of 50 states in 2022 (United Health Foundation, 2022). Notable challenges contributing to poor health outcomes in the state include high economic hardship, high premature death, and high physical inactivity (United Health Foundation, 2022). Economic hardship and physical inactivity are risk factors for heart disease (CDC, 2019).

In New Orleans, the most populous city in Louisiana, health disparities and poor health outcomes remain significant concerns. In the early 21st century, Orleans Parish, one of the largest regions in New Orleans proper, ranked 60th in health status out of the 64 state parishes; however, the area has gradually improved to rank 32nd among other parishes (New Orleans Health Department, 2013, 2019). Orleans Parish has an estimated population of 391,000, which is racially and ethnically diverse, consisting of 71% people of color, 58% of whom are Black or African American (U. S. Census Bureau, 2019). Approximately 20% of the residents are under 18, 59% are 18 to 64, and 15% are over 65 (U. S. Census Bureau, 2019). The city's aging population is significantly affected by poverty and health concerns.

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New Orleans has the highest poverty rate in the United States, with over a quarter of residents living in poverty (New Orleans Health Department, 2019). The median household income is approximately \$37,000, nearly \$23,000 less than the national median household income. The minimum wage in the state is \$7.25 per hour (U.S. Department of Labor, 2021). With approximately 44% of households in New Orleans cost-burdened (New Orleans Health Department, 2019), low wages present obstacles to building wealth and economic stability in Louisiana.

Despite the concerning economic challenges in New Orleans, there have been positive shifts in educational attainment. Approximately 37% of New Orleans residents have bachelor's degrees or higher (New Orleans Health Department, 2019). Even with increasing educational attainment, the city's SES remains low and poor health outcomes remain a concern. Economic stability is a significant influence on quality of life, as it impacts the ability to afford basic needs such as housing and food, stress, and mental health—all of which are health determinants.

In New Orleans, heart disease and cancer are the leading causes of death across gender and race (New Orleans Health Department, 2019). An estimated 32% of adult residents in Orleans Parish are obese and 12% have diabetes. Approximately 22% of the population is food insecure and relies on federal nutrition assistance. The 2017 Community Health Survey administered by the New Orleans Health Department showed the many factors contribute to health disparities in New Orleans, such as crime and violence, limited health care access, poorly built environments, food insecurity, racial inequities, economic instability, and a lack of access to information. These factors impact individuals' health behaviors and the community's health status. According to data in the Community Health Survey report, respondents reported mental health, cancer, obesity, high blood pressure, and diabetes as their top health concerns (New Orleans Health Department, 2019). The health and nutritional benefits of seafood, particularly fatty fish, could address some of the top health concerns of New Orleans residents. Regular seafood consumption according to the recommendation in the DGA and provided by the American Heart Association could be a positive dietary behavior contributing to improved heart health and reduced risk of chronic disease.

## Sound the Alarm: Concerns With Toxins in Seafood

The health and nutritional benefits associated with seafood are a positive component of this protein source; however, there is a negative component that is necessary to consider, which is the toxins associated with seafood. Seafood toxicity and the implications for human health have sparked the interest of global health organizations, researchers, and media outlets to further examine and discuss the health effects regarding seafood consumption. Seafood has several toxins, with mercury being the most common and concerning. Mercury, a highly reactive heavy metal, enters water sources in an inorganic form, where microorganisms convert it to organic methylmercury (MeHg; Hong et al., 2012). Fish and shellfish absorb MeHg from their food and water intake, and humans ingest mercury when they consume seafood. MeHg is consumed throughout the marine food chain, and large predatory fish with long lifespans, such as king mackerel, sharks, swordfish, and tilefish, tend to have the highest MeHg levels (Hong et al., 2012; International Programme on Chemical Safety, 1990). According to the list of commonly consumed seafood published by the National Fisheries Institute, which is based on data derived from the National Oceanic and Atmospheric Administration (NOAA), consumption of large predatory fish is not common among Americans (National Fisheries Institute, 2021; National Marine Fisheries Service, 2021). However, there is also a need to consider the small and medium-sized, commonly consumed seafood species that absorb MeHg, especially for children

and pregnant women. The Environmental Protection Agency (EPA), FDA, DGAC, and other public health organizations have addressed MeHg's adverse effects on human health and safe seafood consumption.

Research shows that fear of toxicity continues to impact seafood consumption despite its health benefits (Sun et al., 2021). Researchers have sought to understand the correlation between seafood consumption, MeHg blood levels, and health. Sun et al. (2021) evaluated the association of MeHg blood levels with seafood consumption and all-cause and CVD-related mortality among U.S. adults. MeHg exposure among Americans was comparable to the low levels in Central Europe and significantly lower than in European countries with high fish intake. Sun et al. (2021) concluded that seafood consumption at current consumption levels and mercury intake did not correlate with risk of all-cause and CVD-related mortality among U.S. adults, indicating no need to revise dietary guidelines for the general public.

An additional concern in New Orleans is the environmental impact of the Deepwater Horizon oil spill that occurred in April 2010. The Deepwater Horizon oil spill, the largest offshore oil spill in U.S. history, filled the Gulf of Mexico with approximately 134 million gallons of oil, causing the death of thousands of marine lifeforms (Wallace et al., 2017). Oil contamination in the Gulf of Mexico also resulted in federally mandated fishery closures across the Gulf Coast, including Louisiana, Mississippi, Alabama, and Florida (Gohlke et al., 2011). The oil spill caused catastrophic damage to marine habitat, health, and the marine food chain (Gohlke et al., 2011; Wallace et al., 2017). Additionally, the chemicals in the oil and the dispersant used to break up the oil on the sea's surface presented significant concerns for seafood safety (Graham, 2015). The Deepwater Horizon oil spill made residents question the safety of consuming seafood from the Gulf of Mexico. Over the course of several years, seafood was assessed to assess toxin levels across the Gulf Coast, and the U.S. FDA deemed seafood safe for consumption (Graham, 2015).

Despite federal oversight of the reopening of Gulf Coast fisheries and research on the safety of eating seafood, skepticism about consumption after the oil spill remains. According to Greiner et al. (2013), a contributing factor to consumer concerns was how the media addressed the oil spill. Although the media enables the quick and widespread delivery of public health messages, news coverage can include extreme views and biases. After the Deepwater Horizon incident, Greiner et al. examined media coverage of the oil spill related to seafood safety and risk. After analyzing 315 news articles, Greiner et al. found that the news did not have a public health lens and varied in delivery. Approximately 72% of the articles in the sample focused on the health risks of seafood consumption, and only 9% addressed how to avoid consumption-related risks; none included the benefits of eating seafood. Greiner et al. indicated the need to consider prevention at the individual and policy levels to educate consumers on seafood safety effectively, so they do not avoid the protein source completely.

#### **Purpose of the Study**

The purpose of this study was to explore how the factors in the socio-ecological model (SEM) influence seafood consumption among SNAP participants. The goals were to gain insight into (a) the participants' seafood knowledge, perceptions, and practices; (b) societal and environmental influences; and (c) opportunities to improve intake. A quantitative, cross-section research design and survey instrumentation were utilized for the study.

## **Research Questions and Hypotheses**

The overarching research question was to understand how the SEM of health behavior indicates seafood consumption among SNAP participants. The following research questions and hypotheses were evaluated:

RQ1: What is the frequency of seafood consumption among SNAP participants?

RQ2: What are the barriers and motivators of seafood consumption among participants? Specifically:

- How do sociodemographic characteristics influence seafood consumption?
- How does knowledge about seafood's health and environmental benefits influence consumption?
- How do participants' perceptions of seafood influence consumption?

Hypothesis 2a: There will be no relationship between sociodemographic factors and participants' weekly seafood consumption.

Hypothesis 2b: There will be no relationship between participants' knowledge about the health and environmental benefits of seafood and their weekly seafood consumption.

Hypothesis 2c: There will be a relationship between participants' perceptions of seafood and their weekly seafood consumption.

RQ3: How do social influences impact seafood consumption among SNAP participants? Specifically:

- Does social support, such as family, friends, and colleagues, impact weekly seafood consumption?
- Do group norms influence weekly seafood consumption?

Hypothesis 3a: There will be a relationship between social support and participants' weekly seafood consumption.

Hypothesis 3b: There will be a relationship between group norms and participants' weekly seafood consumption.

RQ4: What role do environmental factors such as accessibility, availability, and cost of seafood have in weekly seafood consumption among SNAP participants?

Hypothesis 4a: There will be a relationship between the accessibility of seafood and participants' weekly seafood consumption.

Hypothesis 4b: There will be a relationship between the availability of seafood and participants' weekly seafood consumption.

Hypothesis 4c: There will be a relationship between the cost of seafood and participants' weekly seafood consumption.

RQ5: How do nutrition policies, media, and public health campaigns influence seafood consumption among SNAP participants?

Hypothesis 5: There will be a relationship between nutrition policies, media, and public health campaigns and participants' weekly seafood consumption.

## **Delimitations**

- The participants will have active SNAP enrollment.
- The participants will be New Orleans residents (Orleans Parish).
- The participants will be 18 or older.

# Limitations

• This study will focus on a low-income population; therefore, there could be lower response rates due to limited computer or smartphone access for survey completion.

- The modifications to the validated instruments used in this study have not been tested, which could impact internal validity.
- The survey data will reflect the participants' self-reported knowledge, perceptions, and practices related to seafood. Therefore, the data could reflect self-reporting and recall bias, resulting in limited external validity.

#### Assumptions

- The participants will read, write, and understand English.
- The participants will have active SNAP enrollment.
- The participants will answer the survey accurately and honestly.

# Definitions

Aquaculture (farmed seafood): The breeding, raising, and harvesting of fish, shellfish, and aquatic plants (NOAA, 2021).

Food insecurity: A household-level economic and social condition of limited or uncertain access to adequate food (Economic Research Service, 2022)

Seafood: Fresh or saltwater finfish; crustaceans; and other aquatic animal life other than birds or mammals, such as alligators, frogs, aquatic turtles, jellyfish, sea cucumbers, sea urchins, and the roe of such animals, and all mollusks intended for human consumption (U.S. Food and Drug Administration, 2022).

Socioeconomic status (SES): The social standing or class of an individual or group.

Education, income, and occupation indicate SES (American Psychological Association, n.d.).

Supplemental Nutrition Assistance Program (SNAP): A federal program that provides monthly benefits so eligible individuals from low-income households can buy the food necessary for good health (USDA, 2021).

Wild-caught seafood: Fish or shellfish caught from a natural habitat such as a lake, ocean, or river (Marine Stewardship Council, n.d.).

#### **Importance of Study**

Seafood is integral to New Orleans culture and cuisine; however, the commonly consumed types of seafood (e.g., crawfish and oysters) and preparation methods (e.g., boiled and fried) used often do not contribute to good health. Additionally, seafood costs more than other meats. The extent to which residents with low SES in New Orleans incorporate seafood into their diets remains unknown. Finding ways to increase seafood consumption requires understanding the social-ecological factors associated with seafood. Most research to date on seafood consumption and the influencing factors have been international. In the United States, there has been limited research on the influences of seafood consumption, particularly among consumers of low SES. A search for literature on seafood consumption among SNAP participants in New Orleans returned no studies. Although there were several studies on seafood consumption among populations in Louisiana, they differed in focus and did not include SNAP participants in New Orleans (Drewery et al., 2016; Lincoln et al., 2010; Simon-Friedt et al., 2016; Yen et al., 1995; Zilversmit et al., 2017).

This study could fill the knowledge gap on seafood consumption motivators and barriers among low-income populations. This study could contribute to the research on seafood consumption among SNAP participants in the coastal United States, the factors associated with seafood consumption among SNAP participants across various levels of the SEM, and opportunities to improve seafood consumption. Additionally, the findings could provide valuable information for researchers and public health educators regarding the multilevel influences impacting seafood consumption. Future scholars could use the results to focus on other lowincome groups, the public, and seafood intake.

### CHAPTER II

## LITERATURE REVIEW

#### Introduction

Seafood is a lean protein recommended for consumption due to its positive effects on human health and key nutrients, such as vitamins, minerals, and omega-3 fatty acids. Omega-3 fatty acids are an essential polyunsaturated fat in seafood that the human body cannot produce (DGAC, 2020). Seafood such as salmon, trout, herring, tuna, and mackerel contains omega-3 fatty acids (USDA & DHHS, 2020). Due to the anti-inflammatory properties, individuals who consume omega-3 fatty acids can reduce their risk of dying from heart disease by 30% to 50% (Mozaffarian & Rimm, 2006). Consuming seafood at least twice a week correlates with reduced cardiac deaths among individuals with and without cardiovascular issues (Rimm et al., 2018).

The seafood available for purchase varies across the country, with local varieties within or near particular geographical locations determining the fresh seafood available to consumers. Like fresh seafood, frozen varieties vary based on geography and production. Just as fresh and frozen seafood varieties differ nationwide, so do prices. Canned seafood options, such as canned tuna, salmon, oysters, and sardines, are widely available and tend to be less expensive than fresh.

Dietary behaviors are multifaceted. In addition to the complexity of seafood as a protein source, consumer consumption varies across socio-ecological levels. This literature review includes research on the socio-ecological influences on seafood consumption, particularly seafood knowledge, perceptions, and practices.

#### **Literature Search Strategy**

Searches occurred on Academic Search Complete, EBSCOHost, PubMed, and ScienceDirect from January 2021 through February 2022 with the following search terms: attitudes, beliefs, disparities, federal nutrition assistance, fish, food consumption, heart disease, heart health, knowledge, perceptions, practices, seafood, seafood consumption, Supplemental Nutrition Assistance Program, and socio-ecological model. A review of the references in the peer-reviewed articles also occurred for relevant sources. Searches on the CDC, USDA, NOAA, Healthy Eating Research, Food Research & Action Center, Louisiana.gov, and Nola.gov websites provided additional data on heart disease and its risk factors, federal nutrition assistance programs, and statistics for Louisiana and New Orleans.

The selection criteria for peer-reviewed journal articles were publications in English and full-text publications from 2011 to the present; also included were studies older than 10 years relevant to the proposed study. The articles in this review focused on the following topics: (a) seafood consumption determinants; (b) seafood consumption and heart health; and (c) seafood knowledge, perceptions, and practices. This review includes articles on SEM and its applications to health and dietary behaviors.

#### **Application of a Theoretical Model**

Scholars have used several theoretical models to determine and understand the influences on health and dietary behaviors (Conner et al., 2002). The widely used theory of planned behavior (TPB) was a framework used to focus on consumer behaviors related to seafood (Verbeke & Vackier, 2005). The TPB, an extension of the theory of reasoned action, suggests that individuals behave based on their will (Ajzen, 2015). A core TPB component is behavioral intention, meaning that attitude influences intentions. TPB has six constructs: behavioral intention, attitudes toward the behavior, subjective norms, social norms, perceived power, and perceived behavioral control (Ajzen, 2015). Although scholars have used the TPB to research health and dietary behaviors, a limitation of the theory is its indication that individuals inherently have the resources needed to engage in the desired behavior (Conner et al., 2002). Additionally, the TPB does not account for the economic and environmental factors that could influence behavior. There is a need to consider how communities, organizations, and policies can influence an individual's health behaviors. Schultz et al. (2018) indicated the importance of a multilevel approach to reducing health disparities and targeting health behaviors to reduce cardiovascular risk factors. Therefore, understanding and implementing effective strategies requires considering societal, community, interpersonal, and intrapersonal influences.

Researchers have used ecological models for decades to guide research and inform health promotion programming (Sallis & Owen, 2015). The five principles for ecological perspectives on health behavior are: (a) there are multiple levels of influence, (b) environmental contexts are significant determinants of health behaviors, (c) influences on behaviors interact across levels, (d) ecological models should be behavior-specific, and (e) multilevel interventions should be the most effective in changing behavior. Unlike behavioral models that focus primarily on individual and social influences, ecological models also address environmental and policy considerations. All levels of influence are important to holistically understand the drivers of health behaviors. Although their multilevel approach is beneficial, Sallis and Owen (2015) also noted the following as weaknesses of ecological models: the most influential variables and processes might not be identified for each level; a poor understanding of the degree to which influences vary; and feasibility to intervene for each level. A major strength of ecological models is that they are a framework for applying other theories and models to approach study designs and interventions comprehensively.

## **Socio-Ecological Model**

Developed by Bronfenbrenner in the 1970s, the SEM remains widely used in public health to understand the interactions within and across multiple levels for certain health conditions or problems (Golden & Earp, 2012; Kilanowski, 2017). In its most basic form, the SEM focuses on individuals and how their environments impact health outcomes. Bronfenbrenner's initial model presented the individual as a central focus surrounded by hierarchical systems of influence (Kilanowski, 2017). Bronfenbrenner focused on the microsystem, mesosystem, exosystem, macrosystem, and chonosystem. Among the many adaptations of the SEM framework, all models include a hierarchal assessment of factors influencing behavior (Golden & Earp, 2012). Figure 1 presents the CDC's adaptation of Bronfenbrenner's ecological framework for health promotion.

# Figure 1





*Note.* From *The Social-Ecological Model: A Framework for Prevention* [Online image], by the Centers for Disease Control and Prevention, 2022.

(https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html). In the public domain.

SEM adaptations often include overlapping, interconnected layers of influence.

Researchers and health educators can use the SEM to determine the intersection of levels and their influence on behaviors and health outcomes. In the CDC's (2022) SEM, the outermost societal level includes the broad factors (e.g., norms and health, economic, educational, and social policies) that influence individual health outcomes. The community level includes the settings or environments that affect health, such as where individuals live, work, worship, and play. The relationship (interpersonal) level focuses on support from family, friends, and social circles. The individual (intrapersonal) level includes personal factors, such as demographic information, knowledge, attitudes, beliefs, and personality traits (CDC, 2022).

## **Societal Level**

Federal, state, and local policies can impact the environments in which people interact and influence health (Osypuk et al., 2014). Policies can be positive or negative reinforcement for health-related choices. For example, many states have policies or laws for reducing sugarsweetened beverage consumption and caloric intake from sources with minimum nutritional value to promote healthy behaviors (Pomeranz & Chriqui, 2015). Additional societal-level influences include economic and educational impacts, social and cultural norms, and media and marketing.

#### **Dietary Guidelines**

The DGA, a public resource published by the USDA and DHHS every 5 years, presents nutritional recommendations for Americans. Officials from government entities and other organizations use the DGA to serve the general public by tailoring health and nutrition-related messaging for specific populations and designing health promotion programs. The DGA presents information on the nutrients necessary for promoting health and preventing diet-related diseases (USDA & DHHS, 2020). The 2020–2025 DGA has the following recommended pillars:

- A healthy diet pattern across the lifespan
- Customized nutrient-dense food and beverage choices based on personal preferences, budget, and cultural beliefs and norms
- Consumption of nutrient-dense foods and beverages to meet food group needs and caloric limits
- Moderate consumption of foods and beverages with higher added sugar, saturated fat, and sodium

According to the DGA, individuals should eat seafood across the lifespans for omega-3 fatty acids and other nutritional benefits (USDA & DHHS, 2020). Earlier DGA publications included seafood consumption recommendations, but the 2020–2025 DGA includes seafood recommendations for infants and toddlers. The general population should eat at least 8 ounces of seafood weekly and take at least 250 mg of omega-3 fatty acids daily. Pregnant or breastfeeding women should eat at least 8 to 12 ounces of seafood weekly for omega-3 fatty acids and docosahexaenoic acid to improve infant health outcomes (Drewery et al., 2016; USDA & DHHS, 2020), and infants and toddlers up to 2 years should consume 2 to 3 ounces of seafood weekly (USDA & DHHS, 2020). Other USDA branches, such as the USDA FNS, and other health and nutrition-related organizations align with the DGA's seafood guidance and other nutritional guidelines for programs and services.

# SNAP and the Thrifty Food Plan

A low-cost model food plan, the Thrifty Food Plan (TFP) is the means of determining SNAP benefit allocations. USDA officials replaced the Economy Food Plan with the TFP in 1975 to estimate the minimal costs of a healthy diet for a family of four (USDA FNS, 2021c). The length between plan reevaluations (in 1983, 1999, 2006, and 2021) has been a concern because nutritional science, food prices, and consumption patterns change over time. Thus, a directive in the 2018 Farm Bill now requires reevaluating the TFP every 5 years.

The TFP presents low-cost food plans based on evidence-based nutritional guidance, nutrient and caloric intake, the food group recommendations in the DGA, current food prices, and consumption patterns. The food cost calculation for a family of four includes an adult man and woman, ages 20–50, and two children, ages 6–8 and 9–11 (USDA FNS, 2021c). The TFP presents food plans as market baskets: 15 unique meal plans based on nutrient needs. Each market basket includes varying amounts of food and beverages and their associated costs.

The TFP reevaluation report presented seafood as a subgroup and the most expensive of protein foods (USDA FNS, 2021c). The seafood guidance in the Healthy U.S.-Style Dietary Pattern from the 2020–2025 DGA was the framework used to build the market baskets. Due to seafood consumption patterns below the recommended amount, the USDA TFP market baskets include seafood quantities that enable Americans to meet the recommendation. The expanded seafood recommendation is to consume 8 to 10 ounces weekly across the lifespan, at additional expense (\$12.80 in the 2021 TFP). As a result, the market baskets include economical seafood choices. The low-cost seafood options in the 2021 TFP include canned tuna; canned mackerel; fish sticks, patties, or nuggets; cod; haddock; tilapia; catfish; whiting; restructured seafood; sardines; and squid (USDA FNS, 2021c).

## Messaging and Health Promotion

The Supplemental Nutrition Assistance Program Education (SNAP-Ed), a USDA nutrition education program, provides education for users to learn to cost-effectively use their

SNAP dollars, prepare healthy meals, and engage in healthier behaviors (USDA FNS, 2021d). A search of the official SNAP-Ed website and the Louisiana State University Agricultural Center, a local SNAP-Ed partner throughout the state, returned limited SNAP resources or education on increasing seafood consumption. An increase in seafood-related education could show consumers how to plan meals that include seafood, source seafood using SNAP benefits, and prepare seafood to promote health.

Organizations like the Seafood Nutrition Partnership and National Fisheries Institute have seafood-related messaging and initiatives targeted at health professionals and consumers. The goal of both entities is to educate individuals about the health and nutritional benefits of consuming seafood. The Seafood Nutrition Partnership is a national nonprofit that provides recipes, seafood education, and coupons. The National Fisheries Institute is a seafood trade association comprised of diverse companies or members connected to the seafood industry that provide education on seafood safety, sustainability, and nutrition. Although these organizations offer consumer-facing information on seafood, the reach of their messages and resources to low-SES populations and participants of SNAP in New Orleans or nationwide remains unknown.

## **Cultural Norms**

Cultural practices in a city or town affect dietary behaviors and health. In the coastal city of New Orleans, a variety of seafood is central to the cuisine, with legendary dishes including seafood gumbo, crawfish and shrimp étouffée, boiled crawfish and shrimp, and fried seafood poboys (Yen et al., 1995). There are numerous standalone seafood markets throughout New Orleans and seafood options in large grocery stores, restaurants, and fast-food locations. Catholicism, a prominent religion in New Orleans, also is influential on seafood consumption during the Lenten season. Although seafood is popular in the city and among residents, the selection and preparation of the seafood types commonly consumed have implications for health. Crawfish and oysters, which are area staples, have lower protein and levels of omega-3 fatty acids compared to fatty fish options. Crawfish is also commonly prepared boiled in water with high-sodium seasoning. Additionally, fried seafood for poboys and platters, while suitable in moderation, is not recommended for frequent consumption due to the risk of heart disease and diet-related chronic conditions.

#### **Community Level**

#### **Physical Environment**

SNAP benefits provide financial support for food, albeit with restrictions. The physical environment is a key determinant of food access and consumption. Low-SES populations are likelier to have limited resources (e.g., reliable and affordable transportation) and unstable housing (Schultz et al., 2018). Additionally, crime and violence can impact how individuals navigate their neighborhoods and communities. In the 2017 New Orleans Community Health Survey, residents of Orleans Parish reported crime and violence, insufficient infrastructure, unhealthy environments, low wages, and low-quality and unaffordable housing as the top barriers to health (New Orleans Health Department, 2019). These barriers impact how individuals access and consume food and social and economic opportunities and behaviors, including educational attainment, physical activity, and health care access.

#### Food Accessibility

According to the United Health Foundation (2022), Louisiana has one of the highest rates of food insecurity (14.5%) in the nation, and New Orleans has a food insecurity rate of 22% (New Orleans Health Department, 2022). Of the 298 SNAP-authorized retailers across Orleans Parish (USDA FNS, 2021b), more than 50% are convenience stores (e.g., gas stations and minimarts), small stores (e.g., Family Dollar and Dollar Tree), and drug stores (e.g., Walgreens and CVS). The seafood options available at these stores can influence, in some cases limit, the type of seafood that SNAP participants in Orleans Parish can purchase with their benefits. Longstanding seafood markets, such as Castnet Seafood in the eastern part of New Orleans, was once a popular SNAP retailer, but no longer accepts SNAP benefits. Additionally, the impact of hurricanes across Louisiana as well as the COVID-19 pandemic have impacted the business operations of fisherman and retailers across the state and in the New Orleans area. These natural and health disasters have also had implications for the cost of seafood.

# **Interpersonal Level**

The interpersonal level focuses on the relationships that could influence health behaviors. Parents and caregivers are role models for health and nutrition behaviors for children. If parents do not consume seafood, young children might not, either. Parents typically make food purchases and determine and prepare meals on their children's behalf. Peer groups and social circles could also influence food choices, and healthcare providers could influence consumption patterns.

## **Intrapersonal Level**

Individual factors impact health and nutrition behaviors at the intrapersonal level. These individual factors include biological and genetic factors, knowledge, attitudes, and dietary preferences. Knowledge and education can enable individuals to make informed decisions about food and impact attitudes or perceptions regarding food choices.

Gearing et al. (2021) assessed the individual, household, and environmental barriers among SNAP participants. They found five individual and household barriers: a lack of knowledge about healthy eating, a lack of cooking skills, a lack of kitchen equipment and facilities, a lack of time for cooking, and a lack of time to acquire foods for a healthy diet. Although the participants generally understood what constitutes a healthy diet, their practices did not always align with their knowledge. The participants viewed fruits, vegetables, and meat as healthy, and chicken was the top healthy dinner food over other protein sources (Gearing et al., 2021).

## **Review of Seafood Consumption in Louisiana**

Second to Alaska, Louisiana is the largest seafood landing state and the most popular state for aquaculture seafood production (Louisiana Department of Health, n.d.; Yen et al., 1995). Crab, crawfish, oysters, and shrimp are the top seafood types produced in Louisiana (Louisiana Department of Health, n.d.). Yen et al. (1995) identified a misconception that Louisiana's proximity to the Gulf of Mexico correlates with higher seafood consumption than other areas of the country. Another erroneous expectation is that residents of Louisiana have greater seafood knowledge. Because crawfish is one of the state's most consumed seafood options, Yen et al. examined crawfish consumption among the residents of Houma, Louisiana. Although they did not assess broad seafood consumption and health promotion, Yen et al. provided insight into the influencing factors of New Orleans' staple seafood option. While crawfish consumption patterns were generally low, the likelihood of intake increased with income and household size, with the highest consumption among Whites and Catholics (Yen et al., 1995).

Lincoln et al. (2010) assessed seafood consumption and mercury levels among recreational anglers (i.e., fishermen) in Louisiana. The researchers conducted in-person interviews with recreational anglers recruited at boat launches and fishing tournaments in Louisiana and used the Food Frequency Questionnaire (FFQ) to determine their demographics
and seafood consumption. Next, all the anglers provided hair samples to assess their mercury levels. The findings showed that only 36% of participants met the DGA recommendation to consume at least 8 ounces of seafood weekly. Over three-quarters of the fish and a quarter of the shellfish consumed by participants were caught recreationally. According to FFQ data, the participants commonly consumed shrimp, speckled trout, crab, red drum, and crawfish. The hair samples showed high concentrations of mercury, which correlated with high consumption of recreationally sourced versus commercially purchased seafood (Lincoln et al., 2010).

Drewery et al. (2016) assessed seafood consumption among pregnant women in Baton Rouge, Louisiana. They hypothesized that, due to the study's geographical location, pregnant women would meet the DGA seafood recommendations to eat at least 8 to 12 ounces of seafood. The researchers enlisted participants from a single-day event to complete a demographic questionnaire and a four-section survey on dietary habits comprising beef, poultry, pork, and fish. The results did not align with the hypothesis, as the findings showed that the participants did not meet the DGA seafood recommendations (Drewery et al., 2016).

After the 2010 Deepwater Horizon oil spill in Louisiana, researchers conducted the Gulf Resilience on Women's Health study from 2012 through December 2016 (Simon-Friedt et al., 2016; Zilversmit et al., 2017). The quantitative study focused on pregnant women and women of childbearing age (18–45 years) in Southeast Louisiana from 2012 to 2015. Simon-Friedt et al. (2016) assessed the participants' seafood perceptions and intake patterns before, during, and after the oil spill, finding that seafood intake decreased during the spill but increased by 2015. The participants also reported negative perceptions of seafood and mistrusted government entities' seafood information. Approximately 50% of participants reported having insufficient information to make informed decisions about local seafood selections. Therefore, Simon-Friedt et al. suggested strengthening the relationship between government entities and communities.

Zilversmit et al. (2017) also assessed the seafood consumption of women of reproductive age in Louisiana after the Deepwater Horizon oil spill. In the Gulf Resilience on Women's Health study, the researchers compared seafood consumption between pregnant and nonpregnant women using an FFQ. The results showed that pregnant women had lower seafood intakes than nonpregnant women. Pregnant women were likelier to recall mercury-containing seafood than seafood high in omega-3 fatty acids (Zilversmit et al., 2017).

#### Review of General Knowledge, Attitudes, and Practices Related to Seafood

Hicks et al. (2008) investigated consumers' knowledge of and attitudes toward seafood consumption nationally and found that only 22% of the respondents ate the recommended seafood portions at least twice weekly. Taste preference and affordability were the leading contributors to limited or no seafood consumption. Hicks et al. recommended further research on consumers' practices and the messaging needed to reach consumers across various demographics.

Pieniak et al. (2010) examined cultural differences in fish consumption across five European countries, focusing on health-related beliefs, health involvement, and risk perception as determinants of fish consumption. With a cross-sectional consumer survey and 4,786 respondents ranging from 18 to 84, Pieniak et al. assessed consumers' knowledge and healthrelated beliefs about sociodemographics and fish consumption. Despite strongly believing that fish was healthy, the participants did not meet the recommended intake levels. Age and education contributed to the participants' knowledge about the benefits of eating seafood. Pieniak et al. concluded that promoting health benefits alone is not enough to change perceptions and increase seafood intake.

In a clinical review, Mozaffarian and Rimm (2006) suggested that environmental toxin concerns impacted seafood consumption among Americans. Conflicting messages cause consumer confusion related to seafood. Mozaffarian and Rimm evaluated the effects of fish consumption on cardiovascular health and neurological development and the risks of methylmercury and dioxins in fish. The results showed that the benefits of seafood consumption outweighed the risks. Low seafood consumption can adversely affect overall health, contributing to cardiovascular-related death (Mozaffarian & Rimm, 2006).

Although many consumers know about seafood's significant role in diet and health, they decide whether to consume seafood based on their perceptions of the risks of environmental toxins (Hosomi et al., 2012). Similarly, Rahmaniya and Sekharan (2018) found that consumers knew about the health benefits of seafood but felt conflicted about messages regarding seafood safety. Rahmaniya and Sekharan suggested improving consumers' awareness with education about safe seafood sourcing and handling practices from federal, state, and local government entities; manufacturers; and community health stakeholders.

Uchida et al. (2017) used the experimental auction model to examine consumers' risk perceptions, interpretation, and application of federally administered seafood guidance and health promotion materials. The researchers explored three resources for pregnant and breastfeeding women: a resource from the FDA and EPA; a separate pamphlet by the Food Marketing Institute, International Food Information Council, National Fisheries Institute, and National Healthy Mothers Healthy Babies Coalition; and a resource developed at Purdue University. The study included a fourth resource from the National Academy of Science targeted at the public. Uchida et al. (2017) sought to answer the following questions:

- Does the current guidance promote seafood choices that balance health risks and benefits?
- Does the guidance available to consumers drive the consumption of certain seafood species?
- What conclusions can be drawn from the findings regarding the efficacy of seafood consumption guidance? (p. 1058)

The results showed the ineffectiveness of consumer guidance in enabling consumers to weigh seafood's benefits and risks (Uchida et al., 2017).

Oken et al. (2012) examined fish consumption choices from toxicological, nutritional, ecological, and economic points of view. The researchers reviewed prior studies, U.S. public health guidelines, and health and nutrition-related advisories for fish consumption. The results showed that consumption patterns varied widely and that there was minimal information on the health, ecological, and economic impacts of different fish choices. Therefore, there is a need for improved messages about seafood consumption (Oken et al., 2012).

Bloomingdale et al. (2010) assessed the knowledge, behaviors, and messages about fish consumption among pregnant women. The authors discussed the problem associated with low seafood consumption among pregnant women and drew on prior research to speculate about the contributing factors to low consumption. As shown in the results, most of the participating pregnant women knew more about the risks of seafood than its health and nutritional benefits (Bloomingdale et al., 2010).

Birch and Lawley (2012) investigated the perceived risks of seafood consumption among consumers in Australia. The authors divided the participants into three consumption groups: regular, light, and very light. Birch and Lawley categorized and assessed the perceived risks as functional, physical, social, psychological, and financial across the consumer segments. Some of the risks identified in the study included the extent of familiarity with or knowledge about selecting and handling seafood options; acceptance by others in one's social circle (e.g., spouse, family, friends); concerns with possible contaminants; conflicting media messages; sensory preference (e.g., taste or smell); and price. Except for financial risk, the perceived risks varied across the segment groups. A higher perceived functional, physical, social, and psychological risk correlated with low seafood consumption (Birch & Lawley, 2012).

In a survey of the seafood perceptions of coastal residents in the Pacific Northwest, Hall and Amberg (2013) found that the participants preferred wild-caught options. The respondents strongly agreed on the health benefits of wild-caught seafood but felt uncertain about the health benefits of farmed seafood (i.e., aquaculture). Another finding was that mass media news stories caused the participants to feel confused about farmed seafood (Hall & Amberg, 2013). Similarly, Claret et al. (2014) found more favorable perceptions of wild-caught seafood than farmed seafood. The respondents perceived wild-caught seafood as fresher, healthier, and less handled than farmed seafood; however, farmed seafood had more favorable prices. The respondents' responses varied based on sociodemographic characteristics and seafood knowledge (Claret et al., 2014).

#### CHAPTER III

#### **METHODS**

#### **Quantitative Research**

Surveys are common data collection instruments in the social sciences and social inquiry (Babbie, 2016). Scholars have conducted survey research for descriptive and investigative purposes with interviews, questionnaires, or polls. Descriptive surveys are effective quantitative instruments for assessing participants' attitudes, self-perceptions, and behaviors (Bowling, 2005). Additionally, researchers use descriptive surveys to examine the relationship between variables and identify trends. Suitable for large populations, survey research enables exploration of one group or comparison of several groups. One of the approach's strengths is the ability to quickly reach a large sample (Bowling, 2005). With probability sampling recommended for survey research (Babbie, 2016), nonprobability sampling is acceptable when probability sampling is not feasible (McKenzie et al., 2005). Nonprobability sampling is easier, quicker, and more cost-effective than probability sampling.

Despite its benefits, survey research has several weaknesses (Babbie, 2016). Standardized questions can result in limitations or misreported responses. Another limitation is that surveys have less flexibility than direct observations. Although surveys have strong reliability, they have weak validity (Babbie, 2016). Therefore, a scholar must remain mindful of the survey question design, pilot the instrument for reliability and validity, and plan for reliability testing during data analysis.

## Methodology

## **Research Design**

A cross-sectional, nonexperimental design was the approach used for this study to determine seafood knowledge, perceptions, and practices among SNAP participants in New Orleans, Louisiana. With the SEM as the theoretical framework, the study examined how demographics and factors affect seafood consumption patterns across SEM levels. The study included an adaptation of the CDC's SEM (see Figure 2). The independent variables were the participants' sociodemographic characteristics, knowledge, perceptions, social support and norms, seafood accessibility, availability, and cost, and policy and educational awareness. Seafood consumption was the dependent variable.

## Figure 2

#### Adapted Socio-Ecological Model



*Note*. Adapted from *The Social-Ecological Model: A Framework for Prevention*, by the Centers for Disease Control and Prevention, 2022.

(https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html). In the public domain.

The study addressed the following research questions and hypotheses:

RQ1: What is the frequency of seafood consumption among SNAP participants?

RQ2: What are the barriers to and motivators of seafood consumption among the participants, specifically:

- How do specific sociodemographic characteristics influence seafood consumption?
- How does knowledge about the health and environmental benefits of seafood influence consumption?
- How do participants' perceptions of seafood influence consumption?

Hypothesis 2a: There will be no relationship between sociodemographic factors and participants' weekly seafood consumption.

Hypothesis 2b: There will be no relationship between participants' knowledge about the health and environmental benefits of seafood and their weekly seafood consumption.

Hypothesis 2c: There will be a relationship between participants' perceptions of seafood and their weekly seafood consumption.

RQ3: How do social influences impact seafood consumption among SNAP participants, specifically:

- Does social support, such as the influence of family, friends, and colleagues, impact weekly seafood consumption?
- Do group norms influence weekly seafood consumption?

Hypothesis 3a: There will be a relationship between social support and participants' weekly seafood consumption.

Hypothesis 3b: There will be a relationship between group norms and participants' weekly seafood consumption.

RQ4: What role do environmental factors such as accessibility, availability, and cost of seafood have in weekly seafood consumption among SNAP participants?

Hypothesis 4a: There will be a relationship between the accessibility of seafood and participants' weekly seafood consumption.

Hypothesis 4b: There will be a relationship between the availability of seafood and participants' weekly seafood consumption.

Hypothesis 4c: There will be a relationship between the cost of seafood and participants' weekly seafood consumption.

RQ5: How do nutrition policies, media, and public health campaigns influence seafood consumption among SNAP participants?

Hypothesis 5: There will be a relationship between nutrition policies, media, and public health campaigns and participants' weekly seafood consumption.

#### **Selection Sample**

Nonprobability sampling was used for the study. The target population included active SNAP participants who live in Orleans Parish in New Orleans, Louisiana. In Louisiana, the majority attainment is established at age 18; thus, individuals must be 18 or older to apply for SNAP in Louisiana. The eligibility criteria for the study consisted of participants 18 years of age or older who self-identified as active SNAP participants, live in Orleans Parish, and were not pregnant.

The estimated sample among this population was 109. Drawing from Cohen's (1988) work on statistical power analyses, a priori power analysis occurred using G\*Power 3.1.9 to determine the minimum sample size for statistical significance with multiple regression analysis with eight predictors. The desired power of .80, an alpha ( $\alpha$ ) of .05, and a small to moderate

effect size of .10 (f2) indicated a minimum of 109 participants for adequate power. The goal was to reach a sample of approximately 120 (+10%) to account for attrition and the possibility of invalid applications.

#### **Participant Recruitment**

Participant recruitment included key stakeholders who served low-SES families. Each stakeholder received an email with a recruitment flyer presenting the study's eligibility criteria, purpose, participant requirements, time commitment, incentive, and link to participate. The stakeholders were asked to distribute information regarding the study via their listservs or email subscription lists, announcement boards, blogs, or other channels. Additionally, the study was announced on the researcher's Instagram and LinkedIn accounts. Interested individuals were encouraged to follow the survey link to the PsychData platform and review a brief description of the study, participation requirements, and informed consent. Participation in the study was voluntary.

#### Instrumentation

A quantitative survey was the data collection tool used in this study (see Appendix A). Pivarnik (an author of "Consumer Perceptions About Seafood – An Internet Survey" and adjunct associate professor of the Nutrition and Services Department at the University of Rhode Island) and Krimsky (an author of *Seafood Knowledge, Perceptions, and Use Patterns in Florida: Findings From a 2013 Survey of Florida Residents* and regional specialized agent of water resource at Florida Sea Grant) granted permission to use and adapt their seafood surveys for this study. Pivarnik and two coauthors (Hicks et al., 2008) administered a national internet survey on consumer knowledge of and attitudes toward seafood and seafood consumption, which they adapted from the one administered via the Florida Sea Grant. The survey focused on seafood purchase and consumption patterns, knowledge, attitudes, and perceptions among residents in Florida (Adams et al., 2014).

An adaptation of the two validated instruments occurred for this study. To ensure content validity, there was a pilot study with five experts, including nutritionists, public health nutrition educators, a clinician, and a public health evaluator. Feedback from the pilot resulted in survey formatting revisions before Institutional Review Board (IRB) approval.

The instrument in this study included a 71-item survey. The questions were designed to examine the participants' seafood knowledge, perceptions, practices, and demographics (i.e., age, gender, race, education, income, household size, and religion). The survey took approximately 15 minutes to complete, and some questions required a response before moving forward. If participants did not want to advance, they could close their browsers to end the survey and withdraw participation. PsychData was the platform used for dissemination of the survey to eligible participants in English. The survey was open for 3 weeks in December 2022 and closed once the sample size was reached. Following completion of the survey, each participant was offered the opportunity to enter a drawing via a separate PsychData link for a chance to win one of 10 electronic gift cards, which was funded through a \$500 scholarship awarded by the Texas Woman's Office of Research and Sponsored Programs. Once the survey window closed, a random drawing was conducted to identify the gift card winners. All winners were emailed an electronic gift card.

#### **Data Analysis**

The statistical analysis occurred with the IBM Statistical Package for the Social Sciences (SPSS) software. Logistical regressions were initially conducted to determine the relationship between the independent and dependent variables. Descriptive statistics were used to indicate

frequencies, means, and standard deviations for the sociodemographic information (i.e., age, education level, household size, and income) and seafood intake frequency. Cronbach's alpha was conducted for reliability analysis to measure internal consistency with the sets of questions. Table 1 presents the data collection and analysis for each research question in the study.

# Quantitative Study Data Collection and Analysis Plan

Research question	Hypothesis	Theoretical	Dependent	Independent variable	Survey	Statistical
		construct	variable	(level)	questions	test
			(level)			
RQ1: What is the frequency		Intrapersonal	Seafood		5, 7, 16	Frequency
of seafood consumption			consumption			analysis
among SNAP participants?			(ordinal)			
RQ2: What are the barriers		Intrapersonal	Seafood	Sociodemographics	62–71	Logistic
to and motivators of			consumption	• Age (interval)		regression
seafood consumption			(ordinal)	• Education (interval)		
among the participants,				• Gender (nominal)		
specifically:				• Household size		
• How do specific	2a: There will be no			(interval)		
sociodemographic	relationship between			• Marital status		
	sociodemographic factors			(nominal)		

	Research question	Hypothesis	Theoretical	Dependent	Independent variable	Survey	Statistical	
			construct	variable	(level)	questions	test	
				(level)				
	characteristics influence	e and participants' weekly			• Number of children in			
	seafood consumption?	seafood consumption.			household (interval)			
•	How does knowledge	2b: There will be no			• Race (nominal)			
	about the health and	relationship between			• Religion (nominal)			
	environmental benefits	participants' knowledge			Motivators (nominal) 12			
	of seafood influence	about the health and			Barriers (nominal)	13		
	consumption?	environmental benefits of			Knowledge of health and	17–25		
•	How do participants'	seafood and their weekly			environmental benefits			
	perceptions of seafood	2c: There will be a			(interval)			
	influence consumption?	relationship between			Perceptions (interval)	26–40		
		participants' perceptions						
		of seafood and their						

	Research question	Hypothesis	Theoretical	Dependent	Independent variable	Survey	Statistical
			construct	variable	(level)	questions	test
				(level)			
		weekly seafood					
		consumption.					
R	Q3: How do social	3a: There will be a	Interpersonal	Seafood	Social support (interval)	41–48	Logistic
inf	luences impact seafood	relationship between		consumption	Group norms (interval)	49–52	regression
co	nsumption among SNAP	social support and		(ordinal)			
pa	rticipants, specifically:	participants' weekly					
•	Does social support,	seafood consumption.					
	such as the influence of	3b: There will be a					
	family, friends, and	relationship between					
	colleagues, impact	group norms and					
	weekly seafood	participants' weekly					
	consumption?	seafood consumption.					

Research question	Hypothesis	Theoretical	Dependent	Independent variable	Survey	Statistical
		construct	variable	(level)	questions	test
			(level)			
Do group norms						
influence weekly						
seafood consumption?						
RQ4: What role do	4a: There will be a	Environment	Seafood	Accessibility, availability,	12–13	Logistic
environmental factors such	relationship between the		consumption	cost (nominal)		regression
as accessibility,	accessibility of seafood		(ordinal)			
availability, and cost of	and participants' weekly					
seafood have in weekly	seafood consumption.					
seafood consumption						
among SNAP participants?						

Research question	Hypothesis	Theoretical	Dependent	Independent variable	Survey	Statistical
		construct	variable	(level)	questions	test
			(level)			
	4b: There will be a					
	relationship between the					
	availability of seafood and					
	participants' weekly					
	seafood consumption.					
	4c: There will be a					
	relationship between the					
	cost of seafood and					
	participants' weekly					
	seafood consumption.					
RQ5: How do nutrition	There will be a	Societal	Seafood	Policy awareness	53–54	Logistic
policies, media, and public	relationship between		consumption	(nominal)		regression
health campaigns influence	nutrition policies, media,		(ordinal)			

Research question	Hypothesis Theoretical Dependent Inde		Independent variable	Survey	Statistical	
		construct	variable	(level)	questions	test
			(level)			
seafood consumption	and public health			Education awareness	55–60	
among SNAP participants?	campaigns and			(interval)		
	participants' weekly					
	seafood consumption.					

#### CHAPTER IV

## RESULTS

The purpose of this cross-sectional, nonexperimental study was to explore the motivators and barriers to seafood consumption among SNAP participants in New Orleans, Louisiana. With the social-ecological model as the theoretical framework, the study focused on how demographics and factors affect seafood consumption patterns across each level of the model. The study was a means of exploring how the socioecological model's factors influence seafood consumption among SNAP participants. The goals were to gain insight into (a) the participants' seafood knowledge, perceptions, and practices; (b) societal and environmental influences; and (c) opportunities to improve intake.

This chapter provides an overview of the sample population's demographic data. The chapter includes the process for assessing the quantitative data for the study. Finally, there is a discussion of the data analysis and results based on the following research questions:

RQ1: What is the frequency of seafood consumption among SNAP participants?

RQ2: What are the barriers and motivators of seafood consumption among participants? Specifically:

- How do sociodemographic characteristics influence seafood consumption?
- How does knowledge about seafood's health and environmental benefits influence consumption?

• How do participants' perceptions of seafood influence consumption?

Hypothesis 2a: There will be no relationship between sociodemographic factors and participants' weekly seafood consumption.

Hypothesis 2b: There will be no relationship between participants' knowledge about the health and environmental benefits of seafood and their weekly seafood consumption.

Hypothesis 2c: There will be a relationship between participants' perceptions of seafood and their weekly seafood consumption.

RQ3: How do social influences impact seafood consumption among SNAP participants? Specifically:

- Does social support, such as family, friends, and colleagues, impact weekly seafood consumption?
- Do group norms influence weekly seafood consumption?

Hypothesis 3a: There will be a relationship between social support and participants' weekly seafood consumption.

Hypothesis 3b: There will be a relationship between group norms and participants' weekly seafood consumption.

RQ4: What role do environmental factors such as accessibility, availability, and cost of seafood have in weekly seafood consumption among SNAP participants?

Hypothesis 4a: There will be a relationship between the accessibility of seafood and participants' weekly seafood consumption.

Hypothesis 4b: There will be a relationship between the availability of seafood and participants' weekly seafood consumption.

Hypothesis 4c: There will be a relationship between the cost of seafood and participants' weekly seafood consumption.

RQ5: How do nutrition policies, media, and public health campaigns influence seafood consumption among SNAP participants?

Hypothesis 5: There will be a relationship between nutrition policies, media, and public health campaigns and participants' weekly seafood consumption.

#### **Demographics**

Four hundred and sixteen participants completed the seafood consumption survey, with 238 remaining after the data-cleaning process. The demographic variables were age, gender, race/ethnicity, marital status, education, household size, children in the household, and religion. The participants' ages ranged from 18 to 73, with 87% 34 or younger and 13% older than 35. Regarding gender, 44.5% of the participants self-identified as female and 53.4% as male. The majority of participants self-identified White (83.6%). Regarding marital status, 68.9% identified as married, 29.8% as single, 0.4% as divorced/separated, and 0.8% as widowed. The participants fell into the following categories for educational attainment: less than high school (0.4%), high school graduate (14.7%), trade school or vocational program (13.0%), a 2-year associate degree from a college or university (22.7%), 4-year college or university degree (44.1%), and postgraduate or professional degree (5%). For household size, the participants ranged from one to 10 household members, with a mean household size of 4.64. The participants' responses ranged from zero to four children in the household, with a mean number of children in the household of 1.28. Table 2 includes a detailed breakdown of the demographics for the sample.

Prior to further analysis, the frequency analysis for all categorical variables (i.e., gender, race, marital status, and religion) underwent examination to determine response distribution across each level. Based on the frequency analysis, each categorical variable was dichotomized as follows: gender into two levels (female/male); race into two levels (White/non-White); marital status into two levels (married/not married); and religion into four levels (Christian, non-

Christian, unaffiliated, more than one affiliation). Normality tests occurred for all continuous variables, with the assumption of normality satisfied.

# Table 2

Categorical demographic variable	n	%
Gender		
Female	106	44.5
Male	127	53.4
Nonbinary	1	0.4
Transgender	0	0.0
Prefer not to answer	1	0.4
Not listed	3	1.3
Race/ethnicity		
Hispanic/Latino	6	2.5
American Indian or Alaskan Native	9	3.8
Asian	4	1.7
Native Hawaiian or other Pacific Islander	3	1.3
Black or African American	13	5.5
White	199	83.6
Two or more races	2	0.8
Other	2	0.8
Marital status		

Frequencies and Percentages for Categorical Demographic Variables

Categorical demographic variable	n	%
Married	164	68.9
Single (never married)	71	29.8
Divorced/separated	1	0.4
Widowed	2	0.8
Religious affiliation		
Protestant	31	13.0
Roman Catholic	57	23.9
Mormon	8	3.4
Orthodox such as Greek or Russian Orthodox	5	2.1
Jewish	4	1.7
Muslim	21	8.8
Buddhist	4	1.7
Hindu	4	1.7
Atheist	10	4.2
Agnostic	4	1.7
No religious affiliation	47	19.7
More than one affiliation	15	6.3
Other	28	11.8

#### **Summary of Findings**

## **Research Question 1**

What is the frequency of seafood consumption among SNAP participants?

## Data Analysis

Descriptive statistics indicated the frequency and percentages of the participants' seafood consumption (see Table 3). Of the total sample (N = 238), 232 participants ate seafood, and six did not. Determining the number of servings consumed in the last month involved collecting data as a continuous variable and dichotomizing them into two levels: (a) fewer than eight servings and (b) eight or more servings. The analysis involved recoding consumption from a blank response to zero for consumption in the last month for the participants (n = 6) who did not eat seafood. An even distribution of participants (N = 236) consumed fewer than eight servings of seafood (50%) and eight or more servings (50%) monthly. The participants averaged 10 servings monthly (M = 9.89, SD = 7.882). Regarding changes in seafood consumption in the last 2 years, 37.4% of participants reported increased consumption, 39.5% decreased consumption, and 20.6% the same consumption.

### Table 3

#### Seafood Consumption

Question	Frequency	Percentage
Do you eat seafood (any types and forms of finfish and/or		
shellfish)? ( $N = 238$ )		
Yes	232	97.5
No	6	2.5

Question	Frequency	Percentage
Servings per month ( $N = 236^*$ )		
Less than 8 servings	118	50.0
8 servings or more	118	50.0
As compared to 2 years ago (prior to the COVID-19 pandemic),		
how has the amount of seafood you eat changed? ( $N = 232$ )		
Increased	89	37.4
Decreased	94	39.5
Stayed the same	49	20.6
In the last month, how many servings of seafood have you eaten?		
( <i>N</i> = 232)		
M = 9.89		
Mdn = 7.50		
<i>SD</i> = 7.882		

Note. \*Servings for six non-seafood eaters were recoded as zero.

# **Research Question 2**

What are the barriers and motivators of seafood consumption among participants?

Specifically:

- How do sociodemographic characteristics influence seafood consumption?
- How does knowledge about seafood's health and environmental benefits influence consumption?
- How do participants' perceptions of seafood influence consumption?

Hypothesis 2a: There will be no relationship between sociodemographic factors and participants' weekly seafood consumption.

Hypothesis 2b: There will be no relationship between participants' knowledge about the health and environmental benefits of seafood and their weekly seafood consumption.

Hypothesis 2c: There will be a relationship between participants' perceptions of seafood and their weekly seafood consumption.

## Data Analysis: 2a

A logistic regression analysis was performed to determine whether sociodemographic factors (age, gender, race/ethnicity, marital status, education, household size, children in the household, and religion) associated with seafood consumption (see Table 4). The model showed statistical significance,  $\chi^2(10) = 22.803$ , p = .011, Nagelkerke  $R^2 = .129$ . Of all the predictor variables, race (p = .037, OR = .371) and children in the household (p = .007, OR = .565) were significantly related to seafood consumption when controlling for the other independent variables. Non-White participants were less likely than the White participants to consume eight or more servings of seafood monthly. The results also showed that as the number of children in the household increased, the likelihood of consuming eight servings or more of seafood decreased. All remaining predictors (i.e., age, gender, marital status, education, household size, and religious affiliation) were not statistically significant predictors of seafood consumption.

	β	OR	95% CI		р
			Lower	Upper	
Age	.041	1.042	.989	1.098	.120
Male <sup>a</sup>	190	.827	.467	1.466	.516
Non-White <sup>b</sup>	991	.371	.146	.942	.037
Not married <sup>c</sup>	.129	1.138	.569	2.273	.715
Education	.065	1.067	.821	1.388	.627
Household size	.077	1.080	.850	1.373	.529
Children in household	571	.565	.373	.857	.007
Non-Christian <sup>d</sup>	.813	2.255	.925	5.495	.074
Unaffiliated <sup>d</sup>	.297	1.346	.693	2.617	.380
More than one affiliation <sup>d</sup>	853	.426	.117	1.557	.197

Logistic Regression Predicting Seafood Consumption Based on Demographics

*Note*.  $\chi^2(10) = 22.803$ , p = .011, Nagelkerke  $R^2 = .129$ . <sup>a</sup> Compared to female. <sup>b</sup> Compared to White. <sup>c</sup> Compared to married. <sup>d</sup> Religion levels were compared with Christian.

# Data Analysis: 2b

A logistic regression analysis was conducted to ascertain the effects of knowledge on seafood consumption among SNAP participants (see Table 5). The logistic regression model lacked statistical significance,  $\chi 2(1) = .000$ , p = 1.00, Nagelkerke  $R^2 = .000$ . The results showed no change in seafood consumption based on an increase or decrease in knowledge.

	β	OR	95% CI		р
			Lower	Upper	-
Total knowledge score	0.00	1.00	0.867	1.154	1.00

## Logistic Regression Predicting Seafood Consumption Based on Knowledge

*Note*.  $\chi^2(1) = .000$ , p = 1.00, Nagelkerke  $R^2 = .000$ .

### Data Analysis: 2c

A stepwise logistic regression was the initial means of exploring the influence of potential seafood consumption predictors based on the participants' perceptions of 15 seafood-related statements. However, no predictors significantly correlated to the outcome. Thus, crosstabulations with Pearson's chi-square and Cramér's *V* tests were performed to examine the relationship between each seafood-related statement and seafood consumption. As shown in Table 6, there was a statistically significant relationship between the statement "I worry about mercury when eating seafood" and seafood consumption,  $\chi^2(1) = 6.183$ , *p* = .013, Cramér's *V* = .191. A greater proportion of participants who disagreed with the statement "I worry about mercury when eating seafood" at fewer than eight servings of seafood monthly (69.2%) compared to participants who agreed with the statement (46.6%). There was no statistically significant relationship, *p* values > .05, between all remaining seafood-related statements and seafood consumption.

# Perceptions

Statements	ts Servings			$X^2$	р	Cramér's	
	Less than 8		8 or	more	_		V
	n	%	п	%	-		
I think seafood is good for your					1.144	.285	.072
health.							
Agree	102	49.5 <sup>a</sup>	104	50.5 <sup>a</sup>			
Disagree	9	64.3 <sup>a</sup>	5	35.7 <sup>a</sup>			
I think that pregnant women					.094	.759	.024
should eat seafood.							
Agree	48	49.5 <sup>a</sup>	49	50.5 <sup>a</sup>			
Disagree	32	47.1 <sup>a</sup>	36	52.9 <sup> a</sup>			
The health benefits of eating					.295	.587	.041
seafood outweigh the health risks.							
Agree	72	50.7 <sup>a</sup>	70	49.3 <sup>a</sup>			
Disagree	15	45.5 <sup>a</sup>	18	54.5 <sup>a</sup>			
Seafood is too expensive.					.084	.771	.020
Agree	92	54.1 <sup>a</sup>	78	45.9 <sup>a</sup>			
Disagree	18	51.4 <sup>a</sup>	17	48.6 <sup>a</sup>			
I feel comfortable buying and					3.098	.078	.125
preparing seafood.							
Agree	79	47.3 <sup>a</sup>	88	52.7 <sup>a</sup>			

Statements	Servings			$X^2$	р	Cramér's	
-	Less than 8		8 or more		-		V
-	п	%	п	%	-		
Disagree	20	64.5 <sup>a</sup>	11	35.5 <sup>a</sup>			
It is easy to judge the freshness of					.921	.337	.070
seafood.							
Agree	81	48.2 <sup>a</sup>	87	51.8 <sup>a</sup>			
Disagree	13	59.1 <sup>a</sup>	9	40.9 <sup>a</sup>			
I believe overfishing is a problem.					.577	.447	.051
Agree	108	51.2 <sup>a</sup>	103	48.8 <sup>a</sup>			
Disagree	3	37.5 <sup>a</sup>	5	62.5 <sup>a</sup>			
I trust the media to present the					.796	.372	.064
facts about seafood.							
Agree	94	51.9ª	87	48.1 <sup>a</sup>			
Disagree	9	64.3 <sup>a</sup>	5	35.7 <sup>a</sup>			
I think seafood marketing groups					1.865	.172	.104
provide accurate information							
about seafood.							
Agree	86	53.8 ª	74	46.3 <sup>a</sup>			
Disagree	90	52.3 <sup>a</sup>	82	47.7 <sup>a</sup>			
People should follow government					.1491	.222	.090
advice about which seafood to							
eat.							

Statements	Servings			$X^2$	р	Cramér's	
-	Less than 8		8 or	more			V
-	n	%	n	%			
Agree	85	53.1 <sup>a</sup>	75	46.9 <sup>a</sup>			
Disagree	10	40.0 <sup>a</sup>	15	60.0 <sup>a</sup>			
I trust store personnel to be					1.280	.258	.085
knowledgeable about the seafood							
I buy.							
Agree	82	54.3 <sup>a</sup>	69	45.7 <sup>a</sup>			
Disagree	11	42.3 <sup>a</sup>	15	57.7 <sup>a</sup>			
The government ensures that the					1.046	.307	.075
seafood I buy is safe.							
Agree	80	47.9 <sup>a</sup>	87	60.0 <sup>a</sup>			
Disagree	12	52.1 <sup>a</sup>	8	40.0 <sup>a</sup>			
I have adequate information about					.012	.912	.008
seafood safety.							
Agree	81	49.4 <sup>a</sup>	83	50.6 <sup>a</sup>			
Disagree	14	48.3 <sup>a</sup>	15	51.7 <sup>a</sup>			
Seafood imported into the U.S. is					1.188	.276	.084
as safe as locally harvested							
seafood.							
Agree	57	42.5 <sup>a</sup>	77	57.5 <sup>a</sup>			
Disagree	18	52.9 <sup>a</sup>	16	47.1 <sup>a</sup>			

Statements	Servings			$X^2$	р	Cramér's	
	Less	than 8	8 or	more	-		V
	n	%	n	%	-		
I worry about mercury when					6.183	.013	.191
eating seafood.							
Agree	61	46.6 <sup>a</sup>	70	53.4 <sup>a</sup>			
Disagree	27	69.2 <sup>a</sup>	12	30.8 <sup>a</sup>			

*Note*. For each column category in each perception variable, pairs of row proportions with different superscripts differed significantly, p < .05, while the same superscripts indicated no significant differences from each other, p > .05.

# **Research Question 3**

How do social influences impact seafood consumption among SNAP participants? Specifically:

- Does social support, such as family, friends, and colleagues, impact weekly seafood consumption?
- Do group norms influence weekly seafood consumption?

Hypothesis 3a: There will be a relationship between social support and participants'

weekly seafood consumption.

Hypothesis 3b: There will be a relationship between group norms and participants' weekly seafood consumption.

## Data Analysis

Descriptive statistics showed the influence of social support and group norms on the participants' seafood consumption (see Table 7). Using a 5-point Likert scale, the participants were asked to indicate the frequency (*never*, *rarely*, *occasionally*, *frequently*, or *not sure*) in which their families (including spouses/partners, children, and parents) and friends or colleagues did the following: consume seafood, encourage them to eat healthier, encourage them to eat seafood, and prepare or share recipes. Similarly, the participants used a 5-point Likert scale to indicate how social clubs, community gatherings, local culture, and religious/spiritual beliefs and rituals impacted their decisions to eat seafood. The response options were *not important*, *somewhat important*, *important*, *very important*, and *not sure*.

# Table 7

# *Societal Influences: Social Support (N = 238)*

Question	М	SD
Social support		
How often does your family (including your spouse/partner,		
children, and/or parents) do the items listed below?		
Consume seafood	3.28	0.687
Encourage you to eat healthier	3.21	0.917
Encourage you to eat seafood	3.05	0.999
Prepare and/or share seafood recipes with you	3.16	0.931
How often do your <b>friends and/or colleagues</b> do the items listed		

below?

Question	М	SD
Consume seafood	3.18	0.855
Encourage you to eat healthier	3.08	0.986
Encourage you to eat seafood	2.92	0.991
Prepare and/or share seafood recipes with you	3.11	0.906
Group norms		
Please indicate how important each of the following factors are		
to your decisions to eat seafood.		
Social clubs and/or social networks	2.80	1.015
Gatherings in the community (e.g., festivals and events)	2.88	1.084
Local culture (e.g., New Orleans culture)	3.14	0.849
Religious/spiritual belief or rituals	2.61	1.156

A logistic regression analysis was conducted to examine how social support from family and friends and group norms impacted participants' seafood consumption (see Table 8). The model showed statistical significance,  $\chi 2(12) = 47.246$ , p < .001, Nagelkerke  $R^2 = .283$ . Families who consumed seafood (p < .001, OR = 3.694) and local New Orleans culture (p = .008, OR =1.962) were statistically significant predictors. The participants whose families frequently consumed seafood were 3.69 times likelier to consume eight or more servings of seafood. Also, the participants who noted the importance of New Orleans culture in seafood consumption decisions were 1.96 times likelier to consume eight or more servings of seafood. All remaining predictors were not statistically significant seafood consumption predictors.

# Logistic Regression Predicting Seafood Consumption Based on Social Support (Family and

	β	OR	95% CI		р
			Lower	Upper	
Family (including your spouse/ partner,					
children, and/or parents)					
Consume seafood	1.307	3.694	2.010	6.788	<.001
Encourage you to eat healthier	.154	1.167	.742	1.835	.504
Encourage you to eat seafood	308	.735	.459	1.175	.198
Prepare and/or share seafood recipes with you	.187	1.206	.688	2.114	.514
Friends and/or colleagues					
Consume seafood	115	.891	.479	1.659	.716
Encourage you to eat healthier	.220	1.246	.746	2.079	.401
Encourage you to eat seafood	465	.628	.365	1.079	.092
Prepare and/or share seafood recipes with you	479	.619	.357	1.075	.089
Group norms					
Social clubs and/or social networks	137	.872	.564	1.347	.536
Gatherings in the community (e.g., festivals	.467	1.596	.925	2.753	.093
and events)					
Local culture (e.g., New Orleans culture)	.674	1.962	1.190	3.235	.008
Religious/spiritual belief or rituals	216	.806	.538	1.206	.293

Friends) and Group Norms

 $\overline{Note. \ \chi 2(12)} = 47.246, p < .001, Nagelkerke R^2 = .283.$ 

### **Research Question 4**

What role do environmental factors such as accessibility, availability, and cost of seafood have in weekly seafood consumption among SNAP participants?

Hypothesis 4a: There will be a relationship between the accessibility of seafood and participants' weekly seafood consumption.

Hypothesis 4b: There will be a relationship between the availability of seafood and participants' weekly seafood consumption.

Hypothesis 4c: There will be a relationship between the cost of seafood and participants' weekly seafood consumption.

### Data Analysis

A forward and backward stepwise logistic regression showed no predictors significantly correlated to the outcome. To confirm the results, crosstabulations with Pearson's chi-square and Cramér's *V* tests were performed to examine the relationship between each environmental factor and seafood consumption. Specifically related to accessibility, availability, and cost, there was no statistically significant relationship,  $\chi^2(1) = .935$ , p = .334, Cramér's V = .125,  $\chi^2(1) = .065$ , p = .062, Cramér's V = .125, and  $\chi^2(1) = 3.422$ , p = .064, Cramér's V = .124, respectively. As shown in Table 9, there was no statistically significant relationship, p values > .05, between the remaining environmental factors and seafood consumption.
# Table 9

# Environmental Factors

	Servings per month				$\chi^2$	р	Cramér's V
	Lower than 8 8 or more		_				
	n	%	n	%	-		
Access					.935	.334	.065
Checked	29	53.7	25	46.3			
Unchecked	78	46.2	91	53.4			
Availability					3.435	.062	.125
Checked	37	57.8	27	42.2			
Unchecked	70	44.0	89	56.0			
Cost					3.422	.064	.124
Checked	41	56.9	31	43.1			
Unchecked	66	43.7	85	56.3			
Ease of preparation					2.086	.149	.097
Checked	47	54.0	40	46.0			
Unchecked	60	44.1	76	55.9			
Environmental benefits					.021	.885	.010
Checked	35	47.3	39	52.7			
Unchecked	72	48.3	77	51.7			
Flavor/taste					.540	.463	.049
Checked	56	50.6	55	49.5			
Unchecked	51	45.5	39	54.5			

	Servings per month			$\chi^2$	р	Cramér's V	
	Lower	Lower than 8		8 or more			
	n	%	n	%	_		
Habit/tradition					.812	.368	.060
Checked	30	43.5	39	56.5			
Unchecked	77	50.0	77	50.0			
Health benefits					.367	.545	.041
Checked	51	45.9	60	54.1			
Unchecked	56	50.0	56	50.0			
Production and/or					2.027	.155	.095
sourcing							
Checked	16	38.1	26	61.9			
Unchecked	91	50.3	90	49.7			
Quality/freshness					1.238	.266	.074
Checked	33	42.9	44	57.1			
Unchecked	74	50.7	72	49.3			

*Note*. For each column category of every environmental factor, pairs of row proportions did not differ significantly from each other, p > .05.

## **Research Question 5**

How do nutrition policies, media, and public health campaigns influence seafood consumption among SNAP participants?

Hypothesis 5: There will be a relationship between nutrition policies, media, and public health campaigns and participants' weekly seafood consumption.

#### Data Analysis

A forward stepwise logistic regression was used to determine the influence of seafoodrelated policies, media, and public health campaigns or initiatives on the participants' seafood consumption. Variable selection in the equation occurred based on the contribution to the model's R<sup>2</sup> and *p*-value threshold of 0.1. The stepwise logistic regression produced five models, with significant improvements in fit with each step, resulting in a statistically significant model,  $\chi 2(5) = 40.892$ , p < .001, Nagelkerke  $R^2 = .215$ . Based on the results, Model 5 was the final model reported for Research Question 5.

The stepwise logistic regression included 21 predictor variables. The testing showed that five of the 21 were the strongest predictors and significantly correlated to seafood consumption when controlling for other independent variables (see Table 10). The participants aware of Eat Fit NOLA were likelier to consume eight or more seafood servings (p < .001, OR = .294). In contrast, the participants unaware of LiveWell Louisiana (p = .030, OR = 2.395) were 2.4 times likelier to consume eight or more seafood servings. Participants unaware of seafood-related policies and messaging through SNAP-Ed; family/friends; and social media (e.g., Facebook, Instagram, Twitter) were 4.3, 2.3, and 2.9 times likelier to consume eight or more seafood servings.

## Table 10

Influence of Seafood-Related Policies, Media, and Public Health Campaigns on Participants'

Unawareness of predictors	β	OR	95% CI		р
			Lower	Upper	-
Eat Fit NOLA	-1.225	.294	.147	.587	<.001
SNAP-Ed	1.447	4.251	1.560	11.587	.005
Family/friends	.817	2.264	1.170	4.378	.015
LiveWell Louisiana	.873	2.395	1.089	5.267	.030
Social media (e.g., Facebook, Instagram, Twitter)	1.064	2.897	1.055	7.956	.039

Seafood Consumption (N = 188)

*Note*.  $\chi^2(5) = 40.892 \ p < .001$ , Nagelkerke  $R^2 = .215$ .

## Summary

The overarching aim of this cross-sectional, nonexperimental research study was to understand how the SEM of health behavior indicated SNAP participants' seafood consumption in New Orleans, Louisiana. The study focused on the participants' seafood knowledge, perceptions, and practices, associated societal and environmental influences, and the opportunities to improve intake. There were five research questions and associated hypotheses, with each question addressing seafood consumption at a level of the SEM model. The following paragraphs present summaries of each question's exploration, analysis, and findings. Afterward, Table 11 shows a breakdown of the research questions and the actions taken for the posed hypotheses. Research Question 1 focused on the SNAP participants' seafood consumption frequency. The goal was to understand whether the participants consumed at least two servings weekly based on the seafood recommendations in the DGA. The results showed that 50% of the participants ate eight or more servings monthly or two servings weekly.

Research Question 2 focused on the intrapersonal influences on seafood consumption, specifically the participants' sociodemographic data, knowledge about seafood's health and environmental impacts, and perceptions. There was a statistically significant relationship between race, the number of children in the household, and seafood consumption. There was no statistically significant relationship between the total knowledge score and seafood consumption. There was a statistically significant relationship between perceptions about mercury in seafood and seafood consumption.

Research Question 3 focused on the interpersonal influence of seafood consumption among the participants, specifically whether social support of family, friends, colleagues, and group norms were predictors of seafood consumption. The predictor model showed that families who consumed seafood and local New Orleans culture were statistically significant predictors of seafood consumption.

Research Question 4 focused on the environmental factors in seafood consumption, specifically seafood availability, accessibility, and cost. The relationship between the assessed independent variables and seafood consumption lacked statistical significance.

Research Question 5 focused on the impact of nutrition and seafood-related policy, media, and public health campaigns on seafood consumption among the participants. Of the 21 predictors, five predictors had a statistically significant relationship with seafood consumption: (a) awareness of Eat Fit NOLA, (b) unawareness of LiveWell Louisiana, (c) unawareness of

seafood-related policies and messaging through SNAP-Ed, (d) family/friends, and (e) social media (e.g., Facebook, Instagram, Twitter).

# Table 11

# Summary of Findings

Research	Hypotheses	Action
questions		
RQ1	N/A	
RQ2	2a: There will be no relationship between sociodemographic factors	Reject
	and participants' weekly seafood consumption.	
	2b: There will be no relationship between participants' knowledge	Accept
	about the health and environmental benefits of seafood and their	
	weekly seafood consumption.	
	2c: There will be a relationship between participants' perceptions of	Accept
	seafood and their weekly seafood consumption.	
RQ3	3a: There will be a relationship between social support and	Accept
	participants' weekly seafood consumption.	
	3b: There will be a relationship between group norms and	Accept
	participants' weekly seafood consumption.	
RQ4	4a: There will be a relationship between the accessibility of seafood	Reject
	and participants' weekly seafood consumption.	
	4b: There will be a relationship between the availability of seafood	Reject
	and participants' weekly seafood consumption.	

Research	Hypotheses	Action
questions		
	4c: There will be a relationship between the cost of seafood and	Reject
	participants' weekly seafood consumption.	
RQ5	There will be a relationship between nutrition policies, media, and	Accept
	public health campaigns and participants' weekly seafood	
	consumption.	

#### CHAPTER V

## CONCLUSION AND DISCUSSION

Chapter 5 includes a final summary of the research study. The chapter opens with a discussion of the results of the research questions and SEM levels, followed by the study's implications for SNAP participants' purchasing and consumption patterns, nutrition, and health. This chapter also includes the study's limitations and future research and programming recommendations.

#### Summary of the Study

In this study, a cross-sectional, nonexperimental research design was the means of examining motivators and barriers of seafood consumption among SNAP participants in New Orleans, Louisiana. The purpose of the study was to determine if there was a relationship between intrapersonal, interpersonal, environmental, and societal factors and seafood consumption among SNAP participants. The instrument in this study was a 71-item survey disseminated via the PsychData platform over a 3-week period in December 2022. The questions focused on participants' seafood procurement and consumption patterns, seafood-related knowledge and perceptions, and the influence of social and ecological factors. PsychData in IBM SPSS (Version: 28.0.1.0) was the software used for data cleaning and analysis. The data cleaning process involved removing ineligible, duplicate, and invalid cases, resulting in 238 cases for analysis. Frequency analysis was performed for categorical variables and resulted in the dichotomization of the categorical variables. Normality analysis was conducted for the continuous variables. Additionally, a reliability analysis for the Likert-scale questions addressed the participants' perceptions ( $\alpha = 0.692$ ), family support ( $\alpha = 0.674$ ), support of friends ( $\alpha =$ 0.758), and group norms ( $\alpha = 0.686$ ).

### **Discussion of Findings**

## **Intrapersonal Influences**

The first SEM level focuses on the influence of individual factors on behaviors. Research has shown that individual factors, such as sociodemographic factors, biological and personal history, knowledge, attitudes, beliefs, and behaviors, can be used to understand and predict health and nutritional behaviors. Therefore, there is a need to examine how intrapersonal factors impact health and nutritional behaviors to develop strategies to address health issues. The intrapersonal factors in this study were the participants' sociodemographic data and seafood-related eating behaviors, knowledge, and perceptions. The following research questions focused on the SEM's intrapersonal level:

RQ1: What is the frequency of seafood consumption among SNAP participants?

RQ2: What are the barriers and motivators of seafood consumption among participants? Specifically:

- How do sociodemographic characteristics influence seafood consumption?
- How does knowledge about seafood's health and environmental benefits influence consumption?
- How do participants' perceptions of seafood influence consumption?

## **Consumption Patterns**

The DGA suggest the general public consume at least two weekly servings or 8 ounces of seafood and that pregnant and breastfeeding women consume 2 to 3 weekly seafood servings (8 to 12 ounces) to promote health (USDA & DHHS, 2020). In this study, the participants reported seafood consumption frequency by the number of servings consumed in the month prior. The participants also indicated any changes in their seafood consumption over the last 2 years. The

participants in the sample (n = 238) could choose *yes* or *no* responses to indicate seafood consumption. Two-hundred thirty-two participants (97%) ate seafood. The participants also reported the number of servings consumed in the prior month. The seafood recommendation to consume eight or more servings monthly resulted from the calculation of multiplying two weekly servings by 4 weeks in a month. The analysis included the seafood variable dichotomized into two levels: (a) fewer than eight servings and (b) eight or more servings monthly. The six participants who did not eat seafood were coded as consuming zero servings monthly. The analysis indicated that 50% (n = 118) of the participants met the DGA's seafood recommendation. Concerning consumption changes over the last 2 years (before the COVID-19 pandemic), 37.4% of participants reported an increase in consumption, 39.5% a decrease in consumption, and 20.6% the same consumption.

The survey included questions on the participants' seafood procurement and consumption patterns. For example, seafood markets (64.1%), supermarkets (44.6%), and farmers' markets (42.4%) were the top three locations for seafood procurement. The top three seafood sources were fresh seafood purchased from a store (80.8%), fresh seafood recreationally or self-caught (46.3%), and frozen seafood (46.7%). Ninety-four percent of the participants considered their diets to include a variety of seafood. In terms of top motivators of consumption for participants that reported having a varied seafood diet, 112 (50.2%) participants indicated flavor/taste, 112 (50.2%) indicated health benefits, and 88 (39.5%) indicated ease of preparation. Figure 3 shows the seafood consumption motivators of the participants with a varied seafood diet. Of the 6% percent of participants who did not eat a variety of seafood, 66.7% noted cost as a barrier, and 33.3% reported flavor/taste.

## Figure 3



## Motivators of Seafood Consumption

*Note*. Responses by participants (N = 232) indicating a varied seafood diet.

The seafood types the participants ate aligned with the top 10 seafood types consumed in the United States and New Orleans culture and cuisine. A frequency analysis showed that the top three commonly consumed seafood types by the participants (n = 231) were shrimp (48.1%), salmon (47.6%), and crawfish (46.3%), all of which are the EPA's and FDA's best choices. Large predatory fish, such as king mackerel, shark, swordfish, and tilefish, which the EPA and FDA recommends to avoid due to high mercury levels, were the least consumed seafood by most participants. Figure 4 presents a full list of the reported seafood types by the participants.

## Figure 4



Motivators of Seafood Consumption

*Note*. The question consisted of a *check all that apply* response option. Two hundred and thirtyone participants responded to the question, with one response missing. The participants reported the following preferred preparation methods based on the frequency analysis (N = 229): 47.6% preferred seafood baked, 45.9% boiled, 55.5% broiled, 44.5% fried, 39.7% grilled, 35.8% sautéed, and 42.8% steamed.

## **Sociodemographics**

The sociodemographic factors in this study were age, gender, race/ethnicity, marital status, education, household size, children in the household, and religion. These factors aligned with prior research and the survey instruments adapted for this study (Hicks et al., 2008). The survey included questions about income and zip code; however, the responses to these questions did not undergo analysis after further consideration of the population, eligibility questions, and study design.

A logistic regression was performed to determine the relationship between sociodemographic factors and seafood consumption. The results showed the overall model as statistically significant. When controlling for the other independent variables, race and children in the household significantly correlated to seafood consumption. Compared to the White participants, the non-White participants were less likely to consume eight or more servings of seafood monthly. Additionally, as the number of children in the household increased, the likelihood of consuming eight servings or more of seafood decreased.

Consistent with an online seafood study by Hicks et al. (2008), the survey respondents in this study predominantly self-identified as White (83.6%). Nationally, SNAP participants identify as 37% White, 26% Black/African American, 16% Hispanic, 3.3% Asian, and 1.5% Native American (USDA, 2021). The population in New Orleans is 32.7% White, 58.1% Black/African American, 5.6% Hispanic or Latino, 2.7% Asian, 0.2% American Indian or Alaska Native, and 4.1% two or more races (U.S. Census Bureau, 2019). Approximately 20% of Orleans Parish residents are active recipients of SNAP benefits. There were no racial data for SNAP participants in Orleans Parish for review; however, based on the income data and documented income disparities between White and Black/African American households, it is

presumed that most SNAP participants in New Orleans are Black/African American (New Orleans Health Department, 2022).

The recruitment strategy utilized for the study could have resulted in a disproportionate response rate of White compared to Black participants. To account for nuances in consumption patterns by race, future research among SNAP participants in New Orleans should include intentional efforts to ensure research methods are determined with the population in mind. Additionally, inclusive practices are important to consider which take into account harm that has occurred within research and recruitment challenges for historically marginalized groups.

It is important to acknowledge that Black/African Americans have historically had lower participation in health research (Royal, 2019). Skepticism of research by Blacks/Africans Americans stems back to the 1930s when the Tuskegee Study of Untreated Syphillis conducted by the U.S. Public Health Service (USPHS) subjected black men to unethical research practices which ultimately led to the spread of disease and death (Royal, 2019; Scharff et al., 2010). Historical malice combined with structural racism have exacerbated the concerns regarding health research. According to Royal (2019), as it relates to health surveys in research studies, Black/African Americans have expressed a mistrust in health care providers and academic researchers, suspicion in research intent, concern with use of data collected, and low health literacy. Additionally, in comparison to Whites of similar age, education, and gender, Blacks/African Americans are more likely to report beliefs that health research is used to perpetuate negative stereotypes and increased risk (Corbie-Smith et al., 2004).

While the researcher for this study is a native New Orleanian, that was not apparent in the recruitment process. There is a potential that the perception of a researcher coming in to conduct research from an out-of-state university could have sparked increased skepticism among

Black/African American SNAP participants during the recruiting process. Researchers posit that incentives and clear and inclusive communication are important considerations when recruiting Blacks/African Americans. Specifically, researchers suggest that incentives be provided immediately and unconditionally and communication should include plain language and inclusive photos to help increase participation (Royal, 2019; Scharff et al., 2010). Partnering with trusted members of the community, such as community-based or faith-based organizations, is a strategy to consider for future research to get a representative sample of Black/African American SNAP participants.

Household members can influence seafood consumption (Birch & Memery, 2020). This study found that the servings consumed monthly decreased as the number of children in the household increased, perhaps due to the household grocery shopper's purchasing power, issues with food introduction to children, and household members' preferences, among other factors. There has been limited research on seafood acceptability among young people, with relatively new seafood recommendations in the dietary guidelines (Birch & Memery, 2020). Thus, there is a need for further research to better understand the influences of seafood consumption among youth in the United States, particularly for those in low-income households.

Religion was a sociodemographic factor in this study. According to the 2020 Archdiocese of New Orleans census data, approximately 40% of the population within the diocese identifies as Catholic (Archdiocese of New Orleans, n.d.). Fish consumption during the Lenten season is a Catholic tradition. While the study did not occur during the Lenten season, it included an examination of religion's potential influences on seafood consumption. The results showed no statistical significance of religious affiliation when considering seafood consumption among

SNAP participants. However, data analysis indicated that religious/spiritual beliefs or rituals were not strong seafood consumption predictors.

### Knowledge

Research on consumers' seafood knowledge has evolved over the last few decades. Earlier studies have focused on U.S. consumers' knowledge of handling seafood safely but have addressed only a few seafood-related issues. Seafood's complexity consists of more than procuring and preparing the numerous species. Consumers often grapple with environment, health, nutrition, and safety issues. This study's questions on the participants' seafood knowledge aligned with a prior national seafood survey administered by Hick et al. (2008). The participants answered nine Likert-scale survey questions on their knowledge of seafood recommendations, health and nutritional benefits, sourcing options, environmental factors, and safety. The question evaluation occurred based on correct or incorrect answers, with a total knowledge score computed before the analysis. The logistic regression analysis indicated that the model lacked statistical significance. Therefore, the participants' knowledge of health and environmental benefits did not affect seafood consumption.

Eighty percent correct responses indicates seafood knowledge mastery (Hicks et al., 2008; Pivarnik et al., 2006). In this study, 4.2% of SNAP participants answered all questions correctly, indicating a low percentage of total knowledge among the participants. The research question on seafood's health benefits produced the following results: 71.4% of participants agreed that seafood was a high-quality protein source, 66.4% agreed that oily fish were good sources of key nutrients, 68.9% agreed that seafood had heart and brain health benefits, and 36.1% disagreed that deep-fat frying was the healthiest way to prepare seafood. Regarding knowledge of environmental benefits, 60.9% agreed that seafood had a low carbon footprint, and

71.4% agreed that aquaculture was an efficient and environmentally friendly way to produce protein. The results for all knowledge questions fell below the mastery level.

#### Perceptions

In addition to seafood knowledge, this study focused on the participants' perceptions of seafood to determine the potential predictors of seafood consumption. The participants answered 15 seafood-related statements adapted from surveys administered by Hicks et al. (2008) and Adams et al. (2014). The perception statements had a 5-point Likert scale and fit into five categories: health, purchasing, environmental, trust, and seafood safety. The crosstabulations with Pearson's chi-square and Cramér's *V* showed a statistically significant relationship between the statement "I worry about mercury when eating seafood" and seafood consumption. Higher disagreement with the statement regarding worry about mercury in seafood associated with a consumption frequency of less than eight servings of seafood monthly. Although the participants indicated a lack of worry regarding mercury in seafood, other influencing factors impacted seafood consumption. Similarly, Rahmaniya and Sekharan (2018) found that despite positive perceptions and increased knowledge about seafood's health and nutritional benefits, consumers were reserved with consumption due to conflicting messages about seafood safety.

#### **Interpersonal Influences**

The SEM's interpersonal level focuses on how intimate relationships impact behavior. The interpersonal level includes people closest to individuals, such as families, friends, colleagues, and close social networks. Such people can have positive (e.g., positive guidance or reinforcement) or negative (e.g., peer pressure or coercion) behavioral influences. Studies have shown, especially with consideration of seafood consumption by youth, that understanding the role of social influences on seafood consumption is essential to the development and

implementation of appropriate health and nutrition promotion strategies (Birch & Lawley, 2010; Birch & Memery, 2020; Olsen, 2004). Therefore, the interpersonal factors in this study included social support and group norms. The research questions that focused on the SEM's interpersonal level were:

RQ3: How do social influences impact seafood consumption among SNAP participants? Specifically:

- Does social support, such as family, friends, and colleagues, impact weekly seafood consumption?
- Do group norms influence weekly seafood consumption?

## **Social Support and Group Norms**

This study focused on two social support categories: (a) family, including spouses/partners, children, and parents and (b) friends and colleagues. The participants answered the same four questions for each social support category using a 5-point Likert scale. The results showed the frequency that the participants' families, friends, and colleagues consumed seafood, encouraged healthy eating, encouraged eating seafood, and shared seafood recipes and meals. Similarly, the participants rated the importance of four group norms (i.e., social clubs, community gatherings, local culture, and religious/ spiritual beliefs and rituals) in seafood consumption with a 5-point Likert scale. A logistic regression analysis of these factors indicated the model's statistical significance. Specifically, the families who frequently consumed seafood (social support) and local New Orleans culture (group norm) were statistically significant predictors of seafood consumption. As family members' consumption increased, so did the participants' consumption frequency. A higher rating for the importance of New Orleans culture for seafood consumption correlated with an increased monthly recall of seafood intake. The results aligned with prior reports indicating that family influence and local culture are key determinants of food enculturation and dietary habits (Birch & Lawley, 2010; Birch & Memery, 2020; Musarskaya et al., 2018). There is a need for further research on family-centered strategies for seafood consumption among SNAP participants in New Orleans.

## **Environmental Influences**

The third SEM level focuses on the physical and social environment. The environment includes an individual's neighborhoods, communities, schools, workplaces, churches, and stores, as they are places where social interactions occur and have potential implications for behavior. A common barrier to healthy food access and availability is the poor condition of the neighborhood and built environment in which an individual or group lives, works, and plays (Office of Disease Prevention and Health Promotion, n.d.). The availability and proximity of grocery stores, public transportation, walkable streets, and safety impact food access, particularly in impoverished communities. Additionally, cost is an important consideration when making food selections for many people of low-socioeconomic status (Office of Disease Prevention and Health Promotion, n.d.). Therefore, the environmental factors in this study were seafood accessibility, availability, and cost. The data analysis results in this section emerged based on the following research question:

RQ4: What role do environmental factors such as accessibility, availability, and cost of seafood have in weekly seafood consumption among SNAP participants?

#### Accessibility, Availability, and Cost

A forward and backward stepwise logistic regression, followed by crosstabulations using Pearson's chi-square and Cramér's *V* tests, showed the relationship between each environmental factor and seafood consumption. The analyses indicated no statistically significant relationship

between environmental factors and seafood consumption. Despite the results, availability issues should be considered among low-SES groups as lack of availability to healthy foods could cause individuals to explore alternative sourcing options, which might incur more costs in terms of transportation and price points. Studies conducted by Bodor, Rice, et al. (2010) and Bodor, Ulmer, et al. (2010) highlight the influence of the food environment in New Orleans on the availability of fresh fruits and vegetables. Blumenthal et al. (2014) administered a survey to SNAP participants nationally and found that cost, second to marketing in low-income communities, was a barrier to healthy foods. Additionally, the SNAP participants in the national study reported that increased availability of healthy foods would be the most impactful environmental change in low-income communities. Bodor, Ulmer, et al. (2010) noted that lowincome neighborhoods disproportionately lack access to supermarkets despite an abundance of small food and convenience stores, which, correlated with the lower availability of fresh fruits and vegetables at the time of research. Due to refrigeration requirements for fresh and frozen seafood, small food and convenience stores have limited seafood options. There are solutions for improving the availability and affordability of fresh fruit and vegetables, including multidimensional approaches focused on in-store enhancements to improve food access and consumption (Rose et al., 2010). Considering the limitations of convenience and small stores to carry and store a variety of seafood, further research should address similar approaches to improve seafood availability and affordability for low-income groups in New Orleans.

### **Societal Factors**

The outermost or last SEM level focuses on the broad societal factors that impact behaviors. The factors include wide-reaching societal norms and large societal factors, including federal, state, or local policies; media; and campaigns. The societal factors in this study were

nutrition policies, media, and public health campaigns. The results for the societal level emerged from the data analysis for the following research question:

RQ5: How do nutrition policies, media, and public health campaigns influence seafood consumption among SNAP participants?

#### **Policy, Media, and Public Health Campaigns**

The study's fifth and last research question aligned with the last SEM level. The goal was to understand the participants' awareness of seafood-related policy, media, and public health campaigns. With *yes* and *no* response options, the participants indicated their awareness of seafood policies or recommendations. The participants also used a list of options to report where they heard of the policies and recommendations. The last survey question, which had a 3-point Likert scale, focused on the participants' awareness of the following public health campaigns: Dish on Fish; Eat Fit NOLA; Eat Seafood, America!; Healthy Fish, Healthy Planet, Healthy You!; LiveWell Louisiana; and Seafood2xWk.

A stepwise logistic regression was performed to determine the strongest seafood consumption predictor of 21 predictor variables. The stepwise logistic regression indicated the model's statistical significance and the five significant seafood consumption predictors. Awareness of Eat Fit NOLA positively correlated with seafood consumption. However, a lack of awareness of LiveWell Louisiana positively correlated with seafood consumption. Additionally, an unawareness of seafood-related policies and messaging through SNAP-Ed, family/friends, and social media (e.g., Facebook, Instagram, Twitter) had a positive relationship with seafood consumption. These results did not align with earlier research finding that a lack of seafood awareness correlated with decreased consumption (Kantor, 2016). This study's results could suggest that unawareness of the media's or public health campaigns' seafood policies and

messages could limit exposure to conflicting perceptions about seafood safety, thus having little social influence on dietary behaviors.

Seafood messaging is created and tailored for national, state, and local level broadcasting and publication. Most consumer messaging from governmental and health organizations focuses on seafood safety for increased knowledge and awareness. However, although such messages provide information to consumers, they could cause confusion or fear and be a barrier to consumption. Earlier studies have shown that consumer messaging is a leading barrier to consumption, as consumers find it difficult to process seafood advisories to make safe choices (Hosomi et al., 2012; Rahmaniya & Sekharan, 2018). Thus, many consumers steer away from seafood and continue to consume the protein sources that have routinely been a part of their diets.

Regarding food policies, congressional appropriations can significantly impact the viability of the federal nutrition assistance program and SNAP allotments. Changes in congressional appropriations can negatively or positively impact SNAP allotment amounts. For example, in response to the financial challenges of the COVID-19 pandemic, Congress passed a law in March 2020 allowing the USDA to provide emergency allotments to SNAP participants. The emergency allotments provided SNAP participants with more money to purchase food for their households. In December 2022, Congress passed another law to terminate emergency allotments. The loss of the emergency allotments, coupled with inflation, could exacerbate food security challenges for SNAP participants and impact future purchasing decisions.

Policies can also impact SNAP participants through guidelines regarding allowable foods and approved retailers. For example, lawmakers could enact state or local policies in response to emergencies and disasters. Such policies occur in Louisiana due to frequent hurricanes and, most

recently, the COVID-19 pandemic. In 2021, Louisiana provided a waiver for SNAP participants to use their benefits to purchase hot or prepared foods. Awareness of these policies could affect what SNAP participants purchase and consume using their benefits.

Checkoff programs, also known as research and promotion programs, are means of promoting, researching, and sharing information on certain agricultural commodities (National Agricultural Law Center, n.d.). Over time, these programs have increased in size, power, and influence. Industry stakeholders fund many checkoff programs, and the financial capital helps to support large social marketing campaigns and branding that consumers see and recognize nationwide. Unlike most agricultural commodities, such as beef, dairy, and poultry, seafood does not have a national checkoff program or council. Members of state-level boards, such as the Louisiana Seafood Board, and national seafood organizations, such as the National Fisheries Institute or Seafood Nutrition Partnership, have sought to increase awareness of seafood for human consumption. However, such efforts remain overshadowed by the power and influence of the beef, poultry, and pork industries. Additionally, local efforts to incorporate seafood into healthy eating messages continue to occur but minimally compared to other commodities. In September 2022, several members of Congress introduced the Seafood Marketing Act to establish a National Seafood Council. If passed, the bill would provide \$25 million yearly for five years for a seafood marketing campaign to increase awareness of seafood consumption.

#### Implications

To the researcher's knowledge, this was the first study on seafood knowledge, perceptions, and practices among SNAP participants in New Orleans, Louisiana. This research could fill the knowledge gap regarding seafood consumption motivators and barriers among lowincome populations. This study provided important information from a social-ecological

perspective for researchers and public health educators on the factors in seafood consumption. These results could also be a foundation for future research on seafood consumption among SNAP participants in New Orleans and nationwide, including SNAP households, such as youth or elderly populations. Lastly, the data could contribute to nutrition and health interventions to improve seafood consumption among low-income populations.

### **Public Health Implications**

Seafood consumption is a matter of public health. However, multifaceted factors impact a consumer's decision to purchase and eat seafood. Seafood's benefits and risks indicate the need for intentional public health strategies to build awareness, educate, and support healthy behaviors for seafood consumption. Recent changes in the DGA and the Thrifty Food Plan, EPA and FDA guidance, and the movements of prominent seafood-related organizations and government entities have shown the importance of seafood for human consumption.

Seafood is a lean protein that provides vitamins, minerals, and omega-3 fatty acids. Despite the nutritional benefits, seafood consumption among Americans has been a concern for decades. Only approximately 10% of Americans consume two or more servings per week of seafood to promote health, as suggested by health organizations, health professionals, and researchers. Therefore, most Americans miss out on seafood's nutritional and health benefits.

The complexity of seafood as a protein source and the various factors impacting knowledge and perceptions present a challenge to determining the best strategies for improving intake. Intrapersonal, interpersonal, environmental, societal, and political factors vary based on geography, economic status, and cultural implications. The motivators and barriers associated with seafood consumption vary.

This study focused on the frequency, top seafood types, and predictors of seafood consumption among SNAP participants in New Orleans. Half of the study sample did not meet the seafood dietary recommendations; thus, they might not have adequate omega-3 fatty acid intake without proper supplementation. Additionally, the participants frequently consumed diverse seafood options, including fatty fish (i.e., salmon) and shellfish (i.e., crawfish and shrimp). Salmon is a rich source of omega-3 fatty acids and protein, with 20 grams of protein per 3-ounce serving (USDA, 2012). Although shrimp and crawfish are good sources of lean protein, providing approximately 19 grams and 14 grams per 3-ounce serving, respectively, they are not the richest sources of omega-3 fatty acids (USDA, 2012). Consideration of seafood types is a healthy dietary behavior that could impact the prevalence of heart disease in the city and statewide. Nutrition promotion focused on diverse seafood types and fatty fish consumption could contribute to heart health prevention.

#### **Health Education Implications**

Targeted health education and health promotion could be the key to advancing efforts to prevent and reduce heart disease risk through dietary behaviors. Variations in consumption patterns by socioeconomic status make it important to ensure tailored health education for consumers is delivered. Additionally, considering the differences in seafood recommendations by age, tailoring of health education should align with the DGA. SNAP participants could benefit from seafood-related health education that enables them to increase their knowledge and strengthen healthy seafood consumption attitudes and practices in alignment with the dietary guidelines.

The results of this study indicate the need to focus health promotion and health education efforts on increasing SNAP participants' knowledge about seafood's health and environmental

benefits. This study's participants had a total knowledge score below the mastery level, suggesting an opportunity to explore opportunities to revise and create health education to reach SNAP participants better. Efforts to increase participants' knowledge of the benefits of seafood consumption could contribute to healthy behaviors for reduced heart disease risk.

The study results showed a relationship between the participants with friends who frequently prepared and shared seafood recipes and seafood consumption. Therefore, programs could provide SNAP participants with information on purchasing and preparing seafood on a budget. Such programs could have implications for the recipes and nutrition education materials provided by SNAP-Ed nationally and locally. Furthermore, health educators in multiple fields (e.g., schools, community nutrition, health care) could play a role in providing education and supporting public health campaigns to inform SNAP participants about seafood's health, nutrition, and environmental benefits.

#### Limitations

This study has several limitations, one being its design. The study focused on a specific population in a target geographical location. Louisiana's coastal proximity and the seafood footprint in urban New Orleans could present limitations to generalizing the results for landlocked, rural areas. Additionally, the convenience and snowball sampling methods used in this study are a potential limitation, as these methods could involve community bias and lack representation of the target population. The recruitment methods could have inhibited access to a certain population segment, both in age and race/ethnicity. Thus, the results could have had limited generalizability.

As it relates specifically to the racial makeup of the study sample, the potential threat to population validity is a limitation for the study. While the study was designed to assess seafood

consumption among SNAP participants in New Orleans as a whole, consideration must be given to the distribution of race and ethnicity among the participants. With a study sample that was predominantly inclusive of White participants (83%), yet Black/African Americans account for 58% of the population in New Orleans, there is concern that the results may not represent the target population and be generalizable. Further consideration to effectively reach Black/African American SNAP participants in New Orleans is vital for future research.

Gathering sociodemographic data often presents some limitations. For example, considering race is a social construct, presenting participants with race and ethnicity categories could be perceived as leading or restrictive. For this study, the racial categories included in the survey were based on categories published by Pew Research Center. To promote inclusivity and greater accuracy, future collection of race and ethnicity data could be done via a written-in response format.

Another possible factor influencing the racial distribution for the study is related to the research design and recruitment strategies used which relied on convenience and snowball sampling techniques. In addition to direct emails to organizations, the recruitment flyer was shared on social media, which does not allow for a controlled recruitment strategy. This method could have served as a barrier to reaching certain groups within the target population.

Lastly, online dissemination of the survey is another potential influencing factor. Access to a computer and internet access or mobile device with available cellular data could be a challenge for low-income groups, thus potentially impacting the sample for this study. Furthermore, the survey was only available in English, which could have potentially presented a barrier for participants, particularly for Hispanic/Latinx and Asian participants.

To mitigate these limitations and increase external validity, strategies to ensure a representative sample is obtained must be carefully considered during the design and recruitment plan process. Further consideration of the demographic makeup of the city could impact inclusion and exclusion criteria set for the study. In the case of the target population for this study, exploration of seafood consumption specifically among Black/African American SNAP participants in New Orleans could be considered for future research.

## **Recommendations for Future Research**

The first recommendation for future research is to conduct a qualitative study among Black/African American SNAP participants in New Orleans to gather qualitative data regarding their perceptions of seafood consumption. While there are constants for SNAP participants in terms of the guidelines of the program and allowable purchases, there are nuances that must be considered in terms of consumption patterns relative to race. Considering the current study did not include a representative sample of Black/African American SNAP participants, inclusion criteria should be controlled to ensure data is representative of this group. Additionally, interview questions on the social-ecological influences could provide a deeper understanding of the factors impacting seafood consumption than a quantitative survey. A mixed methods approach to data collection would also contribute to stronger planning and implementation of future interventions.

Another recommendation is to examine the role of SNAP-Ed in promoting seafood consumption. The USDA SNAP and the Louisiana State Agricultural Center websites have limited information on seafood, suggesting minimal seafood outreach. Future research on how SNAP participants in New Orleans engage in SNAP-Ed and the program's health and nutritional

education could provide insight into increasing seafood-related knowledge, skills, and awareness.

Further research should occur to understand the perceptions, acceptability, and consumption patterns of seafood among youth in the United States. Seafood has benefits for brain and cognitive development from infancy to adolescence and beyond. Promotion of healthy habits early in childhood could be a way to reduce the risk of chronic diseases and unhealthy behaviors in adulthood. Future scholars could investigate the influence of parents, schools, peers, and other factors on seafood consumption to determine the education and program planning needed to support increased seafood intake at home and in school.

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### APPENDIX A

## SEAFOOD CONSUMPTION QUESTIONNAIRE

	Seafood Consumption Survey
The ( (SNA	xurpose of this research study is to explore influences of seafood consumption among Supplemental Nutrition Assistance Program (P) participants in New Orleans, LA.
<u>Eligi</u>	bility to Participate
	Age 18 or older
	Reside in New Orleans, LA
•	Current SNAP participant
•	Not pregnant
Ques provi	tions 1 through 4 are to confirm eligibility to participate in this study. Following the eligibility questions, you will be taken to a form to de informed consent to participate in the research study. Please press "Continue" to proceed to the eligibility questions.
	Page Break
-	The Owned and
Eligib	ity Question
*1)	Are you 18 years of age or older?
	○ Yes [Value=1]
	○ No [Value=2]
	Guestion Logic If (Yes) is selected, then skip to question [No logic applied] If [No] is selected, then skip to survey [#196443], question [GO TO END OF SURVEY]
	Page Break
	O No [Value=2] Question Logic If (Yes] is selected, then skip to question [No logic applied] If [No] is selected, then skip to survey [#196443], question [GO TO END OF SURVEY]
	Page Break
Eligibi	
*3)	Ity Question
	Irry Question Are you a resident of New Orleans, LA?
	lity Question Are you a resident of New Orleans, LA? ○ Yes [Value=1]
	lity Question Are you a resident of New Orleans, LA? O Yes [Value=1] O No [Value=2]
	lity Question Are you a resident of New Orleans, LA? O Yes [Value=1] No [Value=2] Question Logic If [Yes] is selected, then skip to question [No logic applied] If [No] is selected, then skip to survey [#196443], question [GO TO END OF SURVEY]
	Ity Question Are you a resident of New Orleans, LA? Oreans, Value=1] No [Value=2] Question Logic If (Yes] is selected, then skip to question [No logic applied] If (No] is selected, then skip to survey [#196443], question [GO TO END OF SURVEY]
	Ity Question Are you a resident of New Orleans, LA? O Yes [Value=1] No [Value=2] Question Logic If [Yes] is selected, then skip to question [No logic applied] If [No] is selected, then skip to survey [#196443], question [GO TO END OF SURVEY] Page Break Page Break
Eligibi	Ity Question Are you a resident of New Orleans, LA? Oreans, Value=1 No [Value=2] Question Logic If [Yes] is selected, then skip to question [No logic applied] If [No] is selected, then skip to survey [#196443], question [GO TO END OF SURVEY] Page Break Ity Question
Eligibi *4)	Ity Question Are you a resident of New Orleans, LA? Oreans, Value=1 No [Value=2]  Question Logic If [Yes] is selected, then skip to question [No logic applied] If [No] is selected, then skip to survey [#196443], question [GO TO END OF SURVEY] Page Break Page Break Ity Question Are you currently pregnant?
Eligibi *4)	Ity Question Are you a resident of New Orleans, LA? Orlea
Eligibi *4)	Ity Question Are you a resident of New Orleans, LA? Orlea

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#### **Consent Form for Research Participation**

#### Study Title

Multi-level Influences on Seafood Consumption Among Supplemental Nutrition Assistance Program participants in New Orleans, LA

#### Study Purpose and Eligibility

The purpose of this research study is to identify social-ecological factors associated with seafood consumption among Supplemental Nutrition Assistance Program (SNAP) participants. The aims of this study are to: (1) gain insight about SNAP participants' knowledge, perceptions, and practices towards seafood, (2) understand societal and environmental influences, and (3) identify opportunities to improve intake.

Only current Supplemental Nutrition Assistance Program (SNAP) participants, 18 years or older, not currently pregnant, and who currently reside in New Orleans, LA may participate in this study. Participation in this study is voluntary and you may decline participation at any time. Declining participation will not affect your SNAP participation status in any way.

#### Study Overview

This research study consists of one (1) survey that should take approximately 15 minutes to complete. The survey includes questions that focus on your knowledge, perceptions, and practices related to seafood as well socio-demographic questions that will be used for classification purposes only. You will complete the study in the location of your choosing, which could include any private or public space, as it is an online administered survey.

To complete the survey, please be sure to hit the CONTINUE button on each page until you reach the end. Once you have completed the survey, you will be given the option to voluntarily submit your email address to enter a drawing for a \$50 e-gift card. Submissions to enter the drawing will take place through a separate link from the study survey. Once the survey closes, a lottery will be conducted to select participants to receive an electronic gift card. A total of five (5) \$50 e-gift cards will be distributed.

#### Confidentiality, Risks, and Discomforts

There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. Confidentiality will be protected to the extent allowed by law. The surveys will not contain any personally identifying information. You will not be asked to provide your name at any time. Your personal email address will only be collected separate from your responses if you voluntarily choose to participate in the lottery drawing for a \$50 e-gift card for the completion of the survey. Access to all data will be limited to study personnel. Any identifiable information will be stored in a separate file from other research data, and this information will be destroyed three (3) years from the end of the research study.

Some of the items in the survey will require an answer before moving on. If you are uncomfortable with a required question and do not want to answer it, you may withdraw from the study at any time without penalty by closing your browser.

#### Questions

For questions related to this study, please contact the study Principal Investigator, Traci Causey at tbriant@twu.edu.

When you click CONTINUE below, completing the online survey constitutes your informed consent to act as a participant in this research.

-Page Break

\*5) Do you eat seafood (any types and forms of finfish and/or shellfish)? Examples include, but are not limited to, shrimp, canned tuna, salmon, tilapia, catfish, crab, cod, clams, and other types of aquatic products.

○ Yes [Value=1]
○ No [Value=2]

Question Logic If [Yes] is selected, then skip to question [#7] If [No] is selected, then skip to question [#6]

Page Break

6)

Since you answered "No" to Question 1, what are your reasons for not eating seafood? (Check all that apply)

Allergic to seafood [Checked=1]

Based on health professional's advice [Checked=1]

Concerns about overfishing [Checked=1]

Concerns about seafood safety [Checked=1]

Consume a vegetarian diet [Checked=1]

Cost (seafood is not affordable) [Checked=1]

Environmental concerns [Checked=1]

Fish consumption advisories [Checked=1]

	Health reasons [Checked=1]	
	Household members do not eat seafood [Checked=1]	
	Lack of availability [Checked=1]	
	Limited access [Checked=1]	
	Not knowledgeable about buying seafood [Checked=1]	
	Not knowledgeable about preparing seafood [Checked=1]	
	Prior bad experience [Checked=1]	
	Quality concerns [Checked=1]	
	Taste preferences [Checked=1]	
	The primary household meal preparer does not cook seafood [Checked=1]	
	Other (please specify) [Checked=1]	
Ski	p Logic	
Skip	p to question [after #16, Matrix Text] (See "Edit Logic" for details)	
	Skip Logic	
*7)	In the last month, how many servings of seafood have you eaten?	
	Do unu unu SNAD konstituto aurobano antifand?	
(8)	Do you use your SNAP benefits to purchase seatood?	
	Ves [Value=1]	
	() No [Value=2]	
9)	Where do you usually purchase seafood? (Check all that apply)	
	Club stores (e.g., Sam's Club, Costco, etc.) [Checked=1]	
	Convenience stores (e.g., gas stations or corner stores) [Checked=1]	
	Discount variety stores (e.g., Family Dollar, Dollar General) [Checked=1]	
	Farmers market [Checked=1]	
	Seafood markets (e.g., Cajun Seafood, Castnet, LA Seafood Market) [Checked=1]	
	Supermarkets (e.g., Rouses, Walmart, Winn Dixie) [Checked=1]	
	Roadside vendors [Checked=1]	
	Casual and/or fine dining restaurant [Checked=1]	
	Fast-food restaurant [Checked=1]	
	Other (please specify) [Checked=1]	
10)	Which of the following seafood onlights do you frequently source or nurchase? (Check all that apply)	
,		
	Carined seafood (purchased from a store) [Checked-1]	
	Freeh seefeed (regrestionally or self searcht). [Checked=1]	
	Fresh seafood (recreationally or self-caught) [Checked=1]	
	Fresh seafood (recreationally or self-caught) [Checked=1] Frozen seafood [Checked=1] Searched seafood [Checked=1]	
	Fresh seafood (recreationally or self-caught) [Checked=1] Frozen seafood [Checked=1] Smoked seafood [Checked=1] Other (checked=1]	
	Fresh seafood (recreationally or self-caught) [Checked=1] Frozen seafood [Checked=1] Smoked seafood [Checked=1] Other (please specify) [Checked=1]	
	Fresh seafood (recreationally or self-caught) [Checked=1]     Frozen seafood [Checked=1]     Smoked seafood [Checked=1]     Other (please specify) [Checked=1]	
	Fresh seafood (recreationally or self-caught) [Checked=1]     Frozen seafood [Checked=1]     Smoked seafood [Checked=1]     Other (please specify) [Checked=1]	
•11)	Fresh seafood (recreationally or self-caught) [Checked=1]     Frozen seafood [Checked=1]     Smoked seafood [Checked=1]     Other (please specify) [Checked=1]  Do you consider yourself to have a varied seafood diet (i.e., you eat multiple types of seafood)?	
•11)	Fresh seafood (recreationally or self-caught) [Checked=1]     Frozen seafood [Checked=1]     Smoked seafood [Checked=1]     Other (please specify) [Checked=1]  Do you consider yourself to have a varied seafood diet (i.e., you eat multiple types of seafood)?     Yes [Value=1]	
•11)	Fresh seafood (recreationally or self-caught) [Checked=1]     Frozen seafood [Checked=1]     Smoked seafood [Checked=1]     Other (please specify) [Checked=1]  Do you consider yourself to have a varied seafood diet (i.e., you eat multiple types of seafood)?     Yes [Value=1]     No [Value=2]	

	Page Break-
12)	Since you answered "Yes" to trying various types of seafood, what factor(s) motivate you to try new varieties? (Check all that apply)
	Access [Checked=1]
	Availability [Checked=1]
	Cost [Checked=1]
	Ease of preparation [Checked=1]
	Environmental benefits [Checked=1]
	Flavor/taste [Checked=1]
	Habit/tradition [Checked=1]
	Health benefits [Checked=1]
	Production and/or sourcing [Checked=1]
	Quality/Freshness [Checked=1]
	Other (please specify) [Checked=1]
Ski Skij	ip Logic p to question [#14]
	Skip Logic
	Cost [Checked=1] Difficulty of preparation [Checked=1] Environmental concerns [Checked=1]
	Flavor/taste [Checked=1]
	- HabitTradition [Checked=1]
	Habit/Tradition [Checked=1] Health risks [Checked=1]
	Habit/tradition [Checked=1]  Health risks [Checked=1]  Production and/or sourcing [Checked=1]
	Habit/tradition [Checked=1] Health risks [Checked=1] Production and/or sourcing [Checked=1] Quality/Freshness [Checked=1]
	Habit/tradition [Checked=1]     Health risks [Checked=1]     Production and/or sourcing [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]
	Habit/Tradition [Checked=1] Health risks [Checked=1] Production and/or sourcing [Checked=1] Quality/Freshness [Checked=1] Other (please specify) [Checked=1]
	Habit/Tradition [Checked=1]     Health risks [Checked=1]     Production and/or sourcing [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]
14)	Habit/tradition [Checked=1]     Health risks [Checked=1]     Production and/or sourcing [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     What type(s) of seafood do you regularly eat? (Check all that apply)
14)	Habit/tradition [Checked=1]     Health risks [Checked=1]     Production and/or sourcing [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     What type(s) of seafood do you regularly eat? (Check all that apply)     Catfish [Checked=1]
14)	Habit/tradition [Checked=1]     Health risks [Checked=1]     Ouality/Freshness [Checked=1]     Other (please specify) [Checked=1]     What type(s) of seafood do you regularly eat? (Check all that apply)     Catfish [Checked=1]     Clams [Checked=1]
14)	Habit/tradition [Checked=1]     Health risks [Checked=1]     Ouality/Freshness [Checked=1]     Other (please specify) [Checked=1]     What type(s) of seafood do you regularly eat? (Check all that apply)     Catfish [Checked=1]     Clams [Checked=1]
14)	Habit/tradition [Checked=1]     Health risks [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     What type(s) of seafood do you regularly eat? (Check all that apply)     Catfish [Checked=1]     Clams [Checked=1]     Clams [Checked=1]     Clams [Checked=1]     Cod [Checked=1]
14)	Habit/tradition [Checked=1]     Health risks [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     What type(s) of seafood do you regularly eat? (Check all that apply)     Catfish [Checked=1]     Clams [Checked=1]     Clams [Checked=1]     Crab [Checked=1]     Crab [Checked=1]
14)	Habit/tradition [Checked=1]     Health risks [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     Uhat type(s) of seafood do you regularly eat? (Check all that apply)     Catfish [Checked=1]     Clams [Checked=1]     Cod [Checked=1]     Cod [Checked=1]     Craw [ish [Checked=1]     Crawfish [Checked=1]     Crawfish [Checked=1]
14)	Habit/Tradition [Checked=1]     Health risks [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     Other (please specify) [Checked=1]     Catfish [Checked=1]     Catfish [Checked=1]     Ctars [Checked=1]     Cod [Checked=1]     Crab [Checked=1]     Crab [Checked=1]     [Crawfish [Checked=1]     [Crawfish [Checked=1]     [Checked=1]     [Crawfish [Checked=1]     [Checked=1
14)	Habit/Tradition [Checked=1]     Health risks [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     Other (please specify) [Checked=1]     Catfish [Checked=1]     Clams [Checked=1]     Cod [Checked=1]     Crab [Checked=1]     Crawfish [Checked=1]     [Crawfish [Checked=1]     [Crawfish [Checked=1]     [Crawfish [Checked=1]
14)	Habit/Tradition [Checked=1]     Health risks [Checked=1]     Quality/Freshness [Checked=1]     Other (please specify) [Checked=1]     Other (please specify) [Checked=1]     Catfish [Checked=1]     Clams [Checked=1]     Cod [Checked=1]     Crab [Checked=1]     Crab [Checked=1]     [Crawfish [Checked=1]     [Crawfish [Checked=1]     [Checked=1]     [Crawfish [Checked=1]     [Checked=1]     [Crawfish [Checked=1]     [Checked=1]     [Checked=1]     [Checked=1]     [Checked=1]     [Crawfish [Checked=1]
14)	Habit/Tadition [Checked=1] Health risks [Checked=1] Quality/Freshness [Checked=1] Other (please specify) [Checked=1] Uhat type(s) of seafood do you regularly eat? (Check all that apply) Catfish [Checked=1] Clams [Checked=1] Catfish [Checked=1] C
14)	Habitradition [Checked=1]         Health risks [Checked=1]         Quality/Freshness [Checked=1]         Other (please specify) [Checked=1]
14)	Habitradition [Checked=1] Health risks [Checked=1] Quality/Freshness [Checked=1] Other (please specify) [Checked=1] Catfish [Checked=1] Catfish [Checked=1] Catfish [Checked=1] Catfish [Checked=1] Cats [Checked
14)	Habitradition [Checked=1] Habitradition [Checked=1] Quality/Freshness [Checked=1] Other (please specify) [Checked=1] Catfish [Checked=1] Catfish [Checked=1] Catfish [Checked=1] Catfish [Checked=1] Catfish [Checked=1] Cathick [Checked=1] Cathick [Checked=1] Cathick [Checked=1] Cathick [Checked=1] Cathick [Checked=1] Cathick [Checked=1] Salmon [Checked=1] Sardines
14)	Habitradition (Checked=1)         Health risks [Checked=1]         Quality/Freshness [Checked=1]         Other (please specify) [Checked=1]         What type(s) of seafood do you regularly eat? (Check all that apply)         Caffish [Checked=1]         Clams [Checked=1]         Cod [Checked=1]         Craw [Checked=1]         Craw [Checked=1]         Craw [Checked=1]         Flounder [Checked=1]         King Mackerel [Checked=1]         Salmon [Checked=1]         Salmon [Checked=1]         Salmon [Checked=1]         Salinon [Checked=1]         Shirnip [Checked=1]         Shirnip [Checked=1]         Shirnip [Checked=1]
14)	Habitrradium (Checked=1) Habitrradium (Checked=1) Outer (please specify) (Checked=1) Other (please specify) (Checked=1) Catish (Checked=1) Salmon (Checked=1) Catish (Checked=1) Salmon (Checked=1) Catish (Checked=1) Salmon (Checked=1) Catish
14)	Habitrradium (Checked=1)         Production and/or sourcing [Checked=1]         Quality/Freshness [Checked=1]         Other (please specify) [Checked=1]         Catfish [Checked=1]         Catfish [Checked=1]         Catfish [Checked=1]         Cod [Checked=1]         Crawfish [Checked=1]         Crawfish [Checked=1]         Crawfish [Checked=1]         Flounder [Checked=1]         Saiton [Checked=1]         Saiton [Checked=1]         Saiton [Checked=1]         Saitons [Checked=1]         Shark [Checked=1]         Shark [Checked=1]         Squid (Calamari) [Checked=1]         Squid (Checked=1]

Other (please specify) [Checked=1]

- 15) What is your preferred preparation(s) of seafood? (Check all that apply)
  - Baked [Checked=1]
  - Boiled [Checked=1]
  - Broiled [Checked=1]
  - Fried [Checked=1]
  - Grilled [Checked=1]
  - Sautéed [Checked=1]
  - Steamed [Checked=1]
  - Other (please specify) [Checked=1]

\*16) As compared to 2 years ago (prior to the COVID-19 pandemic), how has the amount of seafood you eat changed?

O Increased [Value=1]

O Decreased [Value=2]

O Stayed the same [Value=3]

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Please indicate whether you agree or disagree with the following statements regarding seafood.

	Disagree	Agree	Not Sure
*17) The general public should eat two or more servings of a variety of seafood each week	[Value=2]	O [Value=1]	 [Value=3]
*18) Seafood is a good source of high quality protein	(Value=2)	(Value=1)	[Value=3]
*19) Oily fish, like tuna and salmon, are good sources of key nutrients	(Value=2)	O [Value=1]	[Value=3]
*20) Seafood has health benefits, such as bene for the heart and brain	fits O [Value=2]	O [Value=1]	[Value=3]
*21) Americans eat more seafood than beef or poultry	O [Value=2]	O [Value=1]	(Value=3)
*22) Deep-fat frying is the healthiest way to pre seafood	pare O [Value=2]	(Value=1)	[Value=3]
*23) Seafood has a relatively low carbon footpri	nt O [Value=2]	O [Value=1]	[Value=3]
*24) Aquaculture (also known as farm-raised seafood) is an efficient and environmentall friendly production of protein	y [Value=2]	[Value=1]	 [Value=3]
*25) Each state posts seafood advisories to info consumers about safe seafood consumption	om [Value=2]	O [Value=1]	O [Value=3]

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Please indicate whether you agree or disagree with the following health statements regarding seafood.

	Disagree	Agree	Not Sure
*26) I think seafood is good for your health.	(Value=2)	O [Value=1]	_ [Value=3]
*27) I think that pregnant women should eat seafood.	O [Value=2]	[Value=1]	[Value=3]
*28) The health benefits of eating seafood outweigh the health risks.	(Value=2)	(Value=1)	_ [√alue=3]

Please indicate whether you agree or disagree with the following purchasing statements regarding seafood.

	Disagree	Agree	Not Sure
*29) Seafood is too expensive.	 [Value=2]	O [Value=1]	_ [Value=3]
*30) I feel comfortable buying and preparing seafood.	[Value=2]	O [Value=1]	[Value=3]
*31) It is easy to judge the freshness of seafood.	[Value=2]	O [Value=1]	[Value=3]

Please indicate whether you agree or disagree with the following environmental statement regarding seafood.

	Disagree	Agree	Not Sure
*32) I believe overfishing is a problem.	_ [Value=2]	(Value=1)	(Value=3)

Please indicate whether you agree or disagree with the following trust statements regarding seafood.

		Disagree	Agree	Not Sure
*33)	I trust the media to present the facts about seafood.	_ [Value=2]	O [Value=1]	_ [√alue=3]
*34)	I think seafood marketing groups provide accurate information about seafood.	_ [Value=2]	O [Value=1]	O [Value=3]
*35)	People should follow government advice about which seafood to eat.	[Value=2]	O [Value=1]	(Value=3]
*36)	I trust store personnel to be knowledgeable about the seafood I buy.	_ [Value=2]	O [Value=1]	(Value=3]
*37)	The government ensures that the seafood I buy is safe.	_ [Value=2]	O [Value=1]	(Value=3]

Please indicate whether you agree or disagree with the following seafood safety statements.

		Disagree	Agree	Not Sure
*38)	I have adequate information about seafood safety.	O [Value=2]	O [Value=1]	[Value=3]
*39)	Seafood imported into the U.S. is as safe as locally harvested seafood.	[Value=2]	[Value=1]	[Value=3]
*40)	I worry about mercury when eating seafood.	_ [Value=2]	 [Value=1]	[Value=3]

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#### How often does your family (including your spouse/partner, children, and/or parents) do the items listed below?

		Never	Rarely	Occasionally	Frequently	Not Sure
*41)	Consume seafood	 [Value=1]	 [Value=2]	O [Value=3]	⊖ [Value=4]	○ [Value=5]
*42)	Encourage you to eat healthier	 [Value=1]	_ [Value=2]	O [Value=3]	 [Value=4]	 [Value=5]
*43)	Encourage you to eat seafood	⊖ [Value=1]	O [Value=2]	O [Value=3]	⊖ [Value=4]	O [Value=5]
*44)	Prepare and/or share seafood recipes with you	 [Value=1]	O [Value=2]	O [Value=3]	O [Value=4]	 [Value=5]

#### How often do your friends and/or colleagues do the items listed below?

		Never	Rarely	Occasionally	Frequently	Not Sure
*45)	Consume seafood	 [Value=1]	O [Value=2]	O [Value=3]	⊖ [Value=4]	O [Value=5]
*46)	Encourage you to eat healthier	O [Value=1]	O [Value=2]	O [Value=3]	 [Value=4]	O [Value=5]
*47)	Encourage you to eat seafood	O [Value=1]	O [Value=2]	O [Value=3]	○ [Value=4]	O [Value=5]
*48)	Prepare and/or share seafood recipes with you	 [Value=1]	_ [Value=2]	O [Value=3]	 [Value=4]	O [Value=5]

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Please indicate how important each of the following factors are to your decisions to eat seafood.

		Not Important	Somewhat Important	Important	Very Important	Not sure
*49)	Social clubs and/or social networks	O [Value=1]	O [Value=2]	○ [Value=3]	O [Value=4]	O [Value=5]
*50)	Gatherings in the community (e.g., festivals and events)	O [Value=1]	 [Value=2]	O [Value=3]	O [Value=4]	O [Value=5]
*51)	Local culture (e.g., New Orleans culture)	O [Value=1]	O [Value=2]	_ [Value=3]	O [Value=4]	O [Value=5]
*52)	Religious/spiritual belief or rituals	_ [Value=1]	_ [Value=2]	 [Value=3]	 [Value=4]	 [Value=5]

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\*53) Are you aware of any policies and/or nutrition recommendations related to seafood?

Yes [Value=1]

O No [Value=2]

O Not sure [Value=3]

Question Logic If [Yes] is selected, then skip to question [#54] If [No] is selected, then skip to question [after #54, Matrix Text] (See "Edit Logic" for details) If [Not sure] is selected, then skip to question [after #54, Matrix Text] (See "Edit Logic" for details)

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54) Where have you heard of the policies and/or nutrition recommendations related to seafood?

Conference/Seminar/Workshop [Checked=1]

Consumer Advocacy Groups [Checked=1]

Doctor/Physician Assistant/Nurse Practitioner [Checked=1]

Environmental Groups [Checked=1]

Family/Friends [Checked=1]

Fishmonger/Seafood Clerk [Checked=1]

Government Publications [Checked=1]

In-store Demonstrations and/or Messaging [Checked=1]

Internet [Checked=1]

Media (magazines, newspapers, radio, television, etc.) [Checked=1]

Nutritionist/Dietitian [Checked=1]

Printed Educational Materials [Checked=1]

SNAP-Ed [Checked=1]

Social Media (Facebook, Instagram, Twitter) [Checked=1]

Other (please specify) [Checked=1]

Below is a list of national seafood campaigns and local educational and marketing initiatives. Please indicate your level of awareness of the items listed.

	Unaware	Aware	Not Sure
*55) Dish on Fish	(Value=2)	O [Value=1]	_ [Value=3]
*56) Eat Fit NOLA	O [Value=2]	O [Value=1]	[Value=3]
*57) Eat Seafood, America!	O [Value=2]	O [Value=1]	(Value=3]
*58) Healthy Fish, Healthy Planet, Healthy You!	_ [Value=2]	(Value=1)	_ [√alue=3]
*59) LiveWell Louisiana	_ [Value=2]	(Value=1)	_ [Value=3]
*60) Seafood2xWk	O [Value=2]	O [Value=1]	 [Value=3]

61) Where would you prefer to receive information about seafood? (Check all that apply)

Conference/Seminar/Workshop [Checked=1]

Consumer Advocacy Groups [Checked=1]

Doctor/Nurse Practitioner/Physician Assistant [Checked=1]

Environmental Groups [Checked=1]

Eamily/Friends [Checked=1]

Fishmonger/Seafood Clerk [Checked=1]

Government Publications [Checked=1]

In-store Demonstrations and/or Messaging [Checked=1]

Internet [Checked=1]

Media (magazines, newspapers, radio, television, etc.) [Checked=1]

Nutritionist/Dietitian [Checked=1]

Printed Educational Materials [Checked=1]

SNAP-Ed [Checked=1]

Social Media (Facebook, Instagram, Twitter, etc.) [Checked=1]

Other (please specify) [Checked=1]

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\*62) What gender do you identify with?

O Female [Value=1]

O Male [Value=2]

○ Non-binary [Value=3]

○ Transgender [Value=4]

O Prefer not to answer [Value=6]

O Not listed (please self describe) [Value=5]

\*63) What is your current age?

\*64) What is your race/ethnicity?

○ Hispanic or Latino or Spanish Origin of any race [Value=1]

American Indian or Alaskan Native [Value=2]

○ Asian [Value=3]

O Native Hawaiian or Other Pacific Islander [Value=4]

O Black or African American [Value=5]

	○ Two or more races [Value=7]	
	○ Other (please specify) [Value=8]	
65)	What is your current marital status?	
	O Married [Value=1]	
	Single (never married) [/alue=2]	
	O Divorced/Separated [/alue=3]	
	O Widowed [Value=4]	
(66)	What is the highest level of school you have completed or the highest degree you have received?	
,	I ess than high school (Grades 1.8 or no formal schooling). [Jalue=1]	
	High school graduate (Grade 12 with diploms or GED certificate). D/slue=21	
	Trade school or vocational program [Value=3]	
	Two year associate degree from a college or university D/alue=41	
	Four year college or university degree including Bacheloria degree [Value=5]	
	Postsreducts or professional degree, including Dachelor's degree [value=5]	
	Posigraduate of professional degree, including master s, boctorate, medical of Law degree [value=o]	
67)	What is your estimated annual household income?	
68)	Including yourself, what is your total household size?	
68)	Including yourself, what is your total household size?	
68) 69)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?	
68) 69)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?	
68) 69) 70)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?  What is your religious affiliation?  O Protectant D/alua=11	
68) 69) 70)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?  What is your religious affiliation?  Protestant [Value=1]  Roman Catholic, Dialue=21	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Momon [Value=3]	
68) 69) 70)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?  What is your religious affiliation?  Protestant [Value=1] Roman Catholic [Value=2] Normon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4]	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Ofthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5]	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6]	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=7] Buddhist [Value=7]	
68) 69) 70)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?  What is your religious affiliation?  Protestant [Value=1]  Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8]	
68) 69) 70)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?  What is your religious affiliation?  Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8] Atheist [Value=9]	
68) 69) 70)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?  What is your religious affiliation?  Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8] Atheist [Value=9] Annestic [Value=10]	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8] Atheist [Value=9] Agnostic [Value=10] No religious affiliation [Value=11]	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8] Atheist [Value=9] Agnostic [Value=10] No religious affiliation [Value=11] Muse than one religious affiliation [Value=13]	
68) 69) 70)	Including yourself, what is your total household size?  How many children are in your household under the age of 18?  What is your religious affiliation?  Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8] Atheist [Value=9] Agnostic [Value=10] No religious affiliation [Value=13] Other (nease specify) [Value=12]	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8] Atheist [Value=9] Agnostic [Value=10] No religious affiliation [Value=13] Other (please specify) [Value=12]	
68) 69) 70)	Including yourself, what is your total household size? How many children are in your household under the age of 18? What is your religious affiliation? Protestant [Value=1] Roman Catholic [Value=2] Mormon [Value=3] Orthodox such as Greek or Russian Orthodox [Value=4] Jewish [Value=5] Muslim [Value=6] Buddhist [Value=7] Hindu [Value=8] Atheist [Value=9] Agnostic [Value=10] No religious affiliation [Value=13] Other (please specify) [Value=12]	

# Thank you for participating in this research study!

If you wish to enter your email address to participate in the lottery for an e-gift card, please click the link below. You will exit this research survey and be taken to a separate form to enter your email adress.

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