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Gain vs. Loss and Near vs. Far Spatial Distance Message Framing and Support for Aquaculture Among U.S. Seafood Consumers

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GAIN VS. LOSS AND NEAR VS. FAR SPATIAL DISTANCE MESSAGE FRAMING AND SUPPORT FOR AQUACULTURE AMONG U.S. SEAFOOD CONSUMERS

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An Abstract of the Thesis Presented
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In the U.S., the aquaculture industry receives differential support from various publics due to the health and environmental concerns of seafood consumers. Since consumer communication plays a significant role in policy support, understanding how messages about aquaculture should be framed is important. This study investigated the influence of gain vs. loss and near vs. far spatial distance framing on support for aquaculture among seafood consumers in the U.S. The study used a 2*2 experimental design to vary gain/loss and near/far framing among 1052 U.S. residents from all 50 states. An online questionnaire, distributed by the survey firm GfK, was employed to collect quantitative data.

Gain frames highlight advantages of adhering to an expected behavioral outcome whereas loss frames highlight disadvantages of nonconforming to a given expectancy. In contrast, a near frame specifies spatial closeness to an event and the far frame is focused on spatially distal events. The framing literature reveals that message framing behaves in contradictory ways depending on the context. For instance, gain frames are more effective

in influencing cautious behaviors but loss frames are more effective in inducing risky behaviors. Similarly, near vs. far spatial distance framing shows converging influences depending on research contexts.

This study investigated three main research questions to identify what message frames may engender more support for aquacultures and tested for their interaction effect. Results suggest that age, gender, education, political orientation, region of the U.S., seafood consumption frequency, and message relevancy cause extra variation above the effect of the framing variables. Therefore, these variables were treated as covariates in the ANCOVA.

Findings further indicated that the loss frame was more effective in increasing support for aquaculture than the gain frame. In addition, near and far spatial distance frames had no significant impact on the support for aquaculture at 5% probability levels. However, loss/near and loss/ far messages show a significant increase in support for aquaculture at the 10% probability level. Finally, gain vs. loss and near vs. far spatial distance frames do not have a significant interaction effect. The above findings indicate that emphasizing the losses of non-adoption of aquaculture in the U.S. (i.e., near) and China (i.e., far) for U.S. audiences may influence support for aquaculture policies, as compared to gain-framed messages.

This study also poses implications for the seafood industry as it suggests that presenting a loss frame (as opposed to a gain frame) may lead to more support for aquaculture among U.S. consumers, when controlling for various individual characteristics.

Loss frames highlight the disadvantages of *not* adopting aquaculture in a given location. In so doing, these messages may provoke thoughts about loss of employment opportunities, adverse economic effects of less adoption, and nutritional disadvantages of not consuming seafood, and thus lead to support for the aquaculture industry. Analyzing the mediation and moderation roles of message relevance and emotions, seafood consumption, aquaculture knowledge, perceived aquaculture benefits, source credibility, and political orientation is suggested as future research to this study.

DEDICATION

I dedicate this thesis to my beloved parents who supported throughout my academic career. Recalling with great love, my late mother who just missed the graduation and could not celebrate the joy of my accomplishments at the University of Maine, USA. I honestly believe that I have not been this far without your kind support, guidance, protection, and affection. With my deep heart felt gratitude I promise to materialize the dreams that you had on me. Thanking you *"Amma and Thaththa".*

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CHAPTER 1

INTRODUCTION

Aquaculture is defined as the breeding, raising, and harvesting of fish, shellfish, aquatic plants, and algae and other organisms in all types of water environments [National Oceanic and Atmospheric Administration (NOAA), 2018]. In some cases, aquaculture is raising aquatic animals and plants under controlled conditions. For instance, fish are bred in hatcheries and grown in monitored water environments (Bosworth, 2012). Basically, there are two main types of aquaculture: marine and freshwater. In the U.S., aquaculture crops include oysters, clams, mussels, shrimp, and seaweed, as well as fish such as salmon, black sea bass, sablefish, yellowtail, and pomopano. There are numerous ways to farm marine shellfish, such as seeding– i.e., growing small shellfish on the seafloor in floating cages (NOAA, 2018). Typically, finfish marine aquaculture takes place in net pens in the water or in tanks on land. In contrast, U.S. freshwater aquaculture can include catfish or trout raised in ponds or other manmade structures (NOAA, 2018).

Aquaculture is one of the fastest growing food producing sectors in the world (World Bank, 2013). During the last three decades, world aquaculture production has increased from 5 million to 63 million tons supplying 6.5% of the total protein requirement for human consumption (FAO, 2012). Currently, the aquaculture production industry has witnessed a 3.5% average growth rate for the period of 2010-2019 (World Bank, 2013). Moreover, according to the most recent data, aquaculture produced 76.6 million tons in 2015 with the growth rate of 4% compared to 2014 (FAO, 2017). Countries leading the

world in wild-caught fishing harvests include: China (number 1), Indonesia (number 2), and the United States, in third place. In addition to that, all together nineteen countries have have caught nearly one million tons each in 2015 and this accounts for 70% of global fish production (FAO, 2017). Similarly, as far as aquaculture is concerned, China produced 47.6 million tons, India 5.2 million tons, Indonesia 4.3 million tons, Vietnam 3.4 million tons, Bangladesh 2.1 million tons, Norway 3.4 million tons, Egypt 1.2 million tones, Chile one million tons, Myanmar one million tons, and Thailand 0.9 million tones. The above top ten aquaculture producers accounted for 89% of world aquaculture production by quantity in 2015 (FAO, 2017). Species-wise classification shows that in 2014, 49.8 tons of finfish, 16.1 million tons of mollusks, 6.9 million tons of crustaceans, and 7.3 million tons of other aquatic animals were produced with the total estimated first-sale value of US $160.2 billion (FAO, 2017). Ironically, the 2015 top-ten aquaculture producers do not include the U.S. even though U.S. is one of the capture fishery leaders in the world.

Even though aquaculture is a growing industry, due to increased environmental concerns, consumers are increasingly looking for sustainable seafood products, and aquaculture offers one source for this seafood. Indeed, increasing demand for seafood consumption cannot be met with wild harvesting (FAO, 2016). Therefore, farming of seafood is a promising solution. Nevertheless, farmed seafood can lead to many environmental and sustainability concerns and support for the seafood industry can be threatened (Grigorakis & Rigos, 2011). This issue has implications for policy, consumer dynamics, and environmental politics, in that seafood consumers play a significant role in supporting policies related to seafood production in the US. In particular, consumer

perceptions and communication patterns can exert a great deal of pressure on seafood production, as consumers are key stakeholders in the aquaculture industry. Based on this context, undertaking this study in the communication discipline can provide insights due to several reasons. Application of message framing can help understand communication patterns of seafood consumers and how they perceive aquaculture, its benefits, and environmental concerns. In addition to that, environmental attitudes can affect sustainable management of natural resources and ecosystems. Thus, consumers' behavior is critical in supporting aquaculture-related policies in the country. Finally, this study is interested in investigating consumer support for policies that fund and expand aquaculture research and operations in U.S. Furthermore, this investigation includes consumer product purchasing behaviors, information seeking, and other issues surrounding aquaculture.

Communication research can play a significant role in examining whether certain messages can foster support for sustainable aquaculture production and products. Message framing is one such strategy that can be used to convey relevant messages to support sustainable aquaculture. In this study, the basic objective is to investigate the influence of message framing on increasing support for aquaculture among US residents. Past literature reveals a number of message frames used in conveying information about widespread agricultural and environmental issues, such as climate change (Scannell & Robert, 2013). Gain and loss framing is one of the message framing techniques that highlights the relative gains and losses of (not) participating in a given venture. Consistent results have not been observed when applying gain and loss frames used across different research contexts. For instance, gain frames have been shown to increase positive

attitudes towards mitigating climate change more so than loss message frames (Morton et al. 2011). However, gain framed messages do not necessarily promote pro-environmental behaviors in all research contexts (Lu, 2015). Similarly, loss framing may not be the most persuasive approach in environment communication (Lu, 2015). Social and spatial distance, the degree to which the communication context is perceived as socially and spatially close or far away from an individual's personal experience, is another message frame that is adapted from social psychology research and applied extensively in environmental communication (Trope & Liberman, 2010). Perception of social and spatial distance may lead to differential understanding of environmental issues, as people may place distinctly different values on environmental issues based on the social and spatial closeness of their experience. Finally, the dependent variable, support for aquaculture, is studied in terms of actual consumer support for aquaculture operations, research, policies, products, and environmental issues surrounding the aquaculture industry.

This research is a sub-study of the Human Dimensions theme ("Theme 4") of a large, National Science Foundation (NSF)-funded project at the University of Maine referred to as the Sustainable Ecological Aquaculture Network (SEANET). The present investigation is undertaken to support the broader research goals of the theme by gaining a further understanding of how consumer support for aquaculture can be influenced by message framing techniques.

1.1 Sustainable Ecological Aquaculture Network (SEANET)

The SEANET project is funded by the National Science Foundation with a $20 million grant and commenced in August 2014 and continues until July 2019 (SEANET, 2013). The main project goals include: 1) "developing and testing a social-ecological system (SES) framework through the lens of aquaculture; 2) conducting interdisciplinary aquaculture research across diverse research themes; 3) increasing Maine's aquaculture research and development network by doubling aquaculture human resources at the University of Maine; 4) gathering near-shore environmental data through a buoy based sensor system in six study sites across three bioregions to the understand Maine's dynamic coastal ecology; 5) strengthening the sustainability of the aquaculture sector by implementing support programs for innovation and entrepreneurial activity; and 6) providing training for the next generation of STEM researchers through K-16 and graduate level program" (SEANET, 2017, p. 5). To achieve the above research goals, the project is divided into four themes with faculty and student researchers engaged in relevant projects: 1) carrying capacity; 2) aquaculture in a changing environment; 3) innovations in aquaculture; and 4) human dimensions (SEANET, 2013). The present thesis research on message framing aligns with the Human Dimensions theme, which will be described in more depth below.

1.2 Human Dimensions

SEANET's Human Dimensions research theme focuses on the scientific basis of decision making through improved understanding of the social dimensions of sustainable ecological aquaculture (SEANET, 2013). The main goal of this dimension is to investigate

the current structure, function, and socio-economic context of Maine's aquaculture industry, including its resilience, potential opportunities, and challenges (SEANET, 2013). The theme consists of social science faculty members who possess quantitative and qualitative analytical skills in the fields of economics, geography, anthropology, and communication science. In addition, this theme's research contributes to interdisciplinary fields of marine policy, human ecology, sustainability science, and human ecology (SEANET, 2013). The Human Dimensions theme is also supported by PhD, MS and MA candidates of the University of Maine. The impacts of research in this theme are multidimensional. Specifically, Dr. Rickard's and Dr. Noblet's research contributes to knowledge development in risk communication and behavioral economics, including the role of information sources in consumer preference for aquaculture products and willingness to accept local aquaculture (SEANET, 2013). Similarly, the present study has a direct link to those research areas as it addresses consumers' support for aquaculture with respect to message framing.

This study uses a cross sectional survey with an embedded experiment to investigate message framing effects on support for aquaculture. The survey covered all four regions of the U.S. with a final sample of 1210. The four experimental conditions were designed to vary gain/loss and near/far language while maintaining much of the message text constant across conditions. Messages were developed based on actual news articles appearing in the *Washington Post* and *Portland Press Herald* (Maine), amended with the incorporation of four combinations of frames: gains vs. loss and near vs. far. Random assignment of subjects to experimental conditions was accomplished using an online survey method, administered by the survey sampling firm GfK. Extensive data cleaning in

SPSS, followed by analytical techniques were used to make statistical inferences (using ANOVA and ANCOVA) and answer the research questions. Age, gender, education, political orientation, region of the U.S., personal relevancy, and seafood consumption frequency were used as covariates of the model. Results suggest that the loss frame increased support for aquaculture more than the gain frame; however, there was not a significant difference between the near vs. far message frame in support for aquaculture. In addition, the interaction effect of both messages frames considered together is not significant. The covariates considered in the study, including level of education, political orientation, seafood consumption frequency, and message relevancy, are significant predictors of support for aquaculture, and should be considered when designing future research.

This study poses implications for the aquaculture industry as it suggests that presenting a loss frame (as opposed to a gain frame) may lead to more support for aquaculture among U.S. consumers, when controlling for various individual characteristics. Loss frames highlight the disadvantages of *not* adopting aquaculture in a given location. In so doing, these messages may provoke thoughts about loss of employment opportunities, adverse economic effects of less adoption, and nutritional disadvantages of not consuming aquaculture seafood. Results suggest applications for the aquaculture industry and government bodies alike, as they work to develop promotion campaigns to garner support for U.S. aquaculture development.

CHAPTER 2

LITERATURE REVIEW

In this chapter I discuss message framing in general and develop the argument based on framing theory and prospect theory focusing on how message framing can be applied to the aquaculture research context. When prospect theory and framing theory are combined, I achieve more conceptual understanding on how prospects are transformed to actionable frames that can be use in applied communication contexts. Furthermore, this chapter discusses research applications of gain. vs. loss and near vs. far spatial distance framing with similar research design and application in the marketing and environmental management literature. Finally, two important study variables, political ideology and support for aquaculture, are discussed with greater details within the context of aquaculture.

2.1 Message framing

Message framing refers to "selection of some aspects of a perceived reality and making them more salient in a communication context, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for them items described" (Entman, 1993, p. 52). This definition explains that message frames set social realities and bring particular issues to the audience attention. Moreover, media communication research explains that message frames play a role of social constructivism by creating social realities for audiences (McQuail, 1994). Setting frames facilitate information processing and interpretation by influencing

preexisting meaning structures and schemas (Scheufele, 1999). Broadly, messages frames can be divided into two categories: media frames and individual frames (Scheufele, 1999). Media frames can be conceptually defined as "a central organizing idea or story line that provides meaning to an unfolding strip of events. The frame suggests what the controversy is about, the essence of the issue" (Gamson & Modigliani, 1987, p. 143). According to this definition of media framing it helps to compile information in such a way that promotes issue salience and presents information to the audience in an appealing manner. In contrast, Individual frames are "mentally stored clusters of ideas that guide individuals' processing of information" (Entman, 1993, p. 53). This definition specifically relates to political communication, as people constantly make inferences as to what they see in politics. Unlike media frames, individual frames are not transmitted by the media; instead, individuals set information into their preferred mental frames to make inferences about their surroundings. In addition to the media communication definitions provided above, there is a broad literature that defines and explores message framing, as I will review below.

Chong and Druckman refer to message framing as a "process in which people develop a particular conceptualization of an issue or reorient their thinking about an issue" (2007, p. 104). This definition is developed with the perspective that any issue could be seen from different angles. For instance, a new tourist hotel construction project in a catchment area could look positive as it attracts an enormous number of tourists that would bring financial benefits to shareholders. However, this project could also have environmental concerns such as pollution downstream and forest destruction leading to

less irrigation water availability for agriculture. The above situation can have multiple perspectives in which people could see impacts of the project. Application of message framing in this situation could be to better communicate economic benefits that the community would get with the construction of the tourist hotel. For instance, any new project in a naturally intact locality would initially seem environmentally devastating, but communities might be mobilized through message framing. For example, pointing out new job creation, market opportunities, infrastructural developments, and connections with the outside world could outweigh some of the negative implications of the project. Perhaps, a clear depiction of losses and how they will be addressed to mitigate negative impacts could attract community support for the project. Community radio, television, and other communication channels could use message frames to attempt to induce favorable community support. As Chong and Druckman (2007) suggest, reorienting location dwellers to think that tourist hotel construction is favorable in socio-economic terms could gain their support. In short, this process involves shaping the context in more appealing ways while keeping communities informed about potential harms and how they could be safely mitigated.

So far, I tried to conceptually evaluate different definitions of messages framing that are coming from diverse branches of communication discipline and the broader social sciences. Now, I turn to explain what frames actually do in human communication. Entman (1993) identifies several theoretical roles of message framing. First, framing can define problems. Message framing can specify what causal agents are making the problem with what costs and benefits that are usually measured with common cultural values. This role

takes more of a definitive task in identifying and conceptually defining the scope of an issue. Second, framing can diagnose causes. Social or environmental issues can have multiple causes. The root causes could be social, economic, political or natural in nature. Third, framing can help individuals make moral judgements. Causes of any issue may not have ascribed moral meanings until frame developers evaluate and assign moral sense to them. Finally, frames can suggest remedies. Messages framing can focus audience attention on corrective measures that fix social and environmental issues. In addition to the above theoretical functions, message framing performs several applied functions. Members of the public rely on frames to make sense about environmental issues, media use frames to craft appealing messages and news reports, policy makers use frames to define policy options and research directive and decisions, and experts and scientists use frames to simplify scientific communication and increase its persuasiveness (Nisbet, 2009). Message framing has been tested with public audiences for various purposes to see the relative influence on shaping public perception and understanding. Moreover, studies have concluded that, when applying certain frames, and among certain audience demographics, message framing can influence public opinion, as well as exert impacts on environmental attitudes and behaviors (Chong & Druckman, 2007).

2.2 Prospect theory of framing

The above definitions of message framing suggested that frames help issue definition, identification of causes, moral evaluation, recommendation of remedies, reorientation of audience thinking, and setting social realities that facilitate information processing; however, as far as this study is concerned, a narrower definition of framing is

needed. Kahneman and Tversky (1979) define framing as presentation of information in two different valences, positive or negative, pursuing the same value outcome in both situations. To add to this definition, message framing can also be described as highlighting both positive and desired aspects or negative consequences of not adhering to an expected communication behavior (Meyerowitz & Shelly , 1987). In this regard, frames act as mental models and organizing devices of communication that set contexts for perception and discussion by selectively activating different cognitive and affective schema (Marx et al. 2007).

Prospect theory (Kahneman & Tversky, 1979) represents how framing initially came into the economic research arena**,** explaining how individual decision-making processes take place when multiple options are presented in the decision-making context, and individuals must evaluate the prospects of a decision with potential economic gains and losses. The theory suggests two stages of the process: editing and evaluation. In the editing phase, individuals consider prospects of each option available that often yield similar representations. The editing process helps simplification of the subsequent evaluation and makes the selection easier. Moreover, the editing process consists of several operations: coding, combination, segregation, and cancellation (Kahneman & Tversky, 1979). The first stage is coding. According to Kahneman and Tversky (1979), in decision making people perceive things in terms of gains and losses rather and wealth or welfare. These gains and losses are estimated based on a neutral benchmark or a reference point. These reference points are assessed based on the current assets and how much will be gained or lost. Nonetheless, placement of the reference point is based on how prospectives are offered

in terms of gains vs. losses (Kahneman & Tversky, 1984). The second stage is combination. Prospects with identical outcomes will be combined to assess the gains and losses (Kahneman & Tversky, 1984). The third stage is segregation. Some prospects can contain riskless components that need to be separated from risk components. Segregation is applied to each prospect separately. The final stage is cancellation. Isolation of outcomes is done through cancellations of offered prospects. Discarding common constituents is also a method of getting rid of options presented to a decision maker (Kahneman & Tversky, 1984).

In the evaluation phase of the theory, based on the prospect evaluation, the option that carries the highest value is chosen as the final decision (Kahneman & Tversky, 1984). Prospect theory gives an empirical explanation for how individuals make decisions. Also, it is quite clear that message framing seems to evolve from prospect theory as it introduces gains and losses in terms of prospects of an economic decision-making situation. This evidence is further visible in other research that uses prospect theory as early conceptual developments in the field. Gains and loss prospects facilitate the decision and narrow prospective outcomes. This facilitation of decision outcomes through gains and losses could be seen in a communication perspective as frames. What message frames are doing is outlining qualities of a given decision making situation and which decision seems more advantageous.

To make the prospect theory less hypothetical, consider the following example. Imagine going to a seafood restaurant. The moment the consumer gets the menu starts the prospect editing process. In the coding stage, all benefits and disadvantages are

evaluated. For instance, nutrition, cost, and health benefits are compared and contrasted with seafood and other food items if the customer has specific interests in choosing a seafood restaurant for dietary reasons. If the consumer is interested in salmon, he/she would consider nutritional aspects of salmon over red meat dishes. Moreover, an environmentally conscious consumer might look into production types: wild caught salmon vs. farmed salmon. Depending on their scientific awareness, the consumer might consider increasing rumors about farmed salmon containing heavy metals and other environmental pollution problems. It is hard to imagine that a consumer might consider all of the above in selecting a meal, but this estimation is unconsciously running in our cognition. Based on the above coding, the consumer may look into combination of several seafood items while segregating riskless components from risky food items such as red meat dishes that contain high unhealthy fatty acids. Now, based on prospect editing, several food dishes may be cancelled out after extracting all beneficial prospects. Finally, in the evaluation stage, considering all estimations, the food dish that fits well with the expectations is finalized and ordered. Now based on the prospect theory individuals undergo the above steps sequentially. However, having presented positive and negative prospects of consumption and non-consumption of seafood could facilitate consumer decision making. In other words, framing of advantages and disadvantages in terms of gain vs. loss frames helps consumers to make informed decisions about their seafood consumption.

2.3 Gain vs. loss framing

The use of gain vs. loss framing has long been researched in a wide variety of health and environmental communication contexts, such as: cancer detection and prevention

(Schneider, et al., 2001), anti-smoking campaigns (Schneider, Salovey, & Smith, 2001), blood donation (Hupfer, 2006), recycling, and energy conservation (Lord, 1994). The gain vs. loss framing is derived from prospect theory and states the premise that the gain frame stresses positive outcomes of compliance and the loss frame emphasizes negative outcomes of noncompliance on a given issue (Kahneman & Tversky, 1984). Moreover, the application of prospect theory in gain vs. loss framing shows that "risky behaviors" — human behaviors that have significant heath, environmental, social, or economically hazardous impacts – are effectively promoted with loss-framed messages (Rothman & P. Salvoey, 1997). For instance, mammography screening and early detection of breast cancer has been identified to be promoted with loss frames. The reason is health behaviors mostly involve significant uncertainty and risk. When people are aware of potential losses, they tend to be more willing to take risks (Rothman & Salvoey, 1997). On the other hand, cautious behaviors are effectively promoted with gain framed messages. Thus, in a health context, prevention behaviors are more effectively promoted with gain framed messages, relative to loss framed messages (Rothman & Salvoey, 1997). For example, contraceptive usage and prevention of sexually transmitted disease could be promoted by highlighting the benefits of contraceptive methods. In an environmental context, an experimental study revealed that gain framed messages developed more favorable attitudes towards climate impact mitigation, as compared to loss framed messages (Spence & Pedigeon, 2010). In recent years, several meta-analyses have determined that the relative persuasiveness of gain vs. loss framing is rather inconsistent across contexts (O'Keefe & Jensen, 2006; 2009), as will be further outlined in the next section.

2.4 Application of gain vs. loss frames in research

I identify Gamliel and Herstei (2013) and Cucchiara and Kwon (2015) as two studies similar to the present study that uses experimental designs with message framing to explain research applications. Both studies have used gain vs. loss framing and consumer involvement as independent variables to investigate the impacts of framing on selected dependent variables. Furthermore, these studies provide evidence on the differential impacts of gain vs. loss framing under given research contexts.

Marketing research in the cosmetic industry has used a 2*2 cross sectional experimental design, N=329, with positive (gain) vs. negative (loss) and low vs. high consumer involvement as experimental conditions in understanding how consumer product choices and perception of monetary gains differ among experimental conditions (Gamliele & Herstei, 2013). This study does not specifically define involvement, but provides an explanation that highly involved consumers use systematic information processing whereas less involved use heuristic information processing techniques in their product selection. The study involved two dependent variables: perceived monetary gains and product choice. The positive frame highlighted the benefits of saving $8 while purchasing regular sunscreen and the negative frame focused on losing $8 by purchasing new sunscreen. The study hypothesized that highly involved consumers perceive the monetary gain associated with purchasing the cheaper product as higher and would choose it more when presented with a negative frame relative to a positive frame. Moreover, low-involved consumers would perceive the monetary gain of the cheaper product as higher, and would choose it more, when presented with a positive frame

relative to a negative frame (Gamliel & Herstein, 2013). The study revealed no significant difference in monetary gains perceived by low involved individuals. However, a significant difference between two message conditions has been observed for highly involved people in the perception of monetary gains. More specifically, highly involved people seem to perceive high monetary gains in negatively framed message relative to the positively framed message. Contrasting, the study also found that message framing does not affect high and low involved customers' product choice. Gamliel and Herstein (2013) further justify this finding by incorporating heuristic-systematic process model and elaboration likelihood model. On the one hand, low involved customers use peripheral and heuristic cues presented in the product in their decision-making process. On the other hand, highly involved people were cognizant of the monetary gains in the negatively framed message that presented losses of buying an expensive product while rationally understanding the financial gains highlighted in positively framed message. They use central information processing systems to make inferences about product choice. From this study it is evident that message framing is moderated by consumer involvement in processing monetary gain-related product information (Gamliel & Herstein, 2013); however, as framing does not impact on product choice directly, it is clear that to make message framing impactful on a given dependent variable, other associated relationships with moderating and mediating variables have to be ascertained. This can be feasible with path analysis of variables and mapping all relationships that are affecting message framing when taken as an independent variable.

Similar to the above study, Cucchiara et al. (2015) conducted a similar web-based study with 1698 organic seafood consumers on how positive, negative, and neutral messages influence their purchase intentions. The positive frame included a short passage on the benefits of consuming organic shrimp. Specifically, the message indicated health, environmental, and seafood sustainability aspects of organic shrimp consumption, whereas the negative frame highlighted disadvantages of not choosing organic seafood. The detailed message further mentioned that non-organic seafood consumption is unhealthy and does not support businesses that initiate environmentally friendly seafood production. The neutral message included a passage that describes the organic accreditation process carried out by USDA. Consumer involvement is used as a main independent variable of the study and it has been operationally defined as the extent of interest and concern that a consumer brings to bear upon a purchase decision task. This study conforms to existing literature that positively framed messages generate superior performance over negatively framed messages in persuading consumers to buy organic food (Cucchiara et al. 2015). The study also confirms the hypothesis that highly involved consumers are persuaded with the negative frame and less involved consumers with the positively framed message in purchasing organic seafood items. That is, the interaction effect between message frame and purchase decision involvement has been identified as significantly negative, indicating that as consumers' involvement in organic seafood increases, the effect of the positively framed message condition on purchase intention decreases (Cucchiara et al. 2015). They justify above findings by indicating the self-congruency effect— a situation in which the message addresses self-image and creates an

affective response inducing consumer buying behaviors. In support of this concept, positive messages and positive emotions provoke a self-congruency effect whereas negatively framed messages impede a self-congruency effect (Cucchiara et al. 2015). Moreover, Cucchiara et al. (2015) conclude the study by suggesting that U.S. market retailers should take advantage of gain framed messages. In addition to that, the effectiveness of gain framed messages could be further improved by targeting consumers who believe individual pro environmental buying choices could make a difference. According to this study it is quite clear that positive and negative message frames behave differentially based on a secondary moderating variable–consumer involvement in choosing a product. Therefore, message framing along cannot optimize an expected outcome in a given communication context.

2.5 Spatial distance framing

Gain vs. loss or positive vs. negative message framing is not the only way to frame a message that could promote an expected outcome. Framing research literatures identifies spatial distance framing as a significant framing technique that addresses spatial distance and its impacts on human communicative responses. Psychological distance can be understood as the subjective experience that something is far away from (or close to) the self, here, and now (Trope & Liberman , 2010). Four factors comprise psychological distance: temporal, spatial, social and hypothetical (Trope & Liberman , 2010). According to construal level theory, perceived psychological distance, in turn, influences our perception of objects, ideas, and events. For instance, people tend to make abstract mental construal of distal objects (Trope & Liberman , 2010). Moreover, space and distance

are factors that affect risk perception. Specifically, perceived spatial distance is considered a main element of psychological risk perception (Kulkarni & Yuan, 2015). Thus, depending on the perceived distance of a given risk, risk perception may differ; geographically distal events tend to be perceived as less serious compared to events that are more proximal (Kulkarni & Yuan, 2015). Spatial distance also appears to play a role in individuals' perceptions of prominent environmental issues such as climate change. Literature reveals that climate change risk perceptions may be influenced by the perceived spatial distance of the threat with respect to the perceiver, with closer distance eliciting greater concern, although this effect may be contingent on other individual characteristics, such as political ideology (Rickard, Yang, & Schuldt, 2016). In some circumstances, spatial distance bias occurs as people become less sensitive to and responsible for environmental issues when they perceive themselves as geographically and spatially removed from the risk, thus resulting in less empowerment, and diminished feelings of environmental responsibility (Uzzella, 2000).

An experimental study (Mir et al. 2016) that aimed to investigate the impact of gain vs. loss framing along with psychological distance framing employed an experimental design with four combinations to test the willingness of university students to change transportation modes to pro-environmental solutions. Four combinations included gain-local, gain- distance, loss-local, and loss-distance. The gain frame highlighted the positive outcomes of reduction of air pollution whereas loss frame highlighted consequences of increased air pollution. To manipulate the psychological distance two locations were used: Teheran and Beijing. Findings indicate that participants had no intention to change pro-

environmental transport modes based on perceived psychological distance. However, the study found that student who were exposed to gain frame message are more likely to prefer greener transport modes compared to student who received loss framed message. Moreover, this study revealed that gain/loss and near/far spatial distance frames do not have an interaction effect indicating that two framing conditions are independent of one another. Mir et al. (2016) use prospect theory to justify the above findings. They indicate that gain frame message carries less risk compared to loss frame that induce students to identify the benefits associated with greener transport modes. In addition, this study reports that consideration of risk associated with a behavior is a significant determinant in order to be effective in communication (Mir et al., 2016). In terms of spatial distance, Mir et al. (2016) have suggested that framing personally relevant risk information could promote action. However, there a dearth of research that support the above proposition. Conforming to literature this study concludes that outcome framing and spatial distance has no interaction effect and a specific reason has not been reported to support the observation. It is possible to infer that two framing conditions being independent of each other create no overlapping variations as they focus on autonomous contexts.

The following study highlights the moderating role of spatial distance. Kulkarni and Yuan (2015) conduct an experimental study to investigate the impact of ad irrelevant cues in ad environment and its connections with perceived psychological distance on message characteristics. More specifically, the main argument of this paper indicates that ad-irrelevant cues increase psychological distance and they interact with the persuasiveness of the message. Interestingly, this study experimentally controls social distance, spatial

distance, and construal level to understand the impact of positive vs. negative frames on message persuasiveness. In general, conclusions of the study reveal that psychological distance acts as moderating variable that determines whether positive or negative framing is likely to be more more persuasive (Kulkarni & Yuan, 2015). Therefore, from this study it is clear that spatial distance moderates the effects of a given message frame, rather than exerting an independent, main effect on the dependent variable.

2.6 Political ideology

The aforementioned passages discussed the behavior of gain vs. loss and near vs. far spatial distance frame in empirical research contexts and their impacts on human behavioral responses such as prevention, product promotion, and mitigation. In the present study, political ideology is considered as a significant variable that affects the dependent variable—support for aquaculture -- as it seems to have a connection with environmental related policy development. Political ideology can be defined in several ways. According to Freeden (2001) ideologies consist of shared and commonly held beliefs, opinions, and values of a recognizable group, class, constituency, or society. This definition shows that political ideologies are more of a cultural construct as they are commonly shared and held by similar people in a community. Culture acts as a proliferative agent in the transmission of political ideologies across generations. This idea is further grounded by Rogers (2003) indicating that political ideology can be considered as a new invention that is diffused into societies depending on its innovativeness, complexity, trialability, and observability. Therefore, culture can be the agent that sustains, modifies, or eradicates political ideologies in a social system. Moreover, political ideologies explain legitimate

means to achieve social goals. Erikson and Tedin (2003, p. 64) explain that ideologies are "a set of beliefs about the proper order of society and how it can be achieved". According to this definition, ideologies define an ideal, ethical, and legitimate code of conduct for being in the society. This argument is further grounded with the explanation given by Jost et al. (2009) that ideologies are ventures to describe the world as it is-by making expectations about human nature, historical events, present realities, and future possibilities-and to envision how the world as it should be structured, specifying socially acceptable ways of attaining social, economic, and political goals. However, some scholars show that ideologies not only focus on societal aspects but also describe how decision and actions on environment should be shaped, as Denzau and North (2000, p. 24) state, "ideologies are the shared framework of mental models that groups of individuals possess that provide both an interpretation of the environment and a prescription as to how that environment should be structured." How one makes decisions about the environment and power exercised over environmental resources has resulted in polarized perceptions about how environmental issues should be handled.

The role of political ideology has been well researched with controversial environmental issues such as climate change. This research defines ideology as a "system of values, norms and political preferences linked to a program of action in relation to a given social and political order (Carvalho, 2007, p. 225)". Furthermore, Carvalho (2007) explicates that ideologies could be philosophical, political, and normative in nature where they explain governments' socio-economic relationships with the environment (Carvalho, 2007). In addition, ideologies are visionary targets for ideal social worlds (Carvalho, 2007).

For example, democratic political ideologies generally tend to support progressive social movements, strong taxation plans, and social programs based on collective community responsibilities. Therefore, political power can be streamed to achieve such visionary goals by subscribing to those ideologies. Based on the above definition, it is quite clear that political ideologies carry norms about idealistic perspectives of the actual world that people wants to encounter. Further, political ideologies apply in all human experience when people understand, verbalize or evaluate social and environmental issues in their day to day life.

In the Western world and the United States, opinions about environmental and social issues are more politicized as people apply party politics to environmental management (Bolsen & Druckman, 2015; Zia & Todd, 2010; Hamilton, 2011). In the U.S., liberals and Democrats tend to agree with scientific findings, whereas Republicans and conservatives tend to show less agreement (McCright, 2011). Further, environmental issues such as climate change are differently perceived by Republicans than Democrats (McCright, Dunlap, & Marquart-Payatt, 2016). Democrats tend to show increased support for climate change mitigation policies whereas Republicans tend to be more hesitant (Hart & Nisbet, 2011). Malka et al. (2009) explains that this is caused due to news cues originating from different elites, organizations and media outlets that reinforce polarized ideas on environmental issues. Polling data shows a political partisanship opinion gap of Democrats and Republicans about whether climate change is caused by human actions or natural causes and has been changing over time. Since 2003 to 2008 this gap has increased from 16% to 29% showing a clear political polarization (Dunlap & McCright, 2008). The

extent of the impact caused by political orientation still exists even when relevant social demographic variables are controlled for (Dunlap & McCright, 2008). This is a clear indication that political polarization is becoming a significant factor that determines people's interpretation of environmental issues.

2.7 Support for aquaculture

In general, there are divergent views about support for sustainable aquaculture among public audiences. Certain studies view aquaculture favorably in light of environmental sustainability. For instance, half of all respondents to a national survey indicated that aquaculture is an environmentally friendly alternative to wild harvesting of fish (Blackstone, 2001). However, respondents' low knowledge of aquaculture and its impact on the environment and public health have challenged the aquaculture industry negatively (Blackstone, 2001). An Australian study on perception of aquaculture concluded that divergent opinions about aquaculture are associated with risk concerns (Mazur & Curtis, 2006). Moreover, the study revealed that the aquaculture industry tends to gain social support and social acceptance from those who perceive fewer risks associated with aquaculture practices. In addition to that, inadequate consumer discussion about aquaculture has been identified as a cause that develops negative impacts on the industry such as less social acceptance and slow growth. The study concludes that targeted communications are required to meet divergent concerns and needs of seafood consumers (Mazur & Curtis, 2006).

There is a plethora of research that highlights benefits and negative consequences of farmed seafood consumption. Hites et al. (2004) highlights that farmed salmon contain significantly high levels of organochlorine that could potentially pose health risks and advise to abstain from frequent consumption. Jacobes et al. (2002) confirmed that Scottish and European salmon contain moderate concentrations of organochlorine pesticides and PBDEs (polybrominated diphenyl ethers). In contrast, the European Food Safety Authority (2005) has shown evidence that there is no significant safety difference between farmed and wild salmon. In addition, Tuomisto et al. (2004) disproves Hites et al.'s (2004) recommendations of restricting farmed salmon consumption, explaining that it is a politically "nonscientific" explication to ignore the health benefits of salmon. Clearly, contamination in farmed seafood is a contentious subject among the scientific community. Importantly, from the communication perspective, a polarized scientific argument between two opposing camps may lead to low perceived credibility of subject area experts and high-risk perception among seafood consumers, and also suggests that consumers' level of knowledge about aquaculture may be critical for determining support for the industry. In addition to above health concerns, there are other ecosystem issues associated with aquaculture. Introduction of alien species, genetic interactions, generation of antibiotic-resistant microorganisms, use of wild resources, alterations of coastal habitats and disturbance of wild life are some of them (Grigorakis & Rigos, 2011). Moreover, build-up of solid waste material leading to eutrophication water destroys the natural beauty of water bodies.

To date, studies have suggested that public audiences around the world know little about aquaculture processes or products. European studies have revealed that the public is aware of possible hazardous compounds found in farmed fish, such as that farmed salmon contain more mercury than wild salmon (Pieniak et al. 2013). In addition, 58.6% of those surveyed in a recent study knew that more than half of fish eaten in Europe is imported (Pieniak et al. 2013). This study further indicated that consumers' knowledge of aquaculture varies significantly among countries. Generally, Southern Europeans, Portuguese, and Germans have significantly higher knowledge about seafood than residents of Romania, the Czech Republic, and Sweden (Pieniak, et al. 2013). To date, no known studies have investigated subjective or objective levels of aquaculture knowledge among a representative sample of U.S. residents; further, little is known about how or where U.S. consumers may be receiving their information about aquaculture products or processes, and how this information may influence their perception of aquaculture risk, or support for its development.

Knowledge about aquaculture may be fostered, in part, through exposure from mass media channels. Mass media is a powerful tool that has the potential to create public knowledge and decides what it reinforces and what is hindered (Feucht & Zander, 2017). Furthermore, Feucht and Zander (2017) indicate that concerns about aquaculture coming through print media could negatively affect seafood production since legislative approvals and decision are influenced by public perception. Feucht and Zander (2017) further report that German print media highlights relatively fewer benefits of aquaculture compared to risks. In this context, Feucht and Zander (2017) explain that media plays a role of agenda

setting where it highlights high environmental concerns that could lead consumers to think of aquaculture as rather harmful to the environment. Agenda setting is media and press setting the tone of socio political issues based on the issue salience (McCombs & Shaw, 1972). In this regard, media do not tell people what to think about a given issue, but rather, what to think about in the first place (McCombs & Shaw, 1972). Further, mass media often provide the best and easiest access to ever changing political realities (McCombs & Shaw, 1972). Therefore, consumer support for aquaculture may be directly and indirectly determined by the aquaculture agenda set by mass media.

In support of the agenda setting function of mass media, recent research that evaluated newspaper headlines in developed countries indicates that the frequency of aquaculture related headlines in newspapers has increased at a rate of 3.7 articles per year (Froehlich et al. 2007). Moreover, newspapers in developed counties more frequently use positive headlines than negative headlines and this percentage is even higher for developing countries. Therefore, it is expected that the general public in developed countries may be more aware and informed about aquaculture developments and policies in their countries, as compared to citizens in developing countries. In the same study, an investigation of public comments submitted about federal aquaculture legislation in the USA suggested that these comments tend to be more positive than negative; however, the negative comments discussed more about environmental policy aspects than monetary issues and expressed a “not in my backyard” perspective about aquaculture (Froehlich et al., 2017).

2.8 Research questions

Based on the literature review it is quite clear that message framing has been applied in wide variety of contexts in diverse ways. An array of literature supports the idea that message framing can be used to induce positive environmental behaviors and attitudes. However, considering the inconsistency of findings in the literature with respect to gain vs. loss framing and spatial/social distance framing on pro-environmental attitudes and behavioral intentions, rather than hypothesizing relationships, I formulated research questions to keep the investigation open. The following three broad research questions are investigated in this study:

RQ1: Is a gain frame more effective than a loss frame in increasing support for aquaculture among U.S. consumers?

RQ2: Is a low spatial distance frame more effective than a high spatial distance frame in increasing support for aquaculture among U.S. consumers?

RQ3: Does the gain/loss frame interact with the spatial distance frame such that a gain frame with low spatial distance will be most effective in increasing support for aquaculture among U.S. consumers?

CHAPTER 3

METHODOLOGY

3.1 Questionnaire

This study uses a part of the data set collected by GfK between January 13 and January 28, 2017. GfK is a research company specializing in marketing, media, social policy, and health-related survey research. They specialize in online studies that help business organizations, government, and academia collect valid data on nationally important issues. GfK samples from online panel members representative of all U.S. states, and has technical support to collect data from households without internet access in the U.S. The present study used a questionnaire to collect data from adult (18 years and older), English-speaking residents of all 50 states. The questionnaire was pre-tested and revisions were made to the final questionnaire. On average, respondents took nearly 25 minutes to complete the survey. A total of 2125 respondent were recruited for the survey but only 1210 complete questionnaires were returned for a response rate of 59.6%.

3.2 Research design

The questionnaire started with a brief explanation about the research followed by the required IRB information – i.e., the risks, benefits, compensation, confidentiality, and voluntary details of the survey and contact information of the survey group. The first several questions inquired about the seafood types, consumption frequency, information seeking behaviors, and subjective and objective aquaculture knowledge. Thereafter,

respondents were assigned to one of four experimental messages, or a no-message control condition.

A 2 (gain/loss) x 2 (near/far spatial distance) factorial, between subjects, experimental design (with no-message control) was employed to investigate how support for aquaculture differs when individuals are exposed to gain vs. loss framed messages about aquaculture development, and whether these aquaculture practices are described as taking place in the U.S. vs. in China. For respondents in the experimental conditions, after reading the message, they answered a test question on the country that the message was focused on to gauge message attention. Likert scale questions on perceived message characteristics, and support for aquaculture followed. Most of the survey questions elicited numerical responses on a Likert scale (i.e., 1-6; strongly disagree to strongly agree) to assess the variables, as will be outlined further below.

3.3 Message content

This study used four different messages with two dimensions: gain vs. loss and spatial distance (near vs. far) framing. Gains and losses highlighted the advantages of adopting or the disadvantages of *not* adopting (respectively) aquaculture. The two geographical locations, China and the U.S., were used to encapsulate the spatial distance frame (near vs. far) with respect to U.S. participants. The content of the messages covered information about the origin of the seafood, sustainability concerns, promotion of domestic aquaculture production, employment generation, and economic benefits. Further, specific information relevant to the country was given while preserving the

general message content across four treatments. Actual messages are provided in the Appendix.

3.4 Measures

3.4.1 Policy support for aquaculture

This variable was measured on a six-point Likert scale with seven items: 1) strongly disagree, 2) disagree, 3) somewhat disagree, 4) somewhat agree, 5) agree, 6) strongly agree. The items covered information such as support for aquaculture research, operations, products, and aquaculture information seeking behaviors. Non-responses were recoded as missing values. All seven items were averaged to construct the variable-support for aquaculture policy. (M=3.78, SD= 1.03, α=.92). This variable is used as the main dependent variable of the study.

3.4.2 Political ideology

Political ideology was measured on two dimensions: concern about social and fiscal issues. Both dimensions were measured with a single item each on seven-point Likert scale ranging from (1) very liberal to (7) very conservative. Given high correlation, the two items were averaged to construct a single variable (*M=4.43, SD=1.44, α=.85)*.

3.4.3 Message relevance

Message relevance was measured with six questions on a binary scale (1= yes, 0= no). The following questions were included: *Have you ever actively looked for information about aquaculture products by:*

- *Talking to a seafood seller about aquaculture products?*
- *Reading labels or packaging information on aquaculture products?*
- *Talking to an aquaculture producer?*
- *Searching online for aquaculture product information?*
- *Talking to someone who prepared an aquaculture product?*
- *Have not looked for information*

The last question was reverse coded. All the respondents who answered "yes" to at least one question were coded one and rest with zeros (yes=30.30%, no=69.70%). The resultant dummy variable was used in the analysis.

3.4.4 Demographic variables

Respondents' age was measured as a ratio variable (*M*=52.27, *SD= 17.00).* Gender was coded as 1= male, 2= female. Education was treated as an interval variable even though it was quantified in 14 categories. Seafood consumers lived in four regional divisions of the U. S.: Northeast[1] (18.2%), Midwest[2] (21.6%), South[3] (35.3%), and West[4] (25.0%), and South was used as the reference group in analyses. Seafood consumption frequency was estimated as a categorical variable (daily, once per week, once per month,

[1] Maine, New York, New Jersey, Vermont, Massachusetts, Rhode Island, Connecticut, New Hampshire, and Pennsylvania
[2] Illinois, Iowa, Kansas, Missouri, North Dakota, South Dakota, Nebraska, Minnesota, Michigan, Ohio, Wisconsin, Indiana
[3] Delaware, District of Colombia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas
[4] Montana, Wyoming, Colorado, New Mexico, Utah, Arizona, Nevada, Washington, Oregon, California, Alaska, Hawaii, and Idaho, and Montana

less than once per month, and never). This variable was re-coded into five dummy variables while keeping the category of "never" as the reference group.

3.4.5 Analysis

Data cleaning was carried out to remove cases with incomplete or missing data. In particular, cases were removed based on two criteria: (1) time taken to complete the questionnaire; and (2) the answer given to a question about the content of the message (i.e., reading check). In terms of time, respondents who completed the survey in 10 minutes or less were omitted from the analysis, under the assumption that they had failed to pay sufficient attention to the questionnaire. With respect to the reading check, respondents who answered wrong were omitted under the assumption that they had not read (and/or not paid sufficient attention to) the treatment message, and thus the reported data are unreliable. All together, 158 cases were removed, resulting in a final sample of 1052 cases.

ANCOVA was the main analytical tool used in this study. Experimental conditions were recoded into dummy variables to isolate message frames (gain=1, loss=0, and near=1, far=0). Age, gender, education, political orientation, region of the state, seafood consumption frequency, and message relevance were considered as covariates in the analysis.

First, in the ANCOVA analysis all three research questions were tested with experimental conditions vs. the dependent variable–support for aquaculture. Second, covariates were added to the model one at a time. Age, gender, education, political

orientation, region of the U.S., seafood consumption frequency, and message relevance were added consecutively. The analysis used SPSS version 24.

CHAPTER 4

RESULTS

This chapter encapsulates results of the study. Manipulation check found that there is no significant association of demographic variables such as age, gender, education, region of the U.S., seafood consumption frequency, and political orientation with experimental conditions. In addition to that message characteristics–persuasiveness, clarity and, informativeness– do not vary among experimental conditions. However, six emotional appeals: happiness, hope, anger, guilt, excitement, and sadness, were significantly different among experimental conditions. In terms of gain/loss frame, loss frame found to be more supportive of aquaculture. Whereas, near/far spatial distance frame has no significant impact on support for aquaculture. Moreover, the interaction of gain/loss and near/far spatial distance frame is insignificant. However, condition 3 (loss/near) and condition 4 (loss/far) are significantly supportive of aquaculture at 10% probability. Covariates, education, political orientation, seafood consumption frequency, and message relevance are significant predictors of support for aquaculture.

4.1 Demographic characteristics

The age of the respondents varied between 18 and 94 years (M = 52.27, SD = 17.00). The gender composition includes 49% males (N=515) and 51% females (N=537). Education qualification identified 14 categories with the overall M= 10.42 and SD=2.01. Respondents who have education below 12^{th} grade was at a minimal level whereas high school graduate/high school diploma, some college education, and bachelors', and

masters' degree holders made up 8.3%, 20.8%, 20.4%, and 10.4% of the sample, respectively. In contrast, individuals with professional or doctorate degrees comprised 4.3%. The sample included respondents from four regions of the United States: Northeast (18.2%), Midwest (21.6%), South (35.3%), and West (25%). Political orientation of respondents aggregated around the middle of the conservative to liberal seven-point Likert scale (M=4.43, SD=1.44). With respect to consuming seafood, 1.3% of the respondents reported consuming seafood daily, 36.6% once a week, 32.2% once per month, and 21.4% less than once per month. In contrast, 8.5% of the respondents never consume seafood (M=2.99, SD=.98). According to the analysis, seafood consumption did not vary significantly by U.S. region, $\chi 2$ (16) =10.38, p=.84.

4.2 Manipulation check

To ensure that participants answered the questionnaire based on experimental conditions they were exposed to, they completed a manipulation check. All respondents in the final sample (N=1052) correctly identified the country that the experimental condition was focused on (i.e., U.S. or China).

Further, a series of Chi-square and ANOVA tests determined whether there were differences in sociodemographic variables across conditions. Age distribution among all experimental conditions and the control group indicates that there is no significant association between experimental condition and age categories (χ^2 (12) =12.80, p=.38). This provides evidence that all age categories are equally distributed among experimental conditions. Distribution of gender among experimental conditions shows that males and

females have been equally distributed. χ^2 (4) =3.66, *p*=.45. Moreover, region of the U.S. was considered in sampling respondents and manipulation check ensures that region and assignment of experimental conditions have no significant relationship. χ^2 (12) =17.83, *p*=.12. In terms of education level, all respondents were equally distributed among experimental and control groups (*F* (4, 1051) =.18, *p* = .95). Similarly, seafood consumption was not associated with experimental conditions. χ^2 (16) = 10.38, *p* =.84. Finally, there was no significant difference in political orientation of respondents assigned to all experimental and control groups (*F* (4, 1041) =.48, *p* = .79). All in all, these tests confirm the success of the experimental randomization, and that the experimental conditions and control group are independent of the magnitude of impact imposed by demographic variables.

Characteristics of experimental conditions such as the perceived persuasiveness, clarity, and informativeness of the message were measured on six-point Likert scale. Tables 4.1 and 4.2 illustrate that persuasiveness of messages had no significant differences across experimental conditions (*F* (3, 821) =1.85, *p*=.13). Tables 4.3 and 4.4 indicate that message clarity among four experimental conditions had no significant difference (*F* (3, 823) = .89, *p*=.44). Finally, Tables 4.5 and 4.6 indicate that informativeness of four experimental conditions had no significant difference (*F* (3, 824) =2.25, *p*=.08). This analysis indicates that persuasiveness, clarity, and informativeness of experimental conditions have not imposed additional variation on the dependent variable—support for aquaculture. This further ensures that the experimental manipulation of gain vs. loss and near vs. far frames has been successful on survey respondents. From this point on, all experimental conditions are numbered and refer to the following framing combinations: Condition 1 (Gain/near),

Condition 2 (Gain/far), Condition 3 (loss/near), Condition 4 (loss/far), and the control condition (no message).

Table 4.1 Descriptive statistics of message persuasiveness

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	209	4.22	1.08	.07	4.07	4.37
condition 2	193	4.03	1.11	.08	3.87	4.18
condition 3	211	4.27	1.17	.08	4.11	4.43
condition 4	209	4.20	1.00	.07	4.06	4.33
Total	822	4.18	1.09	.03	4.11	4.26

Table 4.2 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.68	3	2.22	1.85	.13
Within Groups	983.30	818	1.20		
Total	989.99	821			

Table 4.3 Descriptive statistics of experimental condition and message clarity

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	209	4.62	1.02	.07	4.48	4.76
condition 2	194	4.47	.99	.07	4.33	4.61
condition 3	211	4.53	1.14	.07	4.37	4.68
condition 4	210	4.47	.97	.06	4.34	4.60
Total	824	4.52	1.03	.03	4.45	4.59

Table 4.4 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.87	3	.95	.89	.44
Within Groups	882.68	820	1.07		
Total	885.56	823			

Table 4.5 Descriptive statistics of message informativeness

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	209	4.74	.94	.06	4.61	4.87
condition 2	194	4.48	1.01	.07	4.34	4.62
condition 3	211	4.59	1.16	.08	4.43	4.75
condition 4	211	4.64	.89	.06	4.52	4.76
Total	825	4.61	1.01	.03	4.55	4.68

Table 4.6 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.90	3	2.30	2.25	.081
Within Groups	838.51	821	1.02		
Total	845.42	824			

Moreover, we included measures to ensure that all messages induced similar levels of various emotions. Discreet emotions including happiness, hopefulness, anger, guilt, excitement, and sadness were measured on 10-point Likert scale (1: a none of this emotion to 10: a lot of this emotion). According to the analysis, happiness aroused by experimental condition was significantly different (F (3, 811) =8.80, p<.001). As the Levene test of homogeneity was significant ($p<.001$), a Games- Howell post-hoc test indicated that condition 1 and 4; condition 1 and 3; and condition 2 and 4 were significantly different in terms of evoking happiness.

Table 4.7 Descriptive statistics for experimental conditions and happiness

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	207	4.14	2.47	.17	3.80	4.47
condition 2	191	3.78	2.42	.17	3.43	4.13
condition 3	208	3.41	2.13	.14	3.12	3.71
condition 4	209	3.06	1.91	.13	2.80	3.32
Total	815	3.59	2.27	.08	3.44	3.75

Table 4.8 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	133.14	3	44.38	8.80	.000
Within Groups	4089.61	811	5.04		
Total	4222.75	814			

Table 4.9 Games Howell post-hoc test for multiple comparison of happiness

(I) Randomly assignment for conditions	(J) Randomly assignment for conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
condition 1	condition 2	.355	.246	.472	-.28	.99
	condition 3	.722*	.227	.009	.14	1.31
	condition 4	1.073*	.217	.000	.51	1.63
condition 2	condition 1	-.355	.246	.472	-.99	.28
	condition 3	.367	.230	.382	-.23	.96
	condition 4	.718*	.220	.007	.15	1.29
condition 3	condition 1	-.722*	.227	.009	-1.31	-.14
	condition 2	-.367	.230	.382	-.96	.23
	condition 4	.351	.199	.291	-.16	.86
condition 4	condition 1	-1.073*	.217	.000	-1.63	-.51
	condition 2	-.718*	.220	.007	-1.29	-.15
	condition 3	-.351	.199	.291	-.86	.16
*The mean difference is significant at the 0.05 level.						

The manipulation check also indicates that hopefulness aroused by experimental conditions was significantly different (F (3, 810) =4.31, p =.005). Specifically, according to a post-hoc Bonferroni test for multiple comparisons, conditions 4 and 1 were significantly different in evoking hope.

Table 4.10 Descriptive statistics for experimental conditions and hope

Condition	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	204	5.17	2.70	.189	4.80	5.54
condition 2	191	4.85	2.61	.189	4.48	5.23
condition 3	210	4.69	2.47	.171	4.35	5.03
condition 4	209	4.29	2.32	.161	3.97	4.61
Total	814	4.75	2.54	.089	4.57	4.92

Table 4.11 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	82.90	3	27.63	4.31	.005
Within Groups	5184.96	810	6.40		
Total	5267.86	813			

Table 4.12 Bonferroni test for multiple comparison of hope across conditions

(I) Randomly assignment for conditions	(J) Randomly assignment for conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
condition 1	condition 2	.31	.25	1.000	-.36	.99
	condition 3	.48	.24	.321	-.18	1.14
	condition 4	.88*	.24	.003	.22	1.54
condition 2	condition 1	-.31	.25	1.000	-.99	.36
	condition 3	.16	.25	1.000	-.51	.83
	condition 4	.56	.25	.161	-.11	1.23
condition 3	condition 1	-.48	.24	.321	-1.14	.18
	condition 2	-.16	.25	1.000	-.83	.51
	condition 4	.39	.24	.643	-.26	1.05
condition 4	condition 1	-.88*	.24	.003	-1.54	-.22
	condition 2	-.56	.25	.161	-1.23	.11
	condition 3	-.39	.24	.643	-1.05	.26
*The mean difference is significant at the 0.05 level.						

Results suggest differences among experimental conditions on aroused anger (F (3, 809) = 2.96, p=.03). More specifically, conditions 1 and 3; and conditions 1 and 4 were significantly different. Table 4.13, 4.14, and 4.15 show detailed results.

Table 4.13 Descriptive statistics for experimental conditions and anger

Condition	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	205	2.42	2.05	.14	2.14	2.71
condition 2	190	2.54	2.17	.15	2.23	2.85
condition 3	210	2.93	2.20	.15	2.63	3.23
condition 4	208	2.90	2.07	.14	2.62	3.19
Total	813	2.71	2.13	.07	2.56	2.85

Table 4.14 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	40.35	3	13.45	2.96	.031
Within Groups	3666.38	809	4.53		
Total	3706.74	812			

Table 4.15 LSD test for multiple comparison of anger

(I) Randomly assignment for conditions	(J) Randomly assignment for conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
condition 1	condition 2	-.118	.214	.583	-.54	.30
	condition 3	-.509*	.209	.015	-.92	-.10
	condition 4	-.479*	.210	.022	-.89	-.07
condition 2	condition 1	.118	.214	.583	-.30	.54
	condition 3	-.391	.213	.067	-.81	.03
	condition 4	-.362	.214	.091	-.78	.06
condition 3	condition 1	.509*	.209	.015	.10	.92
	condition 2	.391	.213	.067	-.03	.81
	condition 4	.029	.208	.887	-.38	.44
condition 4	condition 1	.479*	.210	.022	.07	.89
	condition 2	.362	.214	.091	-.06	.78
	condition 3	-.029	.208	.887	-.44	.38
*. The mean difference is significant at the 0.05 level.						

Results also suggest that there is a significant difference in guilt aroused by the four experimental manipulations (F (3, 812) =5.78, p=.001). A Games- Howell post-hoc test identified conditions 1 and 3, and conditions 2 and 3 as significantly different. Descriptive statistics, ANOVA, and Games-Howell test results are provided in tables 4. 16, 4.17, and 4. 18.

Table 4.16 Descriptive statistics for experimental conditions and guilt

Condition	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	207	2.30	1.87	.13	2.04	2.56
condition 2	192	2.28	1.92	.13	2.01	2.56
condition 3	208	2.99	2.06	.14	2.70	3.27
condition 4	209	2.51	1.92	.13	2.24	2.77
Total	816	2.52	1.96	.06	2.39	2.66

Table 4.17 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	66.11	3	22.04	5.78	.001
Within Groups	3091.43	812	3.80		
Total	3157.55	815			

Table 4.18 Games-Howell test for multiple comparisons of guilt

(I) Randomly assignment for conditions	(J) Randomly assignment for conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
condition 1	condition 2	.018	.191	1.000	-.47	.51
	condition 3	-.686*	.194	.002	-1.19	-.19
	condition 4	-.208	.186	.681	-.69	.27
condition 2	condition 1	-.018	.191	1.000	-.51	.47
	condition 3	-.704*	.200	.003	-1.22	-.19
	condition 4	-.226	.193	.645	-.72	.27
condition 3	condition 1	.686*	.194	.002	.19	1.19
	condition 2	.704*	.200	.003	.19	1.22
	condition 4	.478	.196	.070	-.03	.98
condition 4	condition 1	.208	.186	.681	-.27	.69
	condition 2	.226	.193	.645	-.27	.72
	condition 3	-.478	.196	.070	-.98	.03
*The mean difference is significant at the 0.05 level.						

Manipulation check with experimental conditions and excitement indicated that all conditions are significantly different in level of excitement aroused by the messages (F (3, 809) =5.38, p= .001). A Games-Howell post-hoc test identified conditions 1 and 4, and conditions 3 and 4 are significantly different in excitement appeal.

Table 4.19 Descriptive statistics for experimental conditions and excitement

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	206	4.02	2.53	.17	3.67	4.37
condition 2	190	3.67	2.35	.17	3.34	4.01
condition 3	209	3.67	2.30	.16	3.35	3.98
condition 4	208	3.12	1.99	.13	2.85	3.39
Total	813	3.62	2.32	.08	3.46	3.78

Table 4.20 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	85.79	3	28.59	5.38	.001
Within Groups	4296.24	809	5.31		
Total	4382.03	812			

Table 4.21 Games- Howell test for multiple comparison of excitement

(I) Randomly assignment for conditions	(J) Randomly assignment for conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
condition 1	condition 2	.346	.246	.496	-.29	.98
	condition 3	.354	.238	.446	-.26	.97
	condition 4	.899*	.224	.000	.32	1.48
condition 2	condition 1	-.346	.246	.496	-.98	.29
	condition 3	.009	.234	1.000	-.59	.61
	condition 4	.553	.220	.058	-.01	1.12
condition 3	condition 1	-.354	.238	.446	-.97	.26
	condition 2	-.009	.234	1.000	-.61	.59
	condition 4	.545*	.211	.050	.00	1.09
condition 4	condition 1	-.899*	.224	.000	-1.48	-.32
	condition 2	-.553	.220	.058	-1.12	.01
	condition 3	-.545*	.211	.050	-1.09	.00
*The mean difference is significant at the 0.05 level.						

Sadness also varied significantly across experimental conditions (F (3, 813), p<.001). Specifically, post-hoc Bonferroni tests suggested that conditions 1 and 3, conditions 1 and 4, conditions 2 and 3, and conditions 2 and 4 were significantly different in sadness elicited. Table 4. 22, 4. 23, and 4. 24 show detailed of the analysis.

Table 4.22 Descriptive statistics for experimental conditions and sadness

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
condition 1	206	2.67	2.17	.15	2.37	2.96
condition 2	193	2.76	2.17	.15	2.45	3.06
condition 3	209	3.39	2.27	.15	3.08	3.70
condition 4	209	3.47	2.25	.15	3.16	3.78
Total	817	3.08	2.24	.07	2.92	3.23

Table 4.23 ANOVA table

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	107.66	3	35.88	7.28	.00
Within Groups	4003.31	813	4.92		
Total	4110.98	816			

Table 4.24 Boferroni test for multiple comparison of sadness

(I) Randomly assignment for conditions	(J) Randomly assignment for conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
condition 1	condition 2	-.091	.222	1.000	-.68	.50
	condition 3	-.727*	.218	.005	-1.30	-.15
	condition 4	-.804*	.218	.001	-1.38	-.23
condition 2	condition 1	.091	.222	1.000	-.50	.68
	condition 3	-.636*	.222	.025	-1.22	-.05
	condition 4	-.712*	.222	.008	-1.30	-.13
condition 3	condition 1	.727*	.218	.005	.15	1.30
	condition 2	.636*	.222	.025	.05	1.22
	condition 4	-.077	.217	1.000	-.65	.50
condition 4	condition 1	.804*	.218	.001	.23	1.38
	condition 2	.712*	.222	.008	.13	1.30
	condition 3	.077	.217	1.000	-.50	.65
*The mean difference is significant at the 0.05 level.						

4.3 Results of the main analysis

Prior to the main analysis, covariates were identified that could potentially cause additional variation on the dependent variable that is being analyzed. Age, gender, education, political orientation, region of the U.S., personal relevancy, and seafood consumption frequency were considered as covariates of the model that needed to be quantified in order to partial off the variability caused by them in the dependent variable, support for aquaculture. This ensures that our results reflect the impact of message conditions on support for aquaculture while accounting for other potential variables acting on the dependent variable. Moreover, from a statistical point of view, using covariates in ANCOVA could reduce within-group error variance and eliminate confound effects (Field, 2014). Based on above reasons, the current study uses ANCOVA as the main analytical tool in making inferences.

4.3.1 Research question 1

The first research question investigated whether a gain frame is more effective than a loss frame in increasing support for aquaculture among U.S. consumers. The covariates education, seafood consumption frequency, and personal relevance have significant positive relationship with support for aquaculture (Education B = .03, p= .04, daily consumption B = 1.15, p <.001, weekly consumption B = 1.02, p <.001, monthly consumption B = 1.03, p <.001, less than monthly consumption B = .81, p <.001, personal relevance B = .20, p = .01). However, political orientation was negatively related to support for aquaculture B = -.05, p=.01 which indicates that as respondents expressed more conservative political ideology, they were less likely to support aquaculture. Moreover, the

analysis found that the loss frame (N=422, M=3.87) significantly increases support for aquaculture compared to the gain frame (N=398, M=3.74), F (1, 806) =3.60, p =.05, partial η^2 = .004. Tables 4.25 and 4.26 show ANCOVA and parameter estimates.

Table 4.25 Tests of between-subjects effects

Dependent Variable: Support for aquaculture					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	110.36[a]	13	8.48	9.04	.00
Intercept	80.09	1	80.09	85.32	.00
Age	1.55	1	1.55	1.65	.19
Gender	.47	1	.47	.50	.47
Education	3.84	1	3.84	4.09	.04
Political orientation	5.87	1	5.87	6.26	.01
North-East	.14	1	.14	.14	.70
Mid-West	.17	1	.17	.18	.66
West	.86	1	.86	.92	.33
Daily	13.49	1	13.49	14.37	.00
Weekly	55.08	1	55.08	58.67	.00
Monthly	57.41	1	57.41	61.16	.00
Less than monthly	32.76	1	32.76	34.90	.00
Personal relevance	6.22	1	6.22	6.63	.01
Experimental condition Gain=1, Loss=0	3.38	1	3.38	3.60	.05
Error	756.59	806	.93		
Total	12773.65	820			
Corrected Total	866.95	819			
a. R Squared = .127 (Adjusted R Squared = .113)					

Table 4.26 Parameter estimates

Dependent Variable: Support for aquaculture							
Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2.50	.27	8.96	.00	1.95	3.04	.091
Age	.00	.00	1.28	.19	-.00	.00	.002
Gender	.04	.06	.71	.47	-.08	.18	.001
Education	.03	.01	2.02	.04	.00	.06	.005
Political orientation	-.05	.02	-2.50	.01	-.10	-.01	.008
North-East	-.03	.09	-.38	.70	-.23	.15	.000
Mid-West	.04	.09	.42	.66	-.14	.22	.000
West	-.08	.08	-.96	.33	-.25	.08	.001
Daily	1.15	.30	3.79	.00	.55	1.74	.018
Weekly	1.02	.13	7.66	.00	.76	1.28	.068
Monthly	1.03	.13	7.82	.00	.77	1.29	.071
Less than monthly	.81	.13	5.90	.00	.54	1.08	.042
Personal relevance	.20	.07	2.57	.01	.04	.35	.008
[Gain frame=.00]	.12	.06	1.89	.05	-.00	.26	.004
[Gain frame=1.00]	0[a]	.	.	.	.	.	.
a. This parameter is set to zero because it is redundant.							

4.3.2 Research question 2

Research question 2 investigated whether a low spatial distance frame was more effective than a high spatial distance frame in increasing support for aquaculture among U.S. consumers. The covariates education, seafood consumption frequency, and personal relevance have positive significant relationship with support for aquaculture. Education B = .03, p= .04, seafood consumption daily B = 1.14, p <.001, weekly B = 1.00, p <.001, monthly B = 1.02, p< .001, less than monthly B = .80, p <.001, personal relevance B = .20, p = .01. In contrast, political orientation was negatively related to support for aquaculture B = -.05, p= .01 which indicates that moving towards conservatism reduces the support for

aquaculture. Furthermore, the analysis found there is no significant difference between support for aquaculture among near (N=419, M=3.774) and far (N=401, M=3.767) message conditions F (1, 806) = .16, p=.68, η^2 = .00. Table 4.27 and 4.28 show ANCOVA and parameter estimates.

Table 4.27 Test of between-subjects effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	107.13[a]	13	8.24	8.74	.00
Intercept	79.32	1	79.32	84.14	.00
Age	1.71	1	1.71	1.82	.17
Gender	.54	1	.54	.58	.44
Education	3.90	1	3.90	4.13	.04
Political orientation	5.65	1	5.65	6.00	.01
North-East	.10	1	.10	.10	.74
Mid-West	.31	1	.31	.33	.56
West	.82	1	.82	.87	.35
Daily	13.24	1	13.24	14.04	.00
Weekly	53.53	1	53.53	56.79	.00
Monthly	56.47	1	56.47	59.90	.00
Less than monthly	32.16	1	32.16	34.12	.00
Personal relevance	6.34	1	6.34	6.73	.01
Spatial distance Near=1, far=0	.15	1	.15	.16	.68
Error	759.82	806	.94		
Total	12773.65	820			
Corrected Total	866.95	819			
a. R Squared = .124 (Adjusted R Squared = .109)					
b. Computed using alpha = .05					

Table 4.28 Parameter estimates

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2.53	.27	9.08	.00	1.99	3.08	.09
Age	.00	.00	1.35	.17	-.00	.00	.00
Gender	.05	.06	.76	.44	-.08	.18	.00
Education	.03	.01	2.03	.04	.00	.06	.00
Political orientation	-.05	.02	-2.45	.01	-.10	-.01	.00
North-East	-.033	.10	-.33	.74	-.22	.16	.00
Mid-west	.054	.09	.57	.56	-.13	.23	.00
West	-.083	.08	-.93	.35	-.25	.09	.00
Daily	1.14	.30	3.74	.00	.54	1.73	.01
Weekly	1.00	.13	7.53	.00	.74	1.26	.06
Monthly	1.02	.13	7.74	.00	.76	1.28	.06
Less than monthly	.80	.13	5.84	.00	.53	1.07	.04
Personal relevance	.20	.07	2.59	.01	.04	.35	.00
[spatial distance=.00]	.02	.06	.40	.68	-.10	.16	.00
[spatial distance=1.00]	0[a]	.	.	.	.	.	.
a. This parameter is set to zero because it is redundant.							
b. Computed using alpha = .05							

4.3.3 Research question 3

The third research question investigated whether the gain/loss frame interacted with the spatial distance frame such that a gain frame with low spatial distance will be most effective in increasing support for aquaculture among U.S. consumers. This research question was tested in two steps: First, all experimental conditions (1 to 4 and control) vs. the dependent variable were tested with ANCOVA. Second, four experimental conditions (control excluded) vs. the dependent variable were tested with ANCOVA. This stepwise

analysis helps to understand the difference between experimental conditions and the control group, if any. The analysis found that there is no significant difference between the four experimental conditions and the control group in increasing support for aquaculture F (4, 1021) =2.18, p = .069, partial η^2: condition 1 and 2 =.001, condition 3 and 4 =.006 However, at a 10% probability level, condition 3 and condition 4 show a significant difference in support for aquaculture compared to the control group. Moreover, this indicates that loss/near and loss/far framed messages are associated with more supportive for aquaculture, as compared to the no-message control. The covariates education B = .02, p = .05, daily consumption B = 1.20, p <.001, weekly consumption B = .98, p <.001, monthly consumption B = 1.01, p < .001, less than monthly consumption B = .75, p < .001 have significant positive relationship to support for aquaculture. However, political orientation B = -.04, p = .027 has a negative relationship with support for aquaculture.

Table 4.29 Descriptive statistics of support for aquaculture

Random assignment for conditions	Mean	Std. Deviation	N
condition 1	3.74	.96	208
condition 2	3.76	.98	190
condition 3	3.84	1.09	211
condition 4	3.87	1.05	211
control group	3.66	1.03	218
Total	3.78	1.03	1038

Table 4.30 Test of between subject effects

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	137.67[a]	16	8.60	9.09	.00
Intercept	103.39	1	103.39	109.33	.000
Age	.88	1	.88	.93	.333
Gender	1.16	1	1.16	1.22	.268
Education	3.42	1	3.42	3.61	.057
Political orientation	4.65	1	4.65	4.92	.027
North-East	.20	1	.20	.21	.645
Mid-West	.00	1	.00	.00	.946
West	.54	1	.54	.57	.447
Daily	16.09	1	16.09	17.02	.000
Weekly	61.11	1	61.11	64.61	.000
Monthly	66.06	1	66.06	69.85	.000
Less than monthly	33.44	1	33.44	35.35	.000
Personal relevance	14.75	1	14.75	15.59	.000
Experimental condition	8.26	4	2.06	2.18	.069
Error	965.59	1021	.94		
Total	15939.78	1038			
Corrected Total	1103.26	1037			
a. R Squared = .125 (Adjusted R Squared = .111)					

Table 4.31 Parameter estimates

Dependent Variable: Support for aquaculture							
					95% Confidence Interval		
Parameter	B	Std. Error	t	Sig.	Lower Bound	Upper Bound	Partial Eta Squared
Intercept	2.435	.252	9.669	.000	1.941	2.929	.084
Age	.002	.002	.968	.333	-.002	.005	.001
Gender	.067	.061	1.109	.268	-.052	.187	.001
Education	.029	.015	1.902	.057	-.001	.059	.004
Political orientation	-.047	.021	-2.218	.027	-.089	-.005	.005
North-East	-.040	.088	-.461	.645	-.212	.131	.000
Mid-West	-.006	.083	-.067	.946	-.169	.158	.000
West	-.060	.080	-.760	.447	-.216	.096	.001
Daily	1.202	.291	4.126	.000	.631	1.774	.016
Weekly	.984	.122	8.039	.000	.744	1.224	.060
Monthly	1.013	.121	8.358	.000	.775	1.251	.064
Less than monthly	.750	.126	5.946	.000	.502	.997	.033
Personal relevance	.276	.070	3.950	.000	.139	.413	.015
[Condition=1]	.076	.095	.801	.423	-.110	.262	.001
[Condition=2]	.119	.097	1.229	.219	-.071	.309	.001
[Condition=3]	.225	.095	2.381	.017	.040	.411	.006
[Condition=4]	.232	.095	2.446	.015	.046	.417	.006
[Control=5]	0[a]	.	.	.	.	.	.
a. This parameter is set to zero because it is redundant.							

The second part of the analysis shows that there is no significant interaction between gain vs. loss and spatial distance frames F (1, 804) = .04, p = .82. Moreover, the ANCOVA analysis revealed that covariates education B = .03, p = .04, daily consumption B = 1.15, p <.001, weekly consumption B = 1.02, p < .001, monthly consumption B = 1.03, p <.001, and less than monthly consumption B = .81, p < .001, and personal relevance B = .02, p = .01 are positively related to support for aquaculture while political orientation is

negatively related B = -.04, *p* =.01. Descriptive statistics, ANCOVA, and parameter estimates are given in table 4.32, 4.33, and 4.34. Finally, graphical representations of the three research questions are given in Figures 4.1, 4.2, and 4.3

Table 4.32 Descriptive statistics

Dependent Variable: Support for aquaculture					
Frame	Spatial distance	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Loss	Far	3.87[a]	.06	3.74	4.01
	Near	3.86[a]	.06	3.73	4.00
Gain	Far	3.76[a]	.07	3.62	3.90
	Near	3.72[a]	.06	3.59	3.85

Table 4.33 Tests of between-subjects effects

Dependent Variable: Support for aquaculture					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	110.53[a]	15	7.36	7.83	.00
Intercept	80.18	1	80.18	85.22	.00
Age	1.51	1	1.51	1.61	.20
Gender	.46	1	.46	.49	.48
Education	3.85	1	3.85	4.09	.04
Political orientation	5.91	1	5.91	6.29	.01
North-East	.14	1	.14	.14	.70
Mid-West	.17	1	.17	.19	.66
West	.85	1	.85	.90	.34
Daily	13.48	1	13.48	14.33	.00
Weekly	55.02	1	55.02	58.48	.00
Monthly	57.44	1	57.44	61.05	.00
Less than monthly	32.79	1	32.79	34.85	.00
Personal relevance	6.26	1	6.26	6.66	.01
Gain frame	3.33	1	3.33	3.54	.06
Spatial distance frame	.12	1	.12	.13	.71
Gain *spatial distance	.04	1	.04	.04	.82
Error	756.42	804	.94		
Total	12773.65	820			
Corrected Total	866.95	819			
a. R Squared = .127 (Adjusted R Squared = .111)					
b. Computed using alpha = .05					

Table 4.34 Parameter estimates

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2.48	.28	8.78	.00	1.92	3.03	.088
Age	.00	.00	1.27	.20	-.001	.007	.002
Gender	.04	.06	.70	.48	-.08	.18	.001
Education	.03	.01	2.02	.04	.00	.06	.005
Political orientation	-.05	.02	-2.50	.01	-.10	-.01	.008
North-East	-.03	.10	-.38	.70	-.23	.15	.000
Mid-West	.04	.09	.43	.66	-.14	.22	.000
West	-.08	.08	-.95	.34	-.25	.09	.001
Daily	1.15	.30	3.78	.00	.55	1.74	.018
Weekly	1.02	.13	7.64	.00	.76	1.28	.068
Monthly	1.03	.13	7.81	.00	.77	1.29	.071
Less than monthly	.81	.13	5.90	.00	.54	1.08	.042
Personal relevance	.20	.07	2.58	.01	.04	.35	.008
[Gain frame=.00]	.14	.09	1.50	.13	-.04	.33	.003
[Gain frame=1.00]	0[a]	.	.	.	.	.	.
[spatial distance=.00]	.04	.09	.41	.68	-.15	.23	.000
[spatial distance=1.00]	0[a]	.	.	.	.	.	.
[Gain frame=.00] * [spatial distance=.00]	-.03	.13	-.21	.82	-.29	.23	.000
[Gain frame=.00] * [spatial distance=1.00]	0[a]	.	.	.	.	.	.
[Gain frame=1.00] * [spatial distance=.00]	0[a]	.	.	.	.	.	.
[Gain frame=1.00] * [spatial distance=1.00]	0[a]	.	.	.	.	.	.
a. This parameter is set to zero because it is redundant.							
b. Computed using alpha = .05							

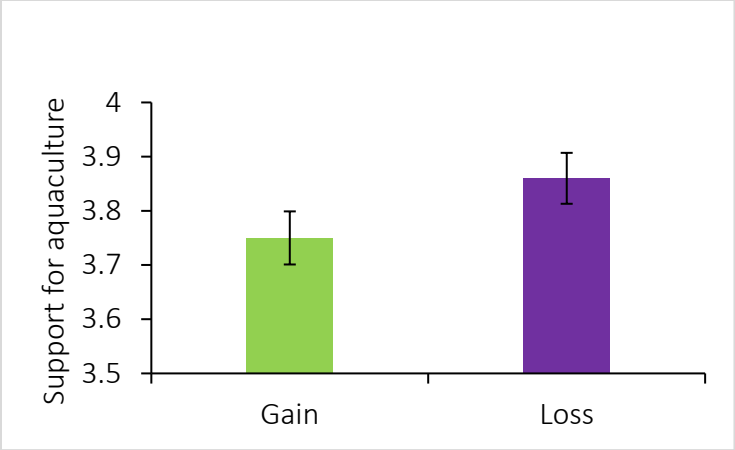

Figure 4. 1 Gain vs. loss framing and support for aquaculture. Error bars represent the variation of dependent variable–support for aquaculture.

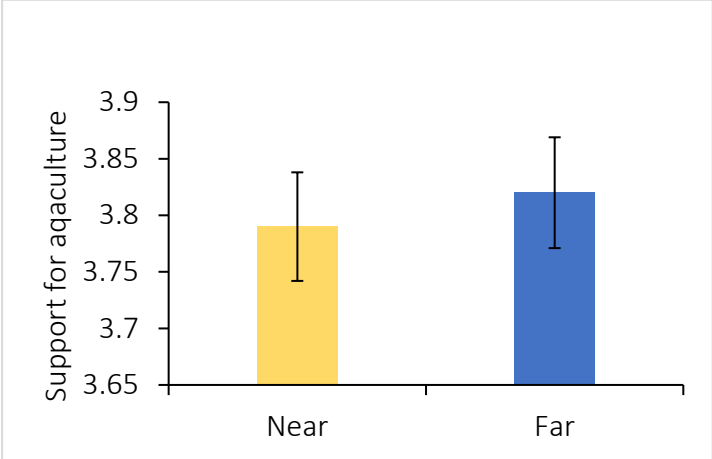

Figure 4. 2 Near vs. far framing and support for aquaculture. Error bars represent the variation of dependent variable–support for aquaculture.

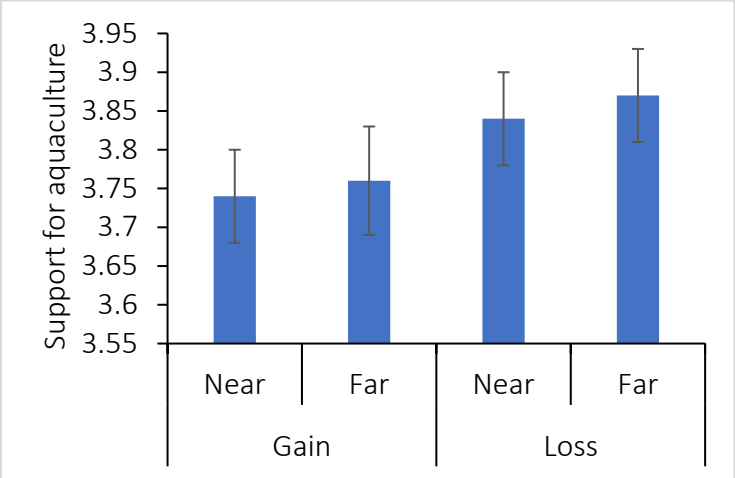

Figure 4. 3 Gain vs. loss and near vs. far interaction. Error bars represent the variation of dependent variable–support for aquaculture.

CHAPTER 5

DISCUSSION

The present study investigates gain vs. loss and near vs. far message framing and its impact on support for aquaculture among seafood consumers in the U.S. This investigation employed four experimental conditions and a control group to manipulate treatment conditions. As the investigation follows randomized experimental conditions, it was necessary to control for the variability caused by demographic variables. According to the manipulation check, it is clear that demographic variables such as age, gender, education, region of the U. S., seafood consumption frequency has no association/relationship with experimental conditions. This finding infers that random assignment to experimental conditions has effectively controlled the variability caused by them. Moreover, using demographic variables as covariate in the ANOVA models reduces within-group error variance. This ensures the variability that is not accounted for is reduced in a way that has no impact on experiment results. In addition, the model identifies, measures, and controls possible confounding variables in the analysis (Field, 2014).

Even though the variability accounted for by demographic variables is controlled in the model, the manipulation check indicated that there were significant differences in emotions (happiness, hopefulness, anger, guilt, excitement, and sadness) elicited by the four experimental conditions. This further indicates that all four experimental conditions appear to be arousing happiness, hopefulness, anger, guilt, excitement, and sadness in

significantly different ways among all experimental conditions. Perception of differential emotional appeals in experimental condition could lead to differences in the estimation of the dependent variable, support for aquaculture. In contrast, three message characteristics, persuasiveness, clarity, and informativeness, are not significantly different across four experimental conditions, thus ensuring consistency and ruling out the additional confound of perceived message quality on the dependent variable, support for aquaculture. Future research should consider using the five emotional appeals as covariates the of the model to control for the variation caused by them. As emotions are subjective feelings toward the experimental conditions, it is quite clear that they cannot be controlled in the experimental design but do in statistical operations. Moreover, future analysis could investigate a possible mediating role of emotion on the relationship of message framing and support for aquaculture.

The first research question explored the possibility of the gain frame being more effective in increasing support for aquaculture than the loss frame. However, the analysis found that loss frame significantly increased support for aquaculture compared to the gain frame. This finding seems to echo the existing literature that explicates the divergent behaviors of gain vs. loss message framing under different context of investigations. As the literature suggests, socially and environmentally risky behaviors can be more effectively minimized with loss framed messages than gain framed messages (Rothman & Salvoey, 1997). Moreover, Tversky and Kahneman (1991, 1992) have suggested that the subjective value of information is high when respondents are presented with information that is loss framed (as compared to gain framed), and, consequently, people experience losses more

intensely than gain framed messages. Further, Kahneman (1979) has indicated that contemplation of advantageous benefits leads individuals to minimize risk whereas contemplation of risky losses leads to assuming risks. In the present study, loss framed messages highlighted disadvantages of not adopting aquaculture such as losing the next generation of watermen, threatened livelihoods of individuals who grow seafood, lack of aquaculture in American and Chinese communities that poses direct and indirect negative impacts on local economies. It is possible to infer that according to prospect theory, perception of the negative consequences of not adopting aquaculture in U.S. and China has evoked more support for aquaculture. This means that psychological fear of losing current benefits motivates consumers to take actions that protect sustainable aquaculture in the U.S.

The ANCOVA analysis further indicates that education, political orientation, seafood consumption, and personal relevance are significant predictors of support for aquaculture. The final regression model explains 11.1% of the variability of support for aquaculture. As this study uses a sample of 1052 cases which is relatively a bigger sample results in medium effect size (Field, 2014). Moreover, there can be other predictors that determine a bigger portion of the variance of support aquaculture that has not been studies in the present study. There is converging evidence in the aquaculture literature that indicates highly educated female respondents identify environment as one of the key issues associated with aquaculture in Australia. Moreover, highly educated young females who have visited marine environments tend to support marine environments and prioritize environment issues over economic concerns when it comes to support for aquaculture

(Mazur & Curtis, 2006). This evidence that conforms with present findings that education and support for aquaculture go hand in hand. The negative association between political orientation and support for environmental policies is evident in the environment policy literature (Ziegler, 2017). More specifically, those having conservative political affiliations tend to be less supportive of environmental policies. For instance, Ziegler (2017) reports that U.S. citizens with a conservative but not green identification significantly often less supportive of financed climate policy. In addition, citizens with liberal political orientation seems to have higher general climate change beliefs. Based on the above environment policy and political ideology literature it can be justified that political orientation behaves similarly in aqaculture research context. The present research also investigated seafood consumers' information seeking behavior in purchasing aquaculture products and message relevancy. It can be inferred that knowledge increases with information seeking results in a positive relationship with support for aquaculture. Moreover, seeing messages in relevance to personal contexts and experience can increase message sensation and understanding compared to seeing totally irrelevant aquacuture messgaes. Finally, frequent seafood consumers may be interacting with aquaculture related information more often as they have special interests in seafood. Therefore, frequent seafood consumers may be more supportive of aquaculture policies due to their food choices, regardless of any messages they are exposed to.

The second research question inquired whether the low spatial distance frame is more effective than the high spatial distance frame in increasing support for aquaculture among U.S. consumers. The analysis shows that there is no significant difference between

near and far spatial distance distance frames in expressed support for aquaculture. According to the construal level theory, people make abstract construal of distant objects, places and perception of distance and time would be more abstract compared to here and now (Trope & Liberman , 2010). Moreover, risk perception depends, in part, on psychological perception of distance and how close or distant the event from one's perceivable vicinity. The current study found that neither near nor far message frames increase the support for aquaculture, suggesting that psychological perception of distance seems not as salient to support for aquaculture. The spatial distance framing literature indicates similar finding where there is no significant influence of near vs. far spatial distance framing in promoting pro environmental behaviors. For instance, Mir et al. (2016) have reported that near vs. far spatial distance manipulations among university students have no significant impacts in promoting pro environmental transportation modes in Iran. However, Scannell and Gifford (2013) have shown that the locally framed message, which is similar to the low spatial distance framing condition in the present study, is more effective than high spatial distance framing in increasing climate change engagement among Canadian communities. Moreover, they report that climate change engagement did not change among those who received global and control messages. In addition to that, Spence and Pidgeon (2010) showed that low and high spatial distance framing does not significantly differ attitudes towards climate change mitigation. The framing literature may justify these incongruent findings on the basis of several explanations. First, personal relevance of messages play a significant role in persuasion in that locally relevant messages seem to be promoting expected behavioral outcomes more than globally framed messages

(Scannell & Gifford, 2013). However, depending on message salience, the impact of spatially framed messages may differ. Research design related issues, such as study location, extent of the issue being studied, and the timing of the research, may matter in interpreting incongruent results. For instance, Canadian communities may have perceived high message salience as the issues explored in Scannell and Gifford's (2013) study, localized climate change impacts, were selected to be occurring nearby (Scannell & Gifford, 2013). In the context of the present research, lack of personal relevancy (e.g., individuals who have not seen any aquaculture operations near their homes) could make experimental messages less effective in near vs. far spatial distance framing dimensions. This is further proven in the ANCOVA results – i.e., that personal relevance is a significant predictor of support for aquaculture. Similar to the analysis in research question one, education, political orientation, and all dummy variables of seafood consumption are significant predictors of the regression model that explains 10.90% of the variability of support for aquaculture.

The third research question expected that gain/loss frame would interact with the spatial distance frame such that a gain frame with low spatial distance would be most effective in increasing support for aquaculture among U.S. consumers. However, the interaction effect of two frames is not significant. This gives the indication that there is a significant main effect of gain/loss message framing variable on support for aquaculture, but it is lessened due to the impact that covariates have on the support for aquaculture.

5.1 Implications of the study

As the study finds that loss framing is more supportive of aquaculture, media, and aquaculture industry communications should focus on highlighting losses. For instance, media messages can highlight failing to adopt aquaculture and the resulting nutritional disadvantages, loss of employment opportunities, adverse economic impacts, and sustainability concerns on the wild fisheries. For instance, seafood and iodine consumption can be easily linked. Most often consumers use iodized salt but over consumption could lead to high blood pressure. However, promotion of seafood consumption as an alternative mean to acquire dietary iodine requirement would be a healthy practice. Therefore, highlighting the losses/disadvantages associated with less seafood consumption could be used to induce consumers to support aquaculture industry, and hence boost seafood production in US. In addition, highlighting environmental losses associated with aquaculture and how those losses can be mitigated through proper application of good aquaculture practices may evoke more support for the industry. For instance, shellfish culture is reported to improve water quality by removing excess nutrients, particulates, and microbes.

Perhaps, losses associated with the non-adoption of aquaculture in the U.S. is unknown to consumers and framing the issue with the process of exemplification could increase the adoption of aquaculture. Exemplification refers to the media selection process by which representative exemplars are selected from a population and presented to stand for a larger whole, and recognized as a form of persuasion. In addition to that sharing amount of similarity between exemplars and exemplified is the most important premise of

exemplification (Zillmann, 1999). For instance, using visuals such as photo and video exemplars of seafood production, fishing, or environment management could induce more support for aquaculture. In this process representative phots or videos of aquaculture should be used to exemplify the aquaculture industry as a whole. Moreover, this study identified personal relevance as a significant predictor of support for aquaculture, a factor that can be capitalized on and used in message design. Personally relevant seafood messages can be developed through understanding of demographic and other socio-psychological characteristics of consumers. There are multiple objectives of general seafood consumption such as nutritional aspects, dietary choices, and environmental concerns. Targeting consumers in message development is a strategic communication technique that could tailor-make messages for an identified consumer niche market. According to exemplification theory (Zillmann, 1999), photo exemplars may make seafood consumer messages more personally relevant with a given weight that leads to gain support for aquaculture industry. As mentioned previously, identifying consumer market characteristics and crafting aquaculture messages with the application of exemplification principles can improve personal relevance of messages. For instance, consumers interested in salmon consumption can be targeted and supplied with messages emphasizing the benefits of quality protein that has high potential of human muscle development. Actual experience of a consumer representative could possibly exemplify the message by increasing the personal relevance.

This study finds that there is no significant difference of near and far spatial distance frames in supporting aquaculture. In other words, presenting a message about

aquaculture in the U.S. vs. in China did not make perceptual differences in support for aquaculture. Perhaps, regardless of the location, environmental concerns and economic advantages about aquaculture seem more or less equally salient, for instance. However, as past literature suggests (Trope & Liberman , 2010), it may be that spatial distance plays a mediating or moderating role in persuading message receivers. Thus, the next step of this study is to identify factors that mediate and moderate seafood consumer support for aquaculture. More specifically mediating/moderating relationships of political orientation, seafood consumption frequency, aquaculture knowledge, perceived aquaculture benefits, source credibility, and message emotions have to be investigated. To study above relationships following research questions are recommended. To what extent: 1) does political ideology moderate the effect of message condition on support for aquaculture? 2) level of seafood consumption moderates the effect of message condition on support for aquaculture? 3) does knowledge of aquaculture, including (a) subjective current knowledge; and (b) objective (fact-based) knowledge moderate the effect of message condition on support for aquaculture? 4) does source credibility moderate the effect of message condition on support for aquaculture? Investigating above subtle behaviors of message framing and its interactions with suggested variables will help design messages that are persuasive in gaining consumer support for the aquaculture industry.

5.2 Limitations of the study

As suggested above, this study did not investigate the mediators and moderators affecting consumer support for aquaculture. Further research is needed to reveal connections with other factors that have impacts on this relationship. For instance, the

significant covariates of this study such as education, political orientation, seafood consumption frequency, and message relevance can be either mediating or moderating the relationship of message frame and support for aquaculture. Knowing how the above-mentioned covariates contribute to the above relationship can be better understood by mapping all possible connections.

Having limited past literature on U.S. consumer support for aquaculture limits understanding the behaviors of the dependent variable. Even though there are multiple studies investigating seafood consumption and health, studies that investigate direct policy support by consumers are lacking. This issue limits the establishment of direct comparison to past research (and thus the establishment of validity). However, this study drew from literature in environmental science, economics, and communication to create new directions for understanding consumer support for aquaculture.

Missing data in the sample proved to be a critical issue. The Likert scale that quantified the dependent variable contained a "don't know" option and many respondents had chosen that option in response to Likert scale items. In the data processing stage, I recoded "don't know" responses to neutral option making the assumption that don't know is more or less similar to being neutral and set at the middle of the scale. Moreover, the above assumption had to be made to ensure the data set had manageable variation to continue with the data analysis. In future studies, omitting don't know options from questionnaires and urging respondents to make an appropriate response is highly recommended.

CHAPTER 6

CONCLUSION

This study investigated the influence of gain vs. loss and near vs. far spatial distance framing on support for aquaculture among seafood consumers in the U.S. The study used 2*2 experimental design to vary gain/loss and near/far framing among 1052 U.S. residents including all 50 states of America. An online questionnaire, distributed by the survey firm GfK, was employed to collect data. This study contributed to the goals of SEANET, a large NSF-funded grant focused on Maine's sustainable aquaculture development under four themes: carrying capacity, aquaculture in a changing environment, innovation in aquaculture, and human dimensions. In particular, the present study supported goals of the human dimensions theme.

Gain frames highlight advantages of adhering to an expected behavioral outcome whereas loss frames highlight disadvantages of nonconforming to a given expectancy. In contrast, near frame specifies spatial closeness to an event (from the perspective of the respondent) and the far frame is focused on spatially distal events. The framing literature reveals that message framing behaves in contradictory ways depending on the context. For instance, gain frames are more effective in influencing cautious behaviors but loss frames are more effective in inducing risky behaviors. Similarly, near vs. far spatial distance framing shows converging influences depending on research contexts. For example, climate change mitigation and involvement research show high involvement with near framed messages but not necessarily consistent with all research locations. Furthermore,

in some instances there is no significant difference of the influence made by near and far spatial distance framing.

This study investigated three main research questions: 1) Is a gain frame more effective in increasing support for aquaculture? 2) Is a low spatial distance frame more effective in increasing support for aquaculture? 3) Do gain/loss and near/far spatial distance frames interact in such a way that gain frame with low spatial distance is more effective in supporting aquaculture? In investigating the above research questions, the present study found that age, gender, education, political orientation, region of the U.S., seafood consumption frequency, and message relevancy cause extra variation above the effect of the framing variables. Therefore, these variables were treated as covariates and we controlled the variation accounted for by them in the ANCOVA.

The findings of this study indicated that loss frame is more effective in increasing support for aquaculture than the gain frame. In addition to that, near and far spatial distance frames have no significant impact on the support for aquaculture at 5% probability levels. However, condition 3 (loss/near) and 4 (loss/ far) show a significant increase in support for aquaculture at 10% probability level. Finally, gain vs. loss and near vs. far spatial distance frames do not have a significant interaction effect. The above major findings indicate that emphasizing the losses of non-adoption of aquaculture in U.S. and China may influence support for aquaculture policies, as compared to gain-framed messages.

This study poses implications for the seafood industry as it suggests that presenting a loss frame (as opposed to a gain frame) may lead to more support for aquaculture among U.S. consumers, when controlling for various individual characteristics. Loss frames highlight the disadvantages of *not* adopting aquaculture in a given location. In so doing, these messages may provoke thoughts about loss of employment opportunities, adverse economic effects of less adoption, and nutritional disadvantages of not consuming aquaculture seafood. Results suggest applications for the aquaculture industry and government bodies alike, as they work to develop promotion campaigns to garner support for U.S. aquaculture development.

REFERENCES

Blackstone, L. (2001). *Environmental consumer research.* McLean, VA: Len Blackstone Ad Group.

Bolsen, T., & Druckman, J. (2015). Counteracting the politicization of science. *Journal of Communication, 65*, 745-769.

Bosworth, B. G. (2012). Aquaculture. In L. A. Guanata, G. J. Flick, Jr., & R. E. Martin (Eds.), *Seafood industry: Species, products, processing, and safety* (pp. 318-326). New Delhi: Blackwell Publishing Ltd.

Carvalho, A. (2007). Ideological cultures and media discourses on scientific knowledge: re-reading news on climate change. *Public Understanding of Science, 165*, 223-243.

Chong, D., & Druckman, J. N. (2007). Framing theory. *Annu. Rev. Polit. Sci.* , 103-126.

Cucchiara, C., Kwon, S., & Ha, S. (2015). Message framing and consumer responses to organic seafood labeling. *British Food Journal, 117*(5), 1547-1563.

Denzau, A. T., & North, D. C. (2000). *Shared mental models: Ideologies and institutions.*

Dunlap, R. E., & McCright, A. M. (2008). A widening gap: Republican and democratic views on climate change. *Environment, 50*(5), 26-35.

EFSA. (2005). Opinion of the scientific panel on contaminants in the food chain on a request from the european parliament related to the safety assessment of wild and farmed fish. *European Food and Safety Authority, 236*, 1-118.

Entman, R. M. (1993). Framing: Towards clarification of a fractured paradigm. *Journal of Communication, 43*(4), 51-58.

Erikson, R. S., & Tedin, K. L. (2003). *American public opinion* (6th ed.). New York: Longman.

FAO. (2012). *The state of the world fisheries and aquaculture.* Rome: FAO.

FAO. (2016). *GLOBEFISH - Analysis and information on world fish trade*. Retrieved July 9, 2018, from Food and Agriculture Organization of United Nations: http://www.fao.org/in-action/globefish/market-reports/resource-detail/en/c/887679/

FAO. (2017). *Fisheries and aquaculture statistics.* Rome: FAO.

Feucht, Y., & Zander, K. (2017). Aquaculture in the German print media. *Aquaculture International, 25*, 177-195.

Field, A. (2014). *Discovering statistics using ibm spss statistics* (4th ed.). (M. Carmichael, Ed.) Los Angeles: Sage.

Freeden, M. (2001). *Reassessing political ideologies.* London: Routledge.

FSA. (2008). *Agency to review fish advice*. Retrieved from http://www.food.gov.uk/news/newsarchive/2008/

Gamliel, E., & Herstein, R. (2013). Involvement moderates the effect of framing consumers' perceived monetary gain and product choice. *Journal of Product and Brand Management, 22*(2), 142-152.

Gamson, W. A., & Modigliani, A. (1987). The changing culture of affirmative action. *Research in Political Sociology, 3*, 137-177.

Gamson, W. A., & Modigliani, A. (1987). The changing culture of affirmative action. *Research in Political Sociology, 3*, 137-177.

Grigorakis, K., & Rigos, G. (2011). Aquaculture effects on environmental and public welfare – The case of Mediterranean mariculture. *Chemosphere, 855*, 899-919.

Hamilton, L. C. (2011). Education, politics and opinions about climate change evidence for interaction effects. *Climate Change*, 231-242.

Hart, P. S., & Nisbet, E. C. (2011). Boomerang effect in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate change. *Communication Research, 9*(6), 700-723.

Hites, R. A., Foran, J. H., Carpenter, D. O., Hamilton, M. C., Knuth, B. A., & Schwager, S. J. (2004). Global assessment of organic contaminants in farmed salmon. *Science*, 226-229.

Hupfer, M. E. (2006). Helping me, helping you: Self- referencing and gender roles in donor advertising. *Transfusion, 46*, 996-1005.

Jacobs, M. N., Covaci, A., & Schepens, P. (2002). Investigation of selected persistent organic pollutants in farmed Atlantic salmon (Salmo Salar), salmon aquaculture feed, and fish oil components on the feed. *Environmental Science & Technology, 36*, 2797-2805.

Jeremy, B. (n.d.). *Classroom*. Retrieved June 29, 2018, from What is the ideology of the democrats?: https://classroom.synonym.com/ideology-democrats-6539.html

Jost, J. T., Federico, C. M., & Napier, J. L. (2009). Political ideology: Its structure, functions, and elective affinities. *Annu. Rev. Psychology, 60*, 307-337.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An analysis of decision under risk. *Econometrica, 47*(2), 263-292.

Kahneman, D., & Tversky, A. (1984). Choices, values and frames. *American Psychology Association, 39*, 341-350.

Kulkarni, A. A., & Yuan, H. (2015). Effect of Ad-irrelevant distance cues on persuasiveness of message framing. *Journal of advertising, 44*(3), 254-263.

Kulkarni, A. A., & Yuan, H. (2015). Effects of ad-irrelevant distance cues on persuasiveness of message framing. *Journal of Advertising, 44*(3), 254-263.

Lord, K. R. (1994). Motivating recycling behaviour: A quasi-experimental investigation of message and source strategies. *Psychology and Marketing, 11*, 341-58.

Lu, H. (2015). The effects of emotional appeals and gain versus loss framing in communication sea star wasting disease. *Science Commnication, 38*(2), 1-27.

Lusk, J. L. (2012). The political ideology of food. *Food Policy, 37*, 530-542.

Malka, A., Krosnick, J. A., & Langer, G. (2009). The association of knowledge with concern about global warning: trusted information sources shape public thinking. *Risk Analysis, 29*, 633-647.

Marx, S. M., Weber, E. U., Orlove, B. S., Leiserowitz, A., & Krantz, G. H. (2007). Communication and mental processes:Experimental and analytical processing of uncertain climate information. *Global Environmental Change, 17*, 47-58.

Mazur, N. A., & Curtis, A. L. (2006). Risk perceptions, aquaculture, and issues of trust: lessons from Australia. *Society and Natural Resources, 19*(9), 791-808.

McComas, K. A., & Trumbo, C. W. (2001). Source credibility in environmental health- risk controversies: Application of Meyer's credibility index. *Risk Analysis, 21*(3), 467-480.

McCombs, M., & Shaw, D. L. (1972). The agenda-setting functions of mass media. *Oxford Journals, 36*(2), 176-187.

McCright, A. M. (2011). Political orientation moderates Americans' beliefs and concerns about climate change. *Climate Change*, 243-253.

McCright, A. M., Dunlap, R. E., & Marquart-Payatt, S. T. (2016). Political ideology and views about climate change in the European union. *Environmental politics, 25*(2), 338-358.

McQuail, D. (1994). *Mass communication theory: An introduction* (3rd ed ed.). London: Sage.

Meyerowitz, B. E., & Shelly , C. (1987). The effects of message framing on breast self-examination attitudes, intentions, and behavior. *Journal of Personality and Social Psychology, 52*(3), 500-510.

Mir, H. M., Behrang, K., Isaai, M. T., & Nejat, P. (2016). The impact of outcome framing and psychological distance of air pollution consequences on transportation mode choice. *Transportation Research, 46*, 328-338.

Morton, T. A., Rabinovich, A., Marshall, D., & Paamela, B. (2011). The future that may (or may not) come: How framing changes response to uncertainty in climate change communications. *Global Environmental Change, 21*, 103-109.

Muzur, N. A., & Curtis, A. (2008). Understanding community perception of aquaculture: Lessons form Australia. *Aquacult Int, 16*, 601-621.

Nisbet, M. C. (2009). Communicating climate change: Why frames matter to public engagement. *Environment, 51*(2), 541-518.

NOAA. (2018, June 25). *What is aquaculture?* Retrieved from National Oceanic Atmospheric Administration: https://oceanservice.noaa.gov/facts/aquaculture.html

O' Keefe, D. J., & Jensen, J. D. (2006). The advantages of compliance or the disadvantages of noncompliance? A meta analytic review of the relative persuasive effectiveness of gain-framed and loss-framed messages. *Communication Yearbook, 30*, 1-43.

O'Keefe, D. J., & Jensen, J. D. (2009). The relative persuasiveness of gain-framed and loss framed messages for encouraging disease detection behaviors: A meta analytic review. *Journal of Communication, 59*, 296-316.

Pieniak, Z., Vanhonacker, F., & Verbeke, W. (2013). Consumer knowledge and use of information about fish and aquaculture. *Food Policy, 40*, 25-30.

Rickard, L. N., Yang, Z. J., & Schuldt, J. P. (2016). Here and now, there and then: How "departure dates" influence climate change engagement. *Global Environment Change, 38*, 97-107.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Rothman, A. J., & P. Salvoey. (1997). Shaping perceptions to motivate healthy behaviour. The role of message framing. *Psychological Bulletin, 121*(1), 3-19.

Scannell, L., & Gifford, R. (2013). Personally relevant climate change" The role of placement attachment and local versus global message framing in engagement. *Environment and Behavior, 45*(1), 60-85.

Scannell, L., & Robert, G. (2013). Personally relevant climate change: The role of place attachment and local versus global message framing in engagement. *Environment and Behavior, 45*(1), 60-85.

Scheufele, D. A. (1999). Framing as a theory of media effects. *Journal of Communication*, 103-122.

Schneider, T. R., Salovey, P., & Smith, N. F. (2001). Visual and auditory message framing effects on tobacco smoking. *Journal of Applied Social Psychology, 31*(4), 667-682.

Schneider, T. R., Salovey, P., Apanovitch, A. M., Pizarro, J., McCarthy, D., & Janet, Z. (2001). The effects of message framing and ethnic trargeting on mammography use among low-income women. *Health Psychology, 20*(4), 256-266.

SEANET. (2013). *Maine EPSCoR: The nexus of coastal social- environmental systems and sustainable ecological aquaculture.* Orono: University of Maine.

Spence, A., & Pedigeon, N. (2010). Framing and communicating climate chnage: The effects of distance and outcomes frame manipulations. *Global Environmental Change, 20*, 656-667.

Trope, L., & Liberman , N. (2010). Construal-level theory of psychological distance. *Psychological Review, 117*(2), 440-463.

Tuomisto, J. T., Tuomisto, J., Tainio, M., Niittynen, M., Verkasalo, P., Vartiainen, T., . . . Schwager, S. J. (2004). Risk benifit analysis of eating farmed salmon. *Science, 305*(5683), 476-477.

Tversky, A., & Kahneman, D. (1991). Loss aversion in riskless choice: a reference-dependent model. *The Quarterly Journal of Economics, 106*(4), 1039-1061.

Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: cumulative representation of uncertainty. *Journal of Risk and Uncertainty, 5*(4), 297-323.

Uzzella, D. L. (2000). The psycho-spatial dimension of global environmental problems. *Journal of Environmental Psychology, 20*, 307-318.

World Bank. (2013). *FISH TO 2030: Prospects for fisheries and aquaculture.* Washington: The World Bank.

Zia, A., & Todd, A. M. (2010). Evaluating the effects of ideology on public understanding of climate change science: How to improve communication accross ideological divides? *Public Understanding of Science, 16*(6), 743-761.

Ziegler, A. (2017). Political orientation, environmental values, and climate beliefs and attitudes: An emperical cross country analysis. *Energy Economics, 63*, 144-153.

Zillmann, D. (1999). Exemplification theory: Judging the whole by some of its parts. *Media Psychology, 1*(1), 69-94.

APPENDIX - EXPERIMENTAL MESSAGES

Experimental condition 1

Sea change: What we gain by adopting aquaculture in the U.S.

WASHINGTON – The past decade brought an unheralded but historic milestone: More than half of the fish and shellfish we consume is now raised by humans, rather than caught in the wild. In the U.S., this new reliance on aquaculture stands to benefit the health of our oceans and freshwater systems, and the livelihoods and diets of our citizens.

Along with cultured shrimp, shellfish and other products, fish farming is a sustainable way to draw protein from the ocean and relieve pressure on wild fish species driven to collapse by our country's expanding appetite for seafood. "Hunting and gathering has reached its limit," said Pat Silliman, of the National Aquaculture Research Institute. "We've got to grow more." The drive to bring fish "from egg to plate," as Silliman puts it, has the potential to answer a growing demand for seafood in the U.S.

The United States is the leading global importer of fish products, with 91% of the seafood we eat (by value) originating abroad. Domestic aquaculture can reverse this seafood trade deficit by expanding operations in traditional U.S. fishing strongholds, such as New England, the Gulf of Mexico, and the Pacific Northwest. Eating local is not only trendy, but also lucrative: indeed, niche products, such as regional oysters and sustainably raised shrimp, now fetch a premium in the U.S. and abroad. Shannon Nystrom, who directs the government's Office of Aquaculture, said she envisions a future in which the U.S. is

"balancing domestic seafood production from wild catch and a range of aquaculture technologies."

Not only can aquaculture supply the U.S. with seafood, it can also offer desperately needed jobs to many states' poorest regions. Indeed, proponents suggest that farming represents the best chance of giving people a chance to make a living off the water. Cameron Ellsworth, executive director of the American Aquaculture Association, a leading trade organization, noted that threequarters of the group's members are either current or former commercial fishermen, and although

the average age of an American with a fishing lease permit is 57, the average for those with a fish-farm permit is 33. "It's really the next generation of watermen," he said. In addition to supporting the individuals who grow the seafood, aquaculture has also had direct and indirect positive impacts on local U.S. economies – such as through restaurants and tourism.

Experimental condition 2

Sea change: What is gained by adopting aquaculture in China

SHANGHAI – The past decade brought an unheralded but historic milestone: More than half of the fish and shellfish we consume is now raised by humans, rather than caught in the wild. In China, this new reliance on aquaculture stands to benefit the health of oceans and freshwater systems, and the livelihoods and diets of people.

Along with cultured shrimp, shellfish and other products, fish farming is a sustainable way to draw protein from the ocean and relieve pressure on wild fish species driven to collapse by the world's expanding appetite for seafood. "Hunting and gathering has reached its limit," said Cheng Yuan, of the National Aquaculture Research Institute. "We've got to grow more." The drive to bring fish "from egg to plate," as Yuan puts it, has the potential to answer a growing demand for seafood worldwide.

China is the leading global importer of fish products, with 91% of its seafood originating abroad. Domestic aquaculture can reverse this seafood trade deficit by expanding operations in traditional Chinese fishing strongholds, such as the Yangtze valley and the Zhu Jiang delta. Eating local is not only trendy, but also lucrative: indeed, niche products, such as regional oysters and sustainably raised shrimp, now fetch a premium in China and abroad. Hua Yang, who directs the government's Office of Aquaculture, said she envisions a future in which China is "balancing domestic seafood production from wild catch and a range of aquaculture technologies."

Not only can aquaculture supply China with seafood, it can also offer desperately needed jobs to many of the poorest regions. Indeed, proponents suggest that farming represents the best chance of giving people a chance to make a living off the water. Jin Wong, executive director of the Chinese Aquaculture Association, a leading trade organization, noted that three-quarters of the group's members are either current or former commercial fishermen, and although the average age of a Chinese resident with a fishing lease permit is 57, the average for those with a fish-farm permit is 33. "It's really the next generation of watermen," he said. In addition to supporting the individuals who grow the seafood,

aquaculture has also had direct and indirect positive impacts on local Chinese economies – such as through restaurants and tourism.

Experimental condition 3

Sea change: What we lose by failing to adopt aquaculture in the U.S.

WASHINGTON – The past decade brought an unheralded but historic milestone: More than half of the fish and shellfish we consume is now raised by humans, rather than caught in the wild. In the U.S., without this reliance on aquaculture, we risk the health of our oceans and fresh water systems, and the livelihoods and diets of our citizens.

Along with cultured shrimp, shellfish and other products, fish farming is a sustainable way to draw protein from the ocean and relieve pressure on wild fish species driven to collapse by our country's expanding appetite for seafood. "Hunting and gathering has reached its limit," said Pat Silliman, of the National Aquaculture Research Institute. "We've got to grow more." Without bringing fish "from egg to plate," as Silliman puts it, we cannot meet a growing demand for seafood in the U.S.

The United States is the leading global importer of fish products, with 91% of the seafood we eat (by value) originating abroad. By rejecting aquaculture, we add to this growing seafood trade deficit, and miss out on opportunities to expand operations in traditional U.S. fishing strongholds, such as New England, the Gulf of Mexico, and the Pacific Northwest. Eating local is not only trendy, but also lucrative; but if we don't farm-raise our seafood, we forego the chance to market niche products, such as regional oysters and sustainably raised shrimp, that can fetch a premium in the U.S. and abroad. Shannon

Nystrom, who directs the federal government's Office of Aquaculture, said she envisions a future in which the U.S. is "balancing domestic seafood production from wild catch and a range of aquaculture technologies."

Not only can aquaculture supply the U.S. with seafood, it can also offer desperately needed jobs to many states' poorest regions. Indeed, when we fail to support aquaculture, we eliminate the best chance of allowing people to make a living off the water. Cameron Ellsworth, executive director of the American Aquaculture Association, a leading trade organization, noted that threequarters of the group's members are either current or former commercial fishermen, and although the average age of an American with a fishing lease permit is 57, the average for those with a fish-farm permit is 33. "Without aquaculture, we risk losing the next generation of watermen," he said. In addition to threatening the livelihood of the individuals who grow the seafood, a lack of aquaculture in American communities poses direct and indirect negative impacts on local U.S. economies – such as through restaurants and tourism.

Experimental condition 4

Sea change: What is lost by failing to adopt aquaculture in China

SHANGHAI – The past decade brought an unheralded but historic milestone: More than half of the fish and shellfish we consume is now raised by humans, rather than caught in the wild. In China, without this reliance on aquaculture, we risk the health of oceans and fresh water systems, and the livelihoods and diets of people.

Along with cultured shrimp, shellfish and other products, fish farming is a sustainable way to draw protein from the ocean and relieve pressure on wild fish species driven to collapse by the world's expanding appetite for seafood. "Hunting and gathering has reached its limit," said Cheng Yuan, of the National Aquaculture Research Institute. "We've got to grow more." Without bringing fish "from egg to plate," as Yuan puts it, we cannot meet a growing demand for seafood worldwide.

China is the leading global importer of fish products, with 91% of its seafood originating abroad. By rejecting aquaculture, China adds to this growing seafood trade deficit, and misses out on opportunities to expand operations in traditional Chinese fishing strongholds, such as the Yangtze valley and the Zhu Jiang delta. Eating local is not only trendy, but also lucrative; but if we don't farm-raise our seafood, we forego the chance to market niche products, such as regional oysters and sustainably raised shrimp, that can fetch a premium in China and abroad. Hua Yang, who directs the government's Office of Aquaculture, said she envisions a future in which China is "balancing domestic seafood production from wild catch and a range of aquaculture technologies."

Not only can aquaculture supply China with seafood, it can also offer desperately needed jobs to many of the poorest regions. Indeed, when we fail to support aquaculture, we eliminate the best chance of allowing people to make a living off the water. Jin Wong, executive director of the Chinese Aquaculture Association, a leading trade organization, noted that three-quarters of the group's members are either current or former commercial fishermen, and although the average age of a Chinese resident with a fishing lease permit is 57, the average for those with a fish-farm permit is 33. "Without aquaculture, we risk

losing the next generation of watermen," he said. In addition to threatening the livelihood of the individuals who grow the seafood, a lack of aquaculture in Chinese communities poses direct and indirect negative impacts on local Chinese economies – such as through restaurants and tourism.

BIOGRAPHY OF THE AUTHOR

Sandaruwan Pradeep Kumara was born in Muwanhela, Sri Lanka on December 9, 1987. He was raised in Delaththagara, Sri Lanka and graduated from the Saranath College in 2006. He entered the University of Peradeniya, Sri Lanka and graduated in 2012 with a bachelor's degree in Agricultural Technology and Management. He arrived Maine to enter the Communication graduate program at the University of Maine in the fall 2016. After receiving his master's degree, he will join the PhD program in Communication the at the Wayne State University, USA. He is a candidate for the Master of Arts degree in Communication from the University of Manie in August 2018.