

The Pennsylvania State University  
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**THE IMPACT OF MESSAGE FRAMING ON CONSUMER ATTITUDE AND  
BEHAVIORAL INTENTION TOWARD HACCP IMPLEMENTATION  
IN FOODSERVICE BUSINESSES**

A Thesis in  
Hotel, Restaurant, and Institutional Management

by  
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## ABSTRACT

This thesis investigated the impact of message framing on consumer attitude and behavioral intention toward the implementation of Hazard Analysis & Critical Control Points (HACCP) in foodservice businesses. Attribute framing effects and goal framing effects were examined separately in two studies. In each study, two message delivery forms, article and video, were used to introduce HACCP and provide food safety knowledge to consumers. Results indicated that most consumers had very favorable attitude and behavioral intention toward HACCP implementation. In addition, significant interactions were found between selected involvement items and valence of messages, indicating that involvement moderated the effect of message framing on consumers' attitude and behavioral intention toward HACCP implementation. Implications and future research directions were discussed.

**Keywords:** HACCP, Attribute framing, Goal framing, Involvement

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## **Chapter 1**

### **INTRODUCTION**

Hazard Analysis and Critical Control Points (HACCP) is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product (FDA, 2011). In the United States, the implementation of HACCP has been mandatory for fish and seafood products since 1995, for meat and poultry processing plants since 1998, and for juice processing and packaging plants since 2001. However, HACCP implementation is still voluntary for the foodservice industry.

Unlike cooking at home, mishandling of food in restaurant kitchens can cause foodborne illness outbreak that affects many people. Mead et al. (1999) estimate that foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States each year. Griffith (2000) and Chapman et al. (2010) suggest that 70% of foodborne illness is associated with foodservice businesses. Substantive studies have also identified restaurants as a major source of foodborne illness outbreaks (Cochran-Yantis et al., 1996; Cotterchio, Gunn, Coffill, Tormey, & Barry, 1998; Lewis & Salsbury, 2001). In addition, poor food safety management system in foodservice businesses and consumer distrust in food served are urgent problems need to be solved (Brewer & Rojas, 2008; Green et al., 2005; Knight, Worosz, & Todd, 2007;

Medus, Smith, Bender, Besser, & Hedberg, 2006; Rudder, 2006; Wheeler et al., 2005).

Implementing HACCP in foodservice establishments is an effective way to ensure food safety. However, as the implementation of HACCP is a voluntary requirement for foodservice operators, motivation for them to adopt HACCP is expected to be low unless consumers show demand for HACCP.

One objective of the USDA funded “Cost-Benefit Assessment of HACCP Implementation in Commercial Retail Foodservice Operations” project is to increase consumer awareness of HACCP. This thesis study is a part of the project, and will serve as tool to develop programs targeted to enhance consumer awareness of HACCP and encourage consumers to demand for HACCP implementation in foodservice businesses. This thesis investigates the effectiveness of framing HACCP consumer educational interventions that introduced HACCP and food safety knowledge to consumers, and also elicited consumer demand for HACCP implementation.

Message framing refers to presenting the same information in positive terms or negative terms. For instance, a beef labeled “75% lean” is objectively the same as a beef labeled “25% fat” (Levin, 1987). Another example is that “women who do not do BSE (breast self-examination) have a decreased chance of finding a tumor in the early, more treatable stage of the disease” and “women who do BSE have an increase chance of finding a tumor in the early, more treatable stage of the disease” are objectively equivalent (Meyerowitz & Chaiken, 1987). Framing literature suggests that decision makers respond different to objectively equivalent information that is framed positively or negatively. In other words, positively framed messages and negatively messages are

different in terms of effectiveness in persuasive communication. To our knowledge, no one has incorporated valence-framed messages into a traditional HACCP or food safety educational interventions for the purpose of enhancing persuasive communication. In this thesis, we investigated these framing effects on HACCP consumer educational interventions.

There are three research objectives of this thesis. The first objective is to investigate the valence effects in attribute framing (Study I) and goal framing (Study II). In each study, we investigate whether positively framed messages or negatively framed messages are more effective in eliciting consumers' favorable attitude and behavioral intention toward the implementation of HACCP in foodservice businesses. The second objective is to examine whether consumers' involvement with the HACCP intervention moderates the effects of valence on consumer attitude and behavioral intention. Furthermore, we investigate two delivery forms, article and video form, of the HACCP interventions. We investigate how delivery forms influenced the occurrence of message framing effects and effectiveness of the HACCP intervention.

The outcome of this thesis will lead to an understanding of the framing effects and message delivery effects of HACCP educational messages for consumers. We are not aware of any previous study that has investigated framing effects in context of food safety messages. The educational messages will be designed to create consumer awareness of HACCP, and elicit consumers to demand HACCP implementation in restaurants. The theoretical contributions of our study will be to provide additional evidence for message framing and the role of involvement in message framing.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **Behavioral Economics Literature**

##### **Prospect Theory**

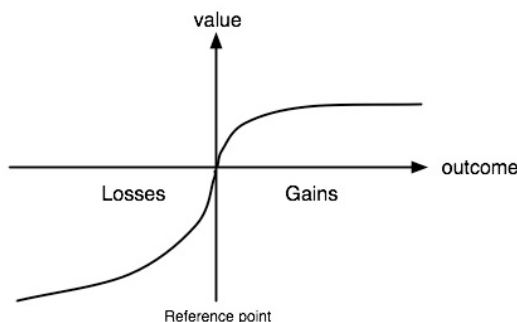
Tversky and Kahneman (1979) introduced prospect theory and brought attention to “framing effects”. Framing effects refer to the phenomenon that decision makers respond differently to objectively equivalent information presented as gains or losses (Levin, Schneider, & Gaeth, 1998).

Prospect theory investigates people’s decisions when two or more choice prospects are given to a decision maker. “Asian disease problem” is a classic example to demonstrate prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981). In the Asian disease scenario, there were two programs, A and B, to fight against Asian disease. If program A was adopted, “200 people will be saved”; while if program B was adopted, there was “1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved”. Therefore, program A represented a sure gain (save lives) while program B represented a risky gain. Although program A and B had the same expected amount of people to be saved, more respondents (72%) preferred program A to program B. This result indicates that when decision makers are facing a risky gain and a riskless gain, they tend to avoid risk.

Still in the Asian disease context, scientists proposed program C and program D in which loss-framed outcomes were presented. If program C was adopted, “400 people would die”; while if program D was adopted, there was “1/3 probability that nobody will die, and 2/3 probability that 600 people will die”. Inconsistent with the previous finding in gain frame, 78% of the respondents exhibited risk-seeking behavior by choosing program D. This result indicates that when decision makers are facing a risky loss and a riskless loss, they tend to take risk. Taking the results from gain-frame and loss-frame together, it is clear that changing the valence of messages can lead to choice reversal phenomenon.

The series of choice experiments conducted by Kahneman & Tversky (1979) revealed that decision makers are not as rational as the expected utility theory describes. Decision makers’ choices are largely affected by the valence of the messages and the presentation of risk. Specifically, they exhibit risk-aversion behavior facing gain-framed prospects, while exhibit risk-seeking behavior when facing loss-framed. Prospect theory illustrates that decision makers have an S-shaped value function that is concave in the domain of gains while convex in the domain of losses (see Figure 2.1).

**Figure 2.1 Value Function in Prospect Theory**



Prospect theory overcomes the limitations of expected utility theory and advances behavioral decision research into a new stage. It not only demonstrates the violation of substitution axiom in a series of choice experiments, but also provides a model to predict people's real-life choices rather than optimal choices. Following Tversky and Kahneman's original demonstration of prospect theory and framing effects, numerous studies have confirmed their prediction in various contexts, such as gambling, jobs, taxes, bargaining behaviors, time allocation decisions, and finance decisions (Highhouse & Paese, 1996; Kühberger, 1995; Neale & Bazerman, 1985; Paese, 1995; Reyna & Brainerd, 1991; Roszkowski & Snelbecker, 1990; Schoorman, Mayer, Douglas, & Hetrick, 1994; Schurr, 1987; Wang, 1996)

### **Mixed Results in Framing Literature**

The effects of valence framing on judgments and decisions have been extensively investigated after the introduction of prospect theory. "Framing" research has extended from behavioral economics to other domains including health and clinical psychology, educational psychology, communication, advertising, and business. However, mixed results have been found.

Levin (1987) found that undergraduate students gave higher rating to ground beef labeled "75% lean" (positively framed) than the same beef labeled "25% fat" (negatively framed), indicating that positive frame is superior to negative frame. In addition, studies in the context of weak job placement program (Davis & Bobko, 1986), punishment decisions (Dunegan, 1996), gambles (Levin, Chapman, & Johnson, 1988), medical

treatment evaluation (Levin, Schnittjer, & Thee, 1988; Marteau, 1989), cheating incidents (Levin, Schnittjer, et al., 1988), and funding allocation (Duchon, Dunegan, & Barton, 1989; Dunegan, 1993) provide evidence to support the view that positively framed messages are more attractive and effective than negatively framed messages.

Reversed outcomes have been obtained in other studies, which indicate that negative frame is superior to positive frame. Meyerowitz & Chaiken (1987) investigated valence framing effects in the context of breast self-examination (BSE). They found that subjects who read the BSE pamphlet written in negatively framed language manifested more positive BSE attitudes, intentions, and behaviors than subjects who read the BSE pamphlet written in positively framed language. Studies in STD prevention (Block & Keller, 1995), sunscreen use (Rothman, Salovey, Antone, Keough, & Martin, 1993), woman Mammography utilization (Banks et al., 1995), and tax practitioner decisions (Newberry, Reckers, & Wyndelts, 1993) suggest that negative frame to be superior to positive frame.

Besides, some studies observed no framing effects. To illustrate a few, no framing effects was observed in breast self-examination with undergraduate female students (Lalor & Hailey, 1989) or Testicular self-examination with undergraduate male students (Steffen, Sternberg, Teegarden, & Shepherd, 1994). In some cases, within one study, framing effects occurred only in a certain gender (Fagley & Miller, 1990; Miller & Fagley, 1992) or only with some probability values (Schneider, 1992). Others found no framing effects with expert sample (Fagley & Kruger, 1986). In addition, studies showed



that framing effects could be reduced or eliminated by asking the subjects to provide a rationale for their choices (Larrick, Smith, & Yates, 1992; Miller & Fagley, 1992).

To explain the mixed results in framing literature, Levin, Schneider, and Gaeth (1998) have developed a typology which distinguish three different kinds of valence framing effects. The next section will demonstrate the LSG framework.

### **LSG Framework**

Several framing studies have deviated greatly from the original “Asian disease problem” not only in terms of the contexts, but also their manipulation of frame valence and risk. Levin, Schneider, and Gaeth (1998) proposed a typology to distinguish three types of framing: *risky choice framing*, *attribute framing*, and *goal framing*. The LSG framework greatly helped organize and explain seemingly contradictory findings in valence framing literature. In addition, cognitive psychology theories of information processing and attitude formation were unitized to explain attribute framing and goal framing effects. Their work “opened the door to a deeper understanding of the causes and consequences of framing effects” (Levin et al., 1998).

#### **Risky Choice Framing**

The first framing type is risky choice framing, which comes directly from Tversky and Kahneman’s (1981) “Asian disease problem”. The manipulation of risky choice framing has two characteristics: 1) in each set of choices, either gain framed

prospects or loss framed prospects are presented. Respondents will not be asked to choose between a gain framed prospect and loss framed prospect; and 2) each (gain or loss) set of prospects involves at least a risky prospect and a riskless prospect.

The dependent measure of risky choice framing is usually a discrete choice between a risky prospect and a riskless prospect in the same (gain or loss) domain. For instance, subjects were asked to choose either program A or B (both are in gain frame) in the “Asian disease problem”. Subjects were not asked to choose between a gain framed prospect and a loss framed prospect. “Choice reversal” phenomenon, in which subjects prefer the riskless prospect when outcomes are described in positive terms but prefer the risky prospect when outcomes are described in negative terms, is commonly found in risky choice framing studies. Two meta-analyses speculate that the similarity between a given framing study and the “Asian disease problem” predicts the likelihood of obtaining choice reversal (Kühberger, 1998; Levin et al., 1998). Among the three types of framing in LSG framework, risky choice framing is most similar to the original framing problems presented in prospect theory experiments.

### **Attribute Framing**

Attribute framing only focuses on framing a single attribute or characteristic of an object framed positively and negatively. Dependent measure for attribute framing is usually evaluation of the target object. For example, we can compare consumers’ attitude toward an airline alliance that “80% of customers were satisfied with” versus “20% customers were dissatisfied with” (Putrevu, 2010). Based on extensive literature that falls

into this category, Levin et al. (1998) conclude that positive attribute framing elicits more favorable evaluations than negative attribute framing. This finding explains those studies claim positive frame is superior to negative frame that we have discussed in the previous section.

Levin et al. (1998) clarify that the ratio or percentage presented in attribute framing studies is not “risk”. It is merely a way to frame messages in positive or negative lights. Indeed, without those percentages, it would be difficult to accurately frame an attribute “differently but objectively equivalent” via valence. Some common valence manipulation in attribute framing studies involved describing situations in success rates versus failure rates (Davis & Bobko, 1986; Levin, Schnittjer, et al., 1988), correct percentage versus incorrect percentage (Levin, Johnson, Russo, & Deldin, 1985), probability of win versus probability of loss (Levin, Chapman, et al., 1988; Levin et al., 1985), satisfaction rate versus dissatisfaction rate (Putrevu, 2010), chance of no vaccine side-effects versus chance of vaccine side-effects (O'Connor, Pennie, & Dales, 1996), and survival rates versus mortality rates (Marteau, 1989; Wilson, Kaplan, & Schneiderman, 1987). Note that the manipulation of framing in those studies focused on a single attribute of an object.

Theories of information processing and attitude formation have been sought to explain attribute-framing effects. Levin and Gaeth (1988) argue that information is encoded relative to its descriptive valence. The encoding of positively framed messages activates favorable associations in memory, whereas encoding of negatively framed messages activates unfavorable association in memory. The “stimulus-response

compatibility effects” causes positive frame to be perceived more favorable than negative frame (Levin et al., 1985). In addition, Russo, Meloy, and Medvec (2004) contend that predecisional distortion can substantially impact the decision process. The valence-based encoding may create substantial positive or negative distortion and confirmation bias that lead to attribute framing effects (Levin et al., 1998).

### **Goal Framing**

Another type of framing that does not involve the presence of risk is goal framing. In goal framing studies, the positive frame describes the positive consequences of adopting an advocated behavior, whereas the negative frame describes the negative consequences of not adopting an advocated behavior.

Goal framing has been widely tested in the area of health communication and persuasive communication. Meyerowitz & Chaiken (1987) suggest that the negative frame “research shows that women who do not do BSE (breast self-examination) have a decreased chance of finding a tumor in the early, more treatable stage of the disease” has a stronger persuasive effect on choices than the positive frame “research shows that women who do BSE have an increase chance of finding a tumor in the early, more treatable stage of the disease”. Studies in STD prevention (Block & Keller, 1995), sunscreen use (Rothman et al., 1993), woman Mammography utilization (Banks et al., 1995), and have confirmed the view that negative frame to be more persuasive than positive frame.

Levin et al. (1998) speculate that in goal framing, negative frame is more persuasive than positive frame. The goal framing effects can be explained by “loss aversion” which argues that losses and disadvantages have greater impact on preferences than gains and advantages (Kahneman & Tversky, 1979). People are highly motivated to avoid losses. Thus, negative goal frame is more effective in persuading decision makers to adopt an advocated behavior.

It is important to distinguish attribute framing and goal framing. Attribute framing is a simple presentation of the positive side of the attribute (e.g. beef labeled “75% lean”) versus the negative side of the attribute (e.g. beef labeled “25% fat”). Goal framing focuses on the consequences of performing (versus not performing) an act. The positive frame presents the positive consequences of performing while the negative frame demonstrates the negative consequences of not performing.

To conclude, unlike risky choice framing which investigates decision making under various levels of risk, attribute framing and goal framing do not involve choosing among prospects that differ in the level of risk. This is probably the most distinct difference between risky choice framing and the other two framings in the LSG framework. In addition, the dependent measure of attribute framing and goal framing is not a choice between two prospects in one frame-valence domain; instead, it is attitude and behavioral intention toward a target concept. Taking all the characteristics of risky choice framing, attribute framing, and goal framing into consideration, this study applied attribute framing and goal framing to the context of HACCP consumer educational

intervention. This thesis examined attribute framing effects in Study I, and goal framing effects in Study II. We hypothesize that:

**H1:** In the context of *attribute framing*, positive frame will elicit more favorable consumer attitude and behavioral intention toward HACCP than negative frame.

**H2:** In the context of *goal framing*, negative frame will elicit more favorable consumer attitude and behavioral intention toward HACCP than positive frame.

## **ELM & Involvement**

The Elaboration Likelihood Model (ELM) proposed by Petty, Cacioppo, and Goldman (1981) is a general theory of attitude change that demonstrates the basic processes underlying the effectiveness of persuasive communication. Persuasion is likely to result from central route processing when a person carefully and thoughtfully evaluates the quality of an argument presented; on the contrary, persuasion is likely to result from peripheral route processing when a person ignores the true merits of the information presented and only judges from some simple cues (e.g. such as positive or negative cues in the argument, or attractiveness of a message source) (Petty, Cacioppo, & Schumann, 1983).

Involvement, also known as personal relevance, measures a person's perceived relevance with a target object (Celsi & Olson, 1988; Greenwald & Leavitt, 1984; Mitchell, 1981; Rothschild, 1984). Celsi and Olson (1988) portray a consumer's level of involvement with an object, situation, or action as the degree to which the consumers perceive that concept to be personal relevant. Zaichkowsky (1985) defines involvement

as “a person’s perceived relevance of the object based on inherent needs, values, and interests”. This concept of involvement can be applied to advertisements, products, and purchase decisions.

Petty, Cacioppo, & Schumann (1983) argue that under high involvement conditions, people process information more extensively through central route, whereas under low involvement conditions, people are more likely to process information through peripheral route. Several studies have specifically examined involvement as a moderator in message framing. Rothman and Salovey (1997) and Wegener, Petty, and Klein (1994) observed framing effects only under high involvement conditions. On the contrary, Krishnamurthy, Carter, and Blair (2001) only found framing effect under low-involvement conditions in attribute framing and goal framing. In addition, Putrevu (2010) reported that attribute framing effects and goal framing effects occurred under both low involvement conditions and high involvement conditions, but the effects were stronger under low involvement conditions. Literature has not reached a consensus and calls for more investigations on involvement as a moderator in message framing, especially under the LSG framework. According to Elaboration Likelihood Model, we predict that low-involved consumers are more likely to pay attention to unimportant cues such as the valence of messages, thus are more susceptible to attribute framing effect and goal framing effect. Therefore, we have the following hypotheses:

**H3:** In the context of *attribute framing*, Involvement moderates the effect of valence on a focal consumer’s attitude and behavioral intention toward HACCP. As involvement increases, framing effect weakens.

**H4:** In the context of *goal framing*, Involvement moderates the effect of valence on a focal consumer's attitude and behavior intention toward HACCP. As involvement increases, framing effect weakens.

Researchers have argued that variation in the type of media, for instance print, audio, and television, impacts respondents' attention and responses to the same message (Krugman, 1966; Worchel, Andreoli, & Eason, 1975; Wright, 1974). In this study, we present framed messages in articles and videos to examine whether the occurrence of message framing effects is consistent in both forms.

**H5:** The effects of *attribute framing* on a focal consumer's attitude and behavioral intention toward HACCP are not different when framing messages are delivered via article or video form.

**H6:** The effects of *goal framing* on a focal consumer's attitude and behavioral intention toward HACCP are not different when framing messages are delivered via article or video form.



## Chapter 3

### STUDY I: ATTRIBUTE FRAMING STUDY

This thesis conducted two separate studies: attribute framing study (Study I) and goal framing study (Study II). Study I focused on framing the attributes of HACCP and tested hypothesis 1, 3, and 5. Study II focused on framing the consequences of implementing HACCP and tested hypothesis 2, 4, and 6.

In this chapter, we conducted an attribute framing study. We expected that in the context of attribute framing, positive frame would elicit more favorable consumer attitude and behavioral intention toward HACCP than negative frame (**H1**). As involvement increased, attribute-framing effect would weaken (**H3**). The effects of attribute framing on a focal consumer's attitude and behavioral intention toward HACCP would not be different when framing messages were delivered via article or video form (**H5**).

## Methodology

### Experiment Design and Participants

This study had a 2 (attribute frame valence: positive vs. negative)  $\times$  2 (delivery form: article vs. video) factorial, between-subjects design with involvement included as an ordinal variable. Subjects were randomly assigned to one of the four experimental conditions (see Table 3.1).

**Table 3.1 Sample Size across Each Experimental Condition**

		Delivery Form		Total
		Video	Article	
Valence	Negative	16	22	38
	Positive	15	23	38
Total		31	45	76

The sample was recruited from 200 individuals that took part in the previous HACCP study in 2010 and agreed to participate in future studies (Sharma, 2010). The sample was composed of residents of a college town including faculty, staff, students, and company employees, etc. This sample was representative of our target population in that they were ordinary people that ate at restaurants. A total of 76 usable responses were received by the cut-off date (response rate= 42%). Female respondents (78.9%) dominated the sample. The average age was 42.43 years, with a standard deviation of 12.76 years. Among the respondents, 12% had some college or associate's degree, 27% had Bachelor's degree, and 20% had Master's degree. For combined annual household income, 15.3% of the respondents reported less than \$40,000, 54.1% reported within the range of \$40,000 to \$99,999, and 30.6% reported at least \$100,000. A lucky draw of \$75 gift card (resulting in 5 winners) with respondents in study I and study II was conducted as an incentive to complete the survey.

### **Experimental Stimuli**

To our knowledge, no one has incorporated valence-framed messages into a traditional HACCP or food safety educational intervention for the purpose of enhancing

persuasive communication. In this thesis study, we created 2 articles and 2 videos to test attribute framing (Study I), and another 2 articles and 2 videos to test goal framing (Study II).

### *Article*

The HACCP food safety articles had five short pages, which took around 3 minutes to read. We had developed a positive attribute framing article and a negative attribute framing article. The articles had the first four pages as same, but were different in the last page. Pictures were inserted in the articles to facilitate the communication of messages.

The article aimed to introduce HACCP and provide food safety knowledge to the audience. The article's first page contained a "messy kitchen" scene (with picture and text) that illustrated poor sanitation and food cross-contamination in a home kitchen where the cook was depicted as preparing food for a crowd. In this way, we induced the audience to concern about sanitation in a commercial kitchen.

The next page had an "astronauts" scene (with picture and text) to illustrate that HACCP was invented by NASA to ensure astronauts were eating safe food when space travelling. And then, two paragraphs provided the definition of HACCP and explained the implementation of HACCP in foodservice businesses.

The third page included three "critical control points" examples in kitchen based on three major consumer food safety knowledge gaps identified from our previous

consumer food safety knowledge study data (Sharma, 2010). These were: adequate cooking temperature and length, temperature danger zone, and proper hand washing.

The fourth page encouraged the audience to ask their foodservice managers and servers whether HACCP had been implemented in the foodservice establishment. This part reflected the purpose of our HACCP project, which was to increase consumer demand for HACCP.

On the last page of this HACCP attribute framing article, we inserted valence framing messages referring to product price increase due to HACCP implementation. The article in positive frame stated that “in a recent research study, 43% of the food firms (including restaurants) did not indicate product price increase due to HACCP implementation”, whereas the article in negative frame stated that “in a recent research study, 57% of the food firms (including restaurants) indicated product price increase due to HACCP implementation” (Mutlu, Bal, Say, & Emeksiz, 2003). This manipulation was based on framing studies in the context of medical treatment, in which positive frame was manipulated as “the chance of having no vaccine side effects” while the negative frame was manipulated as “the chance of having vaccine side effects” (Donovan & Jalleh, 2000; O'Connor et al., 1996). In our food safety context, product price increase could be viewed as a “side effect” of HACCP implementation.

### ***Video***

We also developed two attribute framing animation videos, one in positive frame and the other in negative frame. Each video was three-minute long. These two videos

contained the same information as the two articles. To make the video and article more alike, some animations in the videos were developed from the pictures we used in the attribute framing articles. For instance, the same astronauts were used in the articles and the videos. The only difference was that the astronauts in the videos were animated. Therefore, the video study could be viewed as a replication of the article study.

As discussed earlier that the delivery form of messages may impact respondents' attentions and information processing. The purpose of the video replication study was to investigate whether the delivery form moderates the impacts of message framing on consumer attitude and behavioral intention toward HACCP.

The videos were uploaded to YouTube and then were embedded in the online surveys on Qualtrics. Thus, participants did not need to visit YouTube website to view the videos. The videos could only be accessed by those with the video links. Therefore, our sample participants would not be able to watch the videos on YouTube prior to the experiment.

## **Procedure**

This study used Qualtrics online survey software to collect data. First, we sent out email invitations via Qualtrics. The email list contained 200 individuals that took part in the previous HACCP study in 2010 and agreed to participate in future studies (Sharma, 2010). The invitation email explained the form and length of the study, the incentives, and clarified that we did not expect the participants to recall any information from the 2010 study. After clicking the survey link, Qualtrics randomly assigned participants to

one of the four experimental conditions. Next, participants were asked to either read an article or watch a video depending on which condition they were assigned to. After that, they responded to attitude, behavioral intention, involvement measures, a manipulation check question, and demography questions. Finally, they were asked to provide a contact email if they wanted to participate in the lucky draw.

## **Measures**

### ***Manipulation check***

Manipulation check was used to assess the degree to which participants perceived the HACCP intervention placed emphasis on the positive (negative) proportion of the information. In both the article and video interventions, we used a 7-point bipolar scale as the manipulation check question. Participants were asked whether the article (video) placed emphasis on the likelihood that product price would or would not increase due to HACCP implementation. The likelihood that product price would increase reflected the negative frame condition, whereas the likelihood that product price would not increase reflected the positive frame condition. See manipulation check result in Appendix A.

### ***Attitude***

Attitude toward HACCP was adapted from Maheswaran & Meyers-Levy (1990) and was measured via a 4 item, 7-point, semantic differential scale (not at all

useful/extremely useful; extremely unfavorable/extremely favorable; extremely bad idea/extremely good idea; not at all important/very important).

### ***Behavioral Intention***

Behavioral intention toward HACCP was measured via a 5-item, 5-point Likert scale anchored at 1= very unlikely and 5= very likely. These behavioral measures included likelihood to discuss HACCP information to others, to inquiry about HACCP implementation in restaurants, to recommend restaurants that had implemented HACCP to others, and to search for HACCP information.

### ***Involvement***

The involvement scale was adopted from Zaichkowsky (1994) and was measured via a 10-item, 7-point, semantic differential scale (important/unimportant; boring/interesting; relevant/irrelevant; exciting/unexciting; means nothing/means a lot; appealing/unappealing; fascinating/mundane; worthless/valuable; involving/uninvolving; not needed/needed). Participants were asked how the HACCP article (video) appealed to her/him.

## Results

The attribute framing data set contained three independent variables: valence (positive vs. negative), delivery form (article vs. video), and involvement (10-item, 7-point scale); and contained two dependent variables: attitude (4-item, 7-point scale), and behavioral intention (5-item, 5-point scale). See Table 3.2 for a summary of the variables and Appendix C for survey questions.

In our analyses, involvement, attitude, and behavior were not averaged or summed up, because each item in the scale should be viewed as ordinal rather than continuous (Gaito, 1980; Göb, McCollin, & Ramalhoto, 2007; Shah & Madden, 2004; Zimmerman & Zumbo, 1992). This resulted in ten involvement variables (involvement\_1, 2... 10), four attitude variables (attitude\_1, 2, 3, 4), and five behavioral intention variables (behavior\_1, 2, 3, 4, 5). We tested them separately.

**Table 3.2 Summary of Variables**

<b>Variable</b>	<b>Label</b>	<b>Description</b>
Attitude	Attitude_1	Not at all useful - Extremely useful
	Attitude_2	Extremely unfavorable- Extremely favorable
	Attitude_3	Extremely bad idea - Extremely good idea
	Attitude_4	Not at all important - Very important
Behavioral Intention	Behavior_1	Talk to others about HACCP information in this intervention
	Behavior_2	Ask server or restaurant manager whether HACCP has been implemented in the establishment
	Behavior_3	Recommend a restaurant to others because



Variable	Label	Description
		it has implemented HACCP to ensure food safety
	Behavior_4	Search for more HACCP information, for example, Google HACCP online
	Behavior_5	Choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP
Involvement	Involvement_1	Unimportant - Important
	Involvement_2	Boring - Interesting
	Involvement_3	Irrelevant - Relevant
	Involvement_4	Unexciting - Exciting
	Involvement_5	Means nothing - Means a lot
	Involvement_6	Unappealing - Appealing
	Involvement_7	Mundane - Fascinating
	Involvement_8	Worthless - Valuable
	Involvement_9	Uninvolving - Involving
	Involvement_10	Not needed - Needed

### Valence on Attitude and Behavioral Intention

First, we investigated the effect of valence on attitude and behavioral intention. A K Independent Samples test was conducted with the four attitude variables and five behavior variables as test variables, and valence as a grouping variable. No significance was found in these two tests (see Table 3.3 and Table 3.4). The results failed to support **H1** that in the context of attribute framing, positive frame will elicit more favorable consumer attitude and behavioral intention toward HACCP than negative frame.

**Table 3.3 Krustal-Wallis Test Grouped by Valence**

Test Statistics <sup>a,b</sup>									
	Attitude _1	Attitude _2	Attitude _3	Attitude _4	behavior _1	behavior _2	behavior _3	behavior _4	behavior _5
Chi-Square	.410	.988	.002	.290	.029	.096	1.155	.051	.850
df	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.522	.320	.964	.590	.866	.756	.282	.821	.357

a. Kruskal Wallis Test

b. Grouping Variable: Valence

**Table 3.4 Medan Test Grouped by Valence**

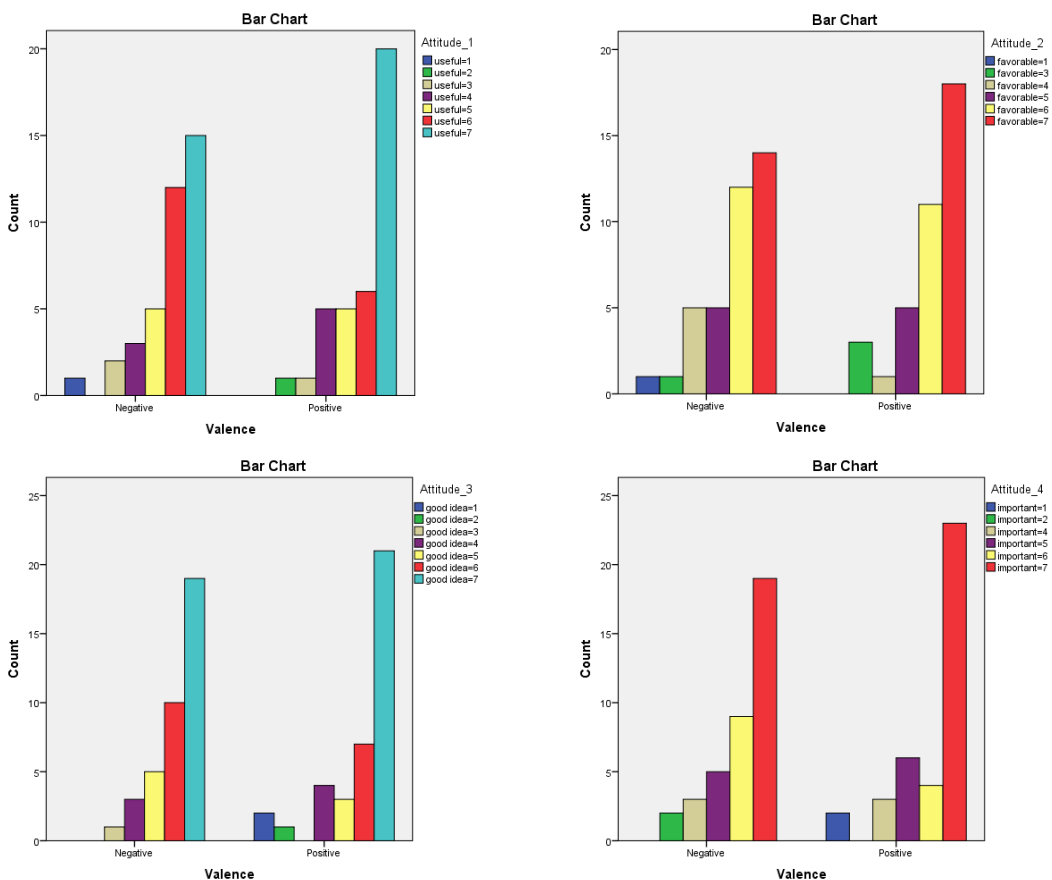
Test Statistics <sup>a</sup>									
	Attitude _1	Attitude _2	Attitude _3	Attitude _4	behavior _1	behavior _2	behavior _3	behavior _4	behavior _5
N	76	76	76	76	76	76	76	76	76
Median	6.00	6.00	7.00 <sup>b</sup>	7.00 <sup>b</sup>	3.00	2.00	3.00	3.00	4.00
Chi-Square	1.324	.864			.054	.057	2.581	.220	.592
df	1	1			1	1	1	1	1
Asymp. Sig.	.250	.353			.815	.811	.108	.639	.442
Yates' Chi-Square	.847	.486			.000	.000	1.896	.055	.263
Continuity df	1	1			1	1	1	1	1
Correction Asymp. Sig.	.357	.486			1.000	1.000	.169	.814	.608

a. Grouping Variable: Valence

b. All values are less than or equal to the median. Median Test cannot be performed.

Although no significance was found, we could further look at the distribution of attitude and behavioral intention responses to gain insight into the effectiveness of the HACCP intervention. In the attitude survey questions, selecting a higher category on the scale represented that the respondent had a more favorable attitude toward the implementation of HACCP in foodservice businesses. The bar charts for attitude by valence were highly left-skewed, indicating that no matter which valence respondents were assigned to, most of them had very favorable attitude toward HACCP (see Figure 3.1).

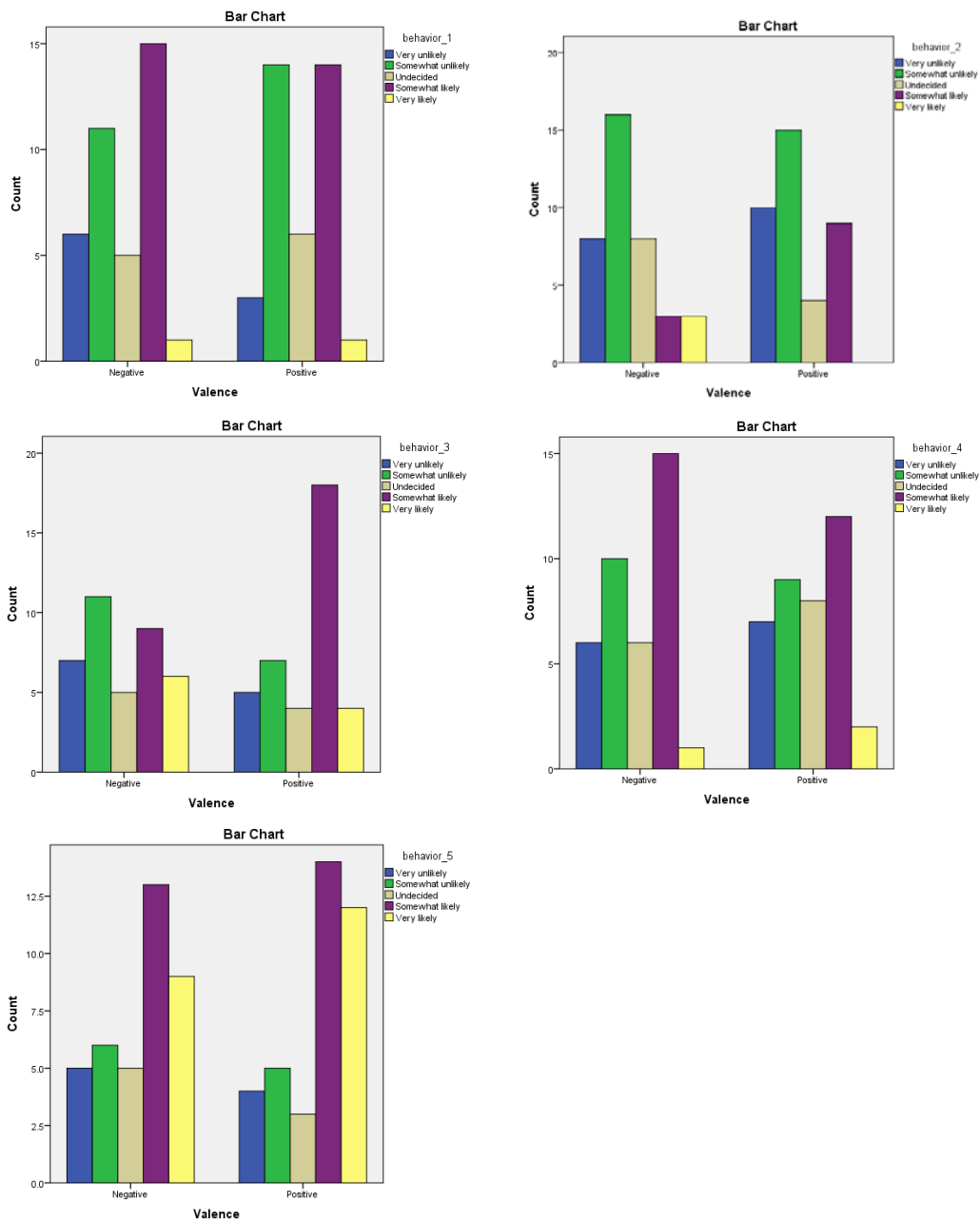
**Figure 3.1 Bar Charts for Attitude by Valence**



Moreover, we could describe the distribution of respondents' behavioral intention toward the implementation of HACCP in foodservice businesses by valence. In the behavioral intention survey questions, selecting a higher category on the scale represented that the respondent had a more favorable behavioral intention toward the implementation of HACCP. The bar charts for behavioral intention suggested that respondents put more favorable responses on behavior\_1, behavior\_4, and behavior\_5 (see Figure 3.2). The results indicated that respondents who participated in our HACCP intervention showed favorable intention to talk to others about HACCP information in our intervention (behavior\_1), to search for more HACCP information (behavior\_4), and

to choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP (behavior\_5).

**Figure 3.2 Bar Charts for Behavioral Intention by Valence**



## Delivery Form on Attitude and Behavioral Intention

Furthermore, we investigated the effect of delivery form on attitude and behavioral intention. A K-Independent Samples tests, including a Kruskal-Wallis test and a median test, were conducted with the four attitude variables and five behavior variables as test variables, and delivery form as a grouping variable. Marginal significance was found on behavior\_2 “Ask server or restaurant manager whether HACCP has been implemented in the establishment” ( $\chi^2 (1) = .087$ ) and behavior\_5 “Choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP” ( $\chi^2 (1) = .070$ ) in the Kruskal-Wallis test results (see Table 3.5). The bar charts for behavioral intention by delivery form demonstrated this finding that participants who read the article might have responded more favorably on behavior\_2 and behavior\_5 than those who watched the video (see Figure 3.4). This revealed that the article delivery form might be more effective in eliciting behavioral intention such as to ask server and restaurant manager whether HACCP has been implemented in the establishment (behavior\_2), and to choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP (behavior\_5). No significance was found in the median test results (see Table 3.6).

**Table 3.5 Kruskal-Wallis Test Grouped by Delivery Form**

	Test Statistics <sup>a,b</sup>								
	Attitude _1	Attitude _2	Attitude _3	Attitude _4	behavior _1	behavior _2	behavior _3	behavior _4	behavior _5
Chi-Square	.738	2.571	1.382	.880	.571	2.927	2.212	1.314	3.276
df	1	1	1	1	1	1	1	1	1
Asym p. Sig.	.390	.109	.240	.348	.450	.087	.137	.252	.070

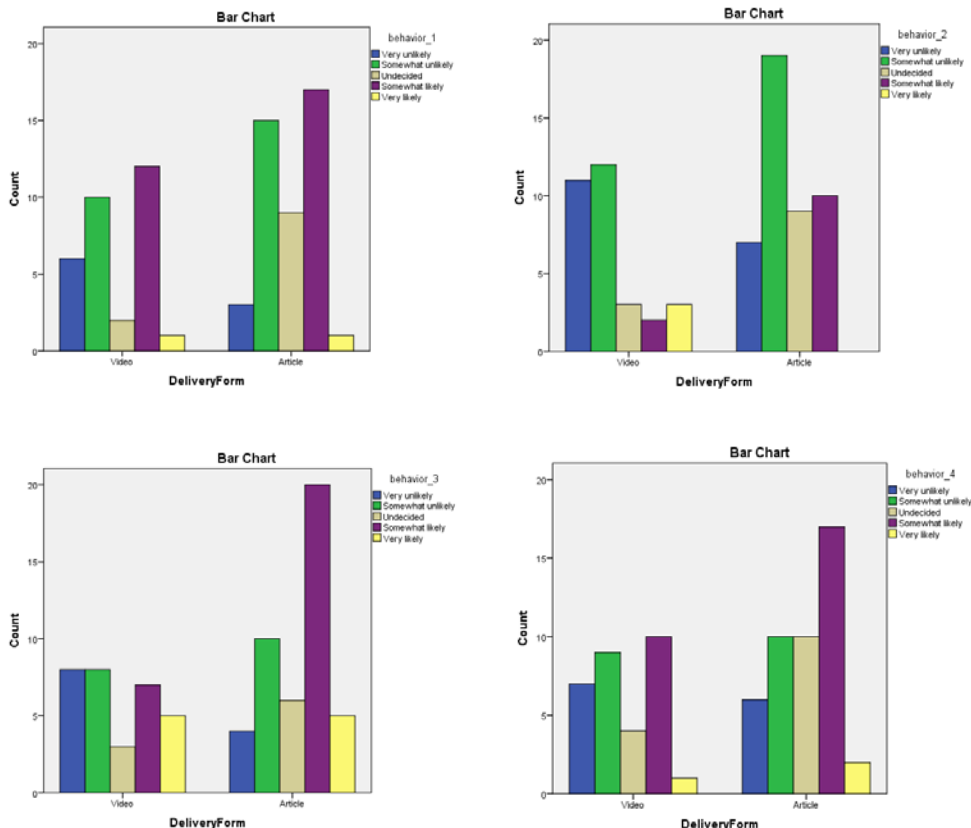
- a. Kruskal Wallis Test.
- b. Grouping Variable: Delivery Form

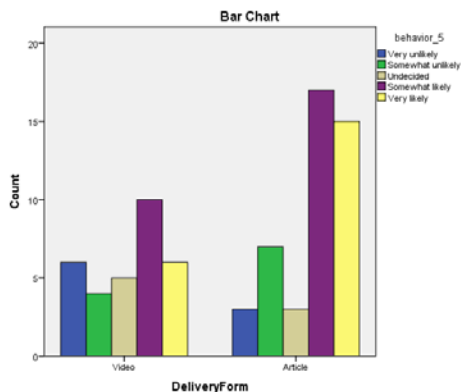
**Table 3.6 Medan Test Grouped by Delivery Form**

Test Statistics <sup>a</sup>									
	Attitude 1	Attitude 2	Attitude 3	Attitude 4	behavior 1	behavior 2	behavior 3	behavior 4	behavior 5
N	76	76	76	76	76	76	76	76	76
Median	6.00	6.00	7.00 <sup>b</sup>	7.00 <sup>b</sup>	3.00	2.00	3.00	3.00	4.00
Chi-Square	.357	2.083			.028	2.159	2.085	.349	1.794
df	1	1			1	1	1	1	1
Asymp. Sig.	.550	.149			.866	.142	.149	.555	.180
Yates' Chi-Square Continuity Correction	.132	1.456			.005	1.502	1.465	.124	1.163
df	1	1			1	1	1	1	1
Asymp. Sig.	.716	.228			.945	.220	.226	.725	.281

- a. Grouping Variable: Delivery Form
- b. All values are less than or equal to the median. Median Test cannot be performed.

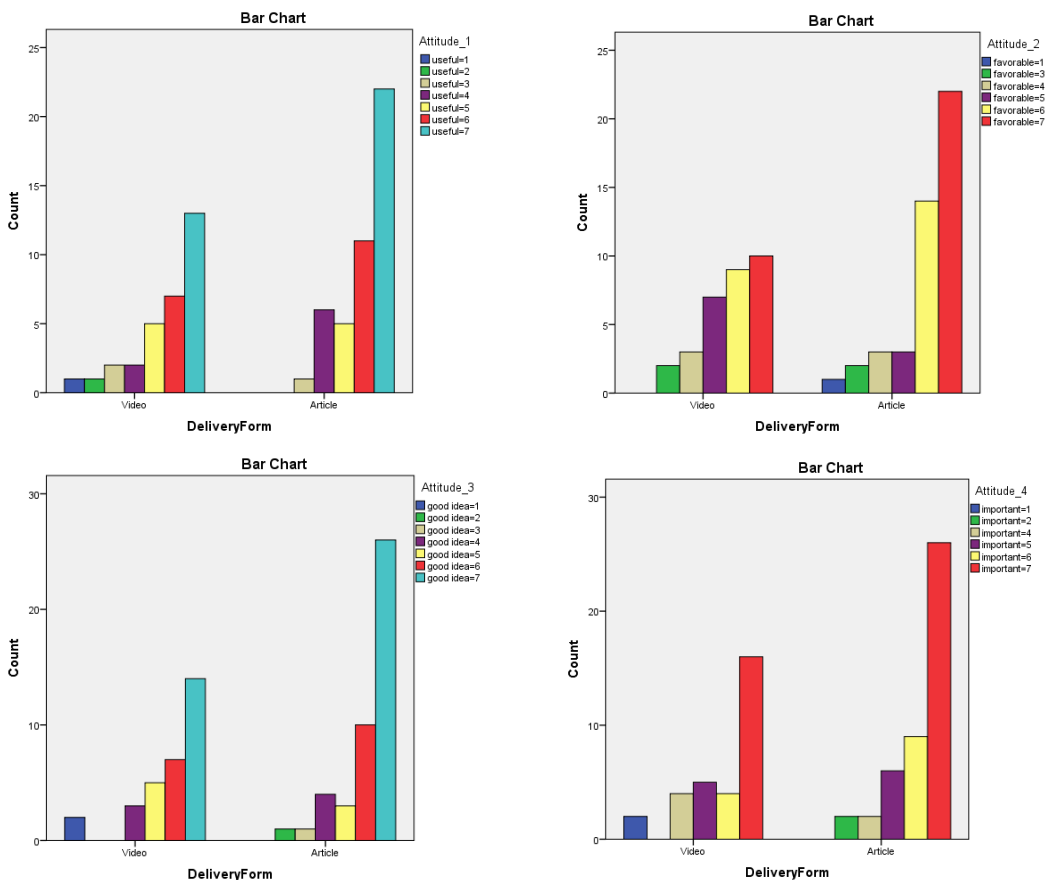
**Figure 3.3 Bar Charts for Behavioral Intention by Delivery Form**





In addition, similar to the results in previous valence analysis, the bar charts for attitude by delivery form were highly left-skewed, indicating that no matter which delivery form respondents were assigned to, most of them had very favorable attitude toward HACCP (see Figure 3.4).

**Figure 3.4 Bar Charts for Attitude by Delivery Form**



### **Involvement × Valence Interaction**

We conducted a series of ordinal logistic regressions using the complementary log-log model to analyze the moderating effect of involvement. These included forty ordinal logistic regressions performed with attitude variables, and fifty ordinal logistic regressions performed with behavioral intention variables. The independent variables were valence and involvement\_1-10. The dependent variables included attitude\_1-4 and behavior\_1-5.

Complementary log-log Model:

$$\log\{-\log[1 - \pi(x)]\} = X_{p \times n}^T \beta_{p \times l}$$

First, we conducted ordinal logistic regressions with each of the four attitude variables. In each regression, we used valence, one of the ten involvement variables, and interaction between valence and involvement. This resulted in ten regression models for each attitude variable, and forty regressions in total because there were four attitude variables. For example, the first regression model included valence, involvement\_1, interaction between valence and involvement\_1 as independent variable, and attitude\_1 as dependent variable. The second model used involvement\_2 instead, with others remaining the same. The *i*th regression model used involvement\_*i*. After these ten regressions, we repeated this process with attitude\_2, and then attitude\_3, and finally attitude\_4. In this way, each attitude variable was regressed on each involvement variable. Similarly, we regressed each of the five behavioral intention variables on valence, each of the ten involvement variables, and interaction between the two, resulting in fifty separate logistic regressions.



To reduce complexity of presenting the regression analyses results, we synthesized the results into Table 3.7, Table 3.8, Table 3.9 and Table 3.10. In general, the results indicated that the overall models were significant. The Goodness-of-Fit tests suggested that these ordinal regression models were well fitted. The Pseudo R-Squares valuables were acceptable for behavioral research. Test of Parallel Lines tested the proportional odds assumption in ordinal regression. The null hypothesis stated that the slope coefficients in the model were the same across response categories. Results indicated that the assumption of proportional odds held in these models. In conclusion, the ordinal regression models were significant.

**Table 3.7 Ordinal Regression Results for Attitude (Part 1)**

			Attitude_1	Attitude_2	Attitude_3	Attitude_4
Involvement_1	<b>Model Fitting</b>	Final	67.117**	124.963**	128.480**	125.761**
	<b>Goodness-of-Fit</b>	Pearson	.048*	40.906	102.551**	61.080
		Deviance	.928	31.353	39.417	31.164
	<b>Test of Parallel Lines</b>	General	43.141	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	0.587	0.807	0.816	.809
Involvement_2	<b>Model Fitting</b>	Final	42.180**	30.664**	43.468**	125.515**
	<b>Goodness-of-Fit</b>	Pearson	78.972	61.419	49.043	27.498
		Deviance	46.543	50.630	45.491	30.017
	<b>Test of Parallel Lines</b>	General	87.952*	49.393	37.894	.000
	<b>Pseudo R-Square</b>	Cox and Snell	0.426	.332	.436	.808
Involvement_3	<b>Model Fitting</b>	Final	113.863**	117.059**	88.058**	122.381**
	<b>Goodness-of-Fit</b>	Pearson	60.381	64.741**	50.226	29.234
		Deviance	33.051	31.357	37.310	31.280
	<b>Test of Parallel Lines</b>	General	.000	.000	33.822	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.776	.786	.686	.800
Involvement_4	<b>Model Fitting</b>	Final	20.323**	28.179**	34.930**	39.105**
	<b>Goodness-of-Fit</b>	Pearson	60.320	57.921+	37.698	27.904
		Deviance	47.484	50.561	36.258	29.129
	<b>Test of Parallel Lines</b>	General	41.312	45.507	33.660	34.204
	<b>Pseudo R-Square</b>	Cox and Snell	.235	.310	.368	.402
Involvement_5	<b>Model Fitting Info</b>	Final	31.234**	109.946**	39.050**	94.261**

		Attitude_1	Attitude_2	Attitude_3	Attitude_4
<b>Goodness-of-Fit</b>	Pearson	56.606	32.859	40.259	56.734
	Deviance	35.636	29.443	37.726	31.868
<b>Test of Parallel Lines</b>	General	32.936		53.784	.000
<b>Pseudo R-Square</b>	Cox and Snell	.337	.765	.402	.711

**Table 3.8 Ordinal Regression Results for Attitude (Part 2)**

			Attitude_1	Attitude_2	Attitude_3	Attitude_4
<b>Involvement_6</b>	<b>Model Fitting</b>	Final	18.790	21.554+	74.616**	68.319**
	<b>Goodness-of-Fit</b>	Pearson	75.122	60.744	46.197	35.063
		Deviance	55.181	48.302	35.031	35.135
	<b>Test of Parallel Lines</b>	General	48.235	25.421	39.413	47.149
	<b>Pseudo R-Square</b>	Cox and Snell	.219	.247	.625	.593
<b>Involvement_7</b>	<b>Model Fitting</b>	Final	24.020**	19.183	26.114**	113.896**
	<b>Goodness-of-Fit</b>	Pearson	59.142	41.002	49.105	26.169
		Deviance	44.855	41.024	40.799	30.544
	<b>Test of Parallel Lines</b>	General	40.874	28.130	37.889	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.271	.223	.291	.777
<b>Involvement_8</b>	<b>Model Fitting</b>	Final	127.667**	116.820**	123.252**	123.516**
	<b>Goodness-of-Fit</b>	Pearson	56.175	24.095	37.661	23.700
		Deviance	40.576	26.858	29.173	26.772
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.814	.785	.802	.803
<b>Involvement_9</b>	<b>Model Fitting</b>	Final	29.078**	18.995	30.507**	33.513**
	<b>Goodness-of-Fit</b>	Pearson	58.902	62.821	46.568	47.126
		Deviance	52.483	57.038	38.623	44.570
	<b>Test of Parallel Lines</b>	General	49.968	69.049+	28.435	50.507
	<b>Pseudo R-Square</b>	Cox and Snell	.318	.221	.331	.357
<b>Involvement_10</b>	<b>Model Fitting</b>	Final	122.141**	121.198**	129.751**	129.303**
	<b>Goodness-of-Fit</b>	Pearson	56.828	68.738	51.859	57.899
		Deviance	27.347	36.462	38.856	35.766
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.800	.797	.819	.818

Note: +p < .10, \*p < .05, \*\*p < .01.

Table 3.9 Ordinal Regression Results for Behavioral Intention (Part 1)

			Behavior_ 1	Behavior_ 2	Behavior_ 3	Behavior_ 4	Behavior_ 5
<b>Involvement_1</b>	<b>Model Fitting</b>	Final	98.669**	107.196**	122.375**	109.791**	121.401**
	<b>Goodness-of-Fit</b>	Pearson	19.511	24.681	21.483	32.335	30.922
		Deviance	21.803	31.005	26.427	34.416	38.672
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.727	.756	.800	.764	.798
<b>Involvement_2</b>	<b>Model Fitting</b>	Final	107.029**	106.315**	134.668**	112.915**	127.112**
	<b>Goodness-of-Fit</b>	Pearson	22.614	22.157	45.478	36.045	31.892
		Deviance	27.019	27.856	50.006	35.143	36.847
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	51.678+
	<b>Pseudo R-Square</b>	Cox and Snell	.755	.735	.830	.774	.424
<b>Involvement_3</b>	<b>Model Fitting</b>	Final	95.237**	85.384**	104.357**	94.644**	101.365**
	<b>Goodness-of-Fit</b>	Pearson	17.856	11.215	17.039	38.367	8.905
		Deviance	20.415	14.637	22.352	32.483	11.760
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.714	.675	.747	.712	.737
<b>Involvement_4</b>	<b>Model Fitting</b>	Final	104.492**	73.043**	32.301**	10.916	27.221**
	<b>Goodness-of-Fit</b>	Pearson	12.710	25.432	34.095	28.530	32.643
		Deviance	15.748	28.694	40.085	33.178	35.137
	<b>Test of Parallel Lines</b>	General	.000	.000	40.106	28.447	84.007**
	<b>Pseudo R-Square</b>	Cox and Snell	.747	.374	.346	.134	.301
<b>Involvement_5</b>	<b>Model Fitting</b>	Final	100.297**	95.351**	117.446**	67.926**	114.347**
	<b>Goodness-of-Fit</b>	Pearson	24.895	19.854	25.790	26.176	21.997
		Deviance	28.428	24.488	28.391	29.049	24.008
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	37.107	
	<b>Pseudo R-Square</b>	Cox and Snell	.733	.715	.787	.591	.778

**Table 3.10 Ordinal Regression Results for Behavioral Intention (Part 2)**

			Behavior_ 1	Behavior_ 2	Behavior_ 3	Behavior_ 4	Behavior_ 5
<b>Involvement_6</b>	<b>Model Fitting</b>	Final	100.714**	63.719**	73.713**	54.392**	68.191**
	<b>Goodness-of-Fit</b>	Pearson	20.952	21.262	46.059	47.792	42.353
		Deviance	23.250	24.348	48.554	46.336	41.761
	<b>Test of Parallel Lines</b>	General	.000	38.688	22.248	56.706*	17.795
	<b>Pseudo R-Square</b>	Cox and Snell	.734	.568	.621	.511	.592
<b>Involvement_7</b>	<b>Model Fitting</b>	Final	106.032**	111.755**	123.804**	24.827*	27.426*
	<b>Goodness-of-Fit</b>	Pearson	26.943	23.448	40.224	33.420	43.582
		Deviance	30.049	27.423	42.375	32.164	45.732
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	22.109	43.427
	<b>Pseudo R-Square</b>	Cox and Snell	.752	.770	.804	.279	.303
<b>Involvement_8</b>	<b>Model Fitting</b>	Final	99.793**	98.016**	131.145**	101.552**	122.736**
	<b>Goodness-of-Fit</b>	Pearson	21.754	22.866	32.478	20.816	21.691
		Deviance	26.872	26.085	33.437	25.384	26.458
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.731	.725	.822	.737	.801
<b>Involvement_9</b>	<b>Model Fitting</b>	Final	110.629**	110.279**	28.796**	24.362*	31.282**
	<b>Goodness-of-Fit</b>	Pearson	26.693	24.209	38.201	25.625	32.708
		Deviance	29.259	29.137	46.487	32.636	34.844
	<b>Test of Parallel Lines</b>	General	.000	.000	48.288	35.547	35.424
	<b>Pseudo R-Square</b>	Cox and Snell	.767	.766	.315	.274	.337
<b>Involvement_10</b>	<b>Model Fitting</b>	Final	99.263**	106.403**	124.315**	98.906**	128.449**
	<b>Goodness-of-Fit</b>	Pearson	16.713	28.738	21.405	16.657	30.254
		Deviance	17.974	36.137	27.500	22.103	33.936
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.729	.753	.805	.728	.816

Note: \*p < .10, \*p < .05, \*\*p < .01.

Our interest was in the interaction terms between valence and each involvement variable. The ordinal regressions revealed many significant and interesting interactions (see Table 3.11). We grouped the results by dependent variables for the purpose of simplicity.

**Table 3.11 Significant Interactions in Attribute Framing Study**

DV	Interaction	Estimate	Exponential
<b>Attitude_1</b>	Valence*Involvement_1=5	2.046	7.74E+00*
	Valence*Involvement_2=1	3.518	3.37E+01*
	Valence*Involvement_4=1	19.631	3.35E+08**
	Valence*Involvement_4=2	19.356	2.55E+08**
	Valence*Involvement_4=3	20.333	6.77E+08**
	Valence*Involvement_5=3	4.867	1.30E+02**
	Valence*Involvement_8=5	2.229	9.29E+00**
	Valence*Involvement_9=1	16.154	1.04E+07**
	Valence*Involvement_9=2	16.811	2.00E+07**
	Valence*Involvement_9=3	16.633	1.67E+07**
	Valence*Involvement_9=4	16.284	1.18E+07**
<b>Attitude_2</b>	Valence*Involvement_9=5	14.584	2.16E+06**
	Valence*Involvement_4=1	19.337	2.50E+08**
	Valence*Involvement_4=2	19.794	3.95E+08**
	Valence*Involvement_4=3	19.987	4.79E+08**
	Valence*Involvement_5=3	3.855	4.72E+01**
	Valence*Involvement_6=1	17.346	3.41E+07**
	Valence*Involvement_6=2	17.565	4.25E+07**
	Valence*Involvement_6=3	18.228	8.25E+07**
	Valence*Involvement_6=4	17.883	5.84E+07**
<b>Attitude_3</b>	Valence*Involvement_6=5	18.356	9.37E+07**
	Valence*Involvement_10=1	3.86	4.75E+01*
	Valence*Involvement_2=1	18.368	9.49E+07**
	Valence*Involvement_2=2	17.886	5.86E+07**
	Valence*Involvement_2=3	17.705	4.89E+07**
	Valence*Involvement_2=4	16.717	1.82E+07**
<b>Attitude_4</b>	Valence*Involvement_2=5	17.749	5.11E+07**
	Valence*Involvement_10=1	6.647	7.70E+02**
	Valence*Involvement_5=3	19.863	4.23E+08**
	Valence*Involvement_5=4	16.676	1.75E+07**
<b>Behavior_1</b>	Valence*Involvement_5=5	18.427	1.01E+08**
	Valence*Involvement_10=1	6.821	9.17E+02**
	Valence*Involvement_9=3	-3.441	3.20E-02*
<b>Behavior_2</b>	Valence*Involvement_10=1	3.496	3.30E+01*
	Valence*Involvement_10=5	-1.97	1.39E-01*
<b>Behavior_3</b>	Valence*Involvement_7=6	4.156	6.38E+01*
<b>Behavior_3</b>	Valence*Involvement_5=4	-2.264	1.04E-01*
	Valence*Involvement_10=5	-1.692	1.84E-01*

DV	Interaction	Estimate	Exponential
<b>Behavior_4</b>	Valence*Involvement_2=1	-2.543	7.86E-02*
	Valence*Involvement_2=3	4.222	6.82E+01**
	Valence*Involvement_2=5	2.574	1.31E+01**
	Valence*Involvement_7=1	-3.445	3.19E-02**
	Valence*Involvement_8=3	3.613	3.71E+01**
<b>Behavior_5</b>			

Note: \*p < .05, \*\*p < .01.

To interpret these interactions, we referred to the survey questions (see Appendix B or Table 3.2). The results of the logistic regression with attitude (attitude\_1-4) and behavioral intention (behavior\_1-5) as the dependent variables, suggested the following interactions between involvement and valence assignments:

1) **Attitude\_1** (“not at all useful-extremely useful”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of attitude\_1 scale than those assigned to the positive condition if they chose the:

- i) fifth category of involvement\_1 (“unimportant-important”);
- ii) first category of involvement\_2 (“boring-interesting”);
- iii) first through third category of involvement\_4 (“unexciting-exciting”);
- iv) third category of involvement\_5 (“means nothing-means a lot”);
- v) fifth category of involvement\_8 (“worthless-valuable”);
- vi) first through fifth category of involvement\_9 (“uninvolving-involving”).

Other interactions between involvement variables (involvement\_3, 6, 7, and 10) and valence were not statistically significant with attitude\_1.

### Summary

The respondents who generally found the intervention important and valuable, but boring, unexciting, meant nothing, and uninvolved in the negative valence condition were more likely than those in the positive valence condition to find HACCP useful. In other words, even though in the negative valence condition importance and valuable aspects of the HACCP intervention were able to influence the usefulness attitude, the respondents found the information boring, unexciting, less meaningful, and uninvolved.

2) **Attitude\_2** (“extremely unfavorable-extremely favorable”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of attitude\_2 scale than those assigned to the positive condition if they chose the:

- i) first through third category of involvement\_4 (“unexciting-exciting”);
- ii) the first through fifth category of involvement\_6 (“unappealing-appealing”);
- iii) first category of involvement\_10 (“not needed-needed”).

Other interactions between involvement variables (involvement\_1, 2, 3, 5, 7, 8, and 9) and valence were not statistically significant with attitude\_2.

### **Summary**

The respondents who generally found the intervention unexciting, ‘not needed’, unappealing and moderately appealing in the negative valence condition were more likely than those in the positive valence condition to find HACCP favorable. In other words,

although respondents perceived the HACCP intervention to be unexciting, unappealing, and not needed, the intervention was still able to enhance the favorableness attitude with messages in negative valence.

3) **Attitude\_3** (“extremely bad idea-extremely good idea”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of attitude\_3 scale than those assigned to the positive condition if they chose:

- i) first through fifth category of involvement\_2 (“boring-interesting”);
- ii) first category of involvement\_10 (“not needed-needed”).

Other interactions between involvement variables (involvement\_1, 3, 4, 5, 6, 7, 8, and 9) and valence were not statistically significant with attitude\_3.

### **Summary**

The respondents who generally found the HACCP intervention boring and ‘not needed’ in the negative valence condition were more likely than those in the positive valence condition to consider HACCP a good idea. In other words, although respondents perceived the HACCP intervention to be boring and ‘not needed’, the intervention was able to make respondents consider HACCP as a good idea by including messages framed in negative valence.



4) **Attitude\_4** (“not at all important-very important”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of attitude\_4 scale than those assigned to the positive condition if they chose the:

- i) third through fifth category of involvement\_5 (“means nothing-means a lot”);
- ii) first category of involvement\_10 (“not needed-needed”).

Other interactions between involvement variables (involvement\_1, 2, 3, 4, 6, 7, 8, and 9) and valence were not statistically significant with attitude\_4.

### **Summary**

The respondents who thought the HACCP intervention was ‘not needed’ but did not have an extreme opinion on the meaningfulness of the intervention in the negative valence condition were more likely than those in the positive valence condition to find HACCP important.

5) **Behavior\_1** (“talk to others about HACCP information in this intervention”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_1 scale than those assigned to the positive condition if they chose the:

- i) first category of involvement\_10 (“not needed-needed”).

In contrast, those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of behavior\_1 scale than those assigned to the positive condition if they chose the:

- i) third category of involvement\_9 (“uninvolving-involving”);
- ii) fifth category of involvement\_10 (“not needed-needed”).

Other interactions between involvement variables (involvement\_1, 2, 3, 4, 5, 6, 7, and 8) and valence were not statistically significant with behavior\_1.

### **Summary**

The respondents who found the HACCP intervention uninvolving in the negative valence condition were less likely than those in the positive valence condition to talk to others about HACCP information in this intervention. However, mixed results were found regarding how perception of whether HACCP intervention was needed influenced the likelihood to talk to others about HACCP information in this intervention.

6) **Behavior\_2** (“ask server or restaurant manager whether HACCP has been implemented in the establishment”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_2 scale than those assigned to the positive condition if they chose the:

- i) sixth category of involvement\_7 (“unappealing-appealing”).

Other interactions between involvement variables (involvement\_1, 2, 3, 4, 5, 6, 8, 9, and 10) and valence were not statistically significant with behavior\_2.

### Summary

The respondents who found the HACCP intervention appealing in the negative valence condition were more likely than those in the positive valence condition to ask their server or restaurant manager whether HACCP had been implemented in the establishment.

7) **Behavior\_3** (“recommend a restaurant to others because it has implemented HACCP to ensure food safety”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_3 scale than those assigned to the positive condition if they chose the:

- i) fourth category of involvement\_5 (“means nothing-means a lot”);
- ii) fifth category of involvement\_10 (“not needed-needed”).

Other interactions between involvement variables (involvement\_1, 2, 3, 4, 6, 7, 8, and 9) and valence were not statistically significant with behavior\_3.

### Summary

The respondents who found the HACCP intervention ‘moderately needed’ or ‘neither meaningless nor meaningful’ in the negative valence condition were more likely than those in the positive valence condition to ask their server or restaurant manager whether HACCP had been implemented in the establishment.

8) **Behavior\_4** (“search for more HACCP information”), involvement (1-10) \*  
valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_4 scale than those assigned to the positive condition if they chose the:

- i) third or fifth category of involvement\_2 (“boring-interesting”);
- ii) third category of involvement\_8 (“worthless-valuable”).

In contrast, those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of behavior\_4 scale than those assigned to the positive condition if they chose the:

- i) first category of involvement\_2 (“boring-interesting”);
- ii) first category of involvement\_7 (“mundane-fascinating”).

Other interactions between involvement variables (involvement\_1, 3, 4, 5, 6, 9, and 10) and valence were not statistically significant with behavior\_4.

### **Summary**

The respondents who found the HACCP intervention worthless in the negative valence condition were more likely than those in the positive valence condition to search for more HACCP information. On the contrary, those who found the HACCP intervention mundane in the negative valence condition were less likely than those in the positive valence condition to search for more HACCP information. Mixed results were obtained depended on respondents’ perception of the boringness of the HACCP intervention.

9) **Behavior\_5** (“choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP”), involvement (1-10) \* valence (negative vs. positive):

No interaction between involvement variables (involvement\_1-10) and valence was statistically significant with behavior\_5.

### **Summary**

The respondents in the negative valence condition and the positive valence condition had the same likelihood to choose a restaurant that had implemented HACCP over a comparable restaurant that had not implemented HACCP regardless how involved they were with the HACCP intervention.

## Chapter 4

### STUDY II: GOAL FRAMING STUDY

Study II was conducted to test hypotheses 2, 4, and 6. We expected that in the context of goal framing, negative frame would elicit more favorable consumer attitude and behavioral intention toward HACCP than positive frame (**H2**). As involvement increased, goal framing effect would weaken (**H4**). The effects of goal framing on a focal consumer's attitude and behavioral intention toward HACCP would not be different when the framing messages were delivered via article or video form (**H6**).

## Methodology

### Experiment Design and Participants

This study had a 2 (goal frame valence: positive vs. negative)  $\times$  2 (delivery form: article vs. video) factorial, between-subjects design with involvement included as an ordinal variable. Subjects were randomly assigned to one of the four experimental conditions (see Table 4.1).

**Table 4.1 Sample Size across Each Experimental Condition**

		Delivery Form		Total
		Video	Article	
Valence	Negative	21	22	43
	Positive	21	21	42
Total		42	43	85

The sample was recruited from 200 individuals that took part in the previous HACCP study in 2010 and agreed to participate in future studies (Sharma, 2010). The sample was composed of residents of a college town including faculty, staff, students, and company employees, etc. This sample was representative of our target population in that they were ordinary people that ate at restaurants. A total of 85 usable responses were received by the cut-off date (response rate= 43.5%). Female respondents (67.1%) dominated the sample. The average age was 46 years, with a standard deviation of 13.70 year. Among the respondents, 16.5% had some college or associate's degree, 43.5% had Bachelor's degree, and 18.8% had Master's degree. About combined annual household income, 15.3% of the respondents reported less than \$40,000, 50% reported within the range of \$40,000 to \$99,999, and 18.7% reported at least \$100,000. A lucky draw of \$75 gift card (resulting 5 winners) with respondents in both study 1 and study 2 were conducted as an incentive to complete the survey.

## **Experimental Stimuli**

### *Article*

We developed two goal-framing articles with a similar process as the two attribute framing articles. The goal framing articles each had four pages: the "kitchen" page, "astronauts" page, "three examples" page, and "ask your manager and server" page. We inserted additional goal frame messages into those four pages. Following the goal framing definition, we emphasized the positive consequences of implementing HACCP

in the positive article, and emphasized the negative consequences of not implement HACCP in the negative article. Some examples are listed in Table 4.2.

**Table 4.2 Goal Framing Article Examples**

Positive Goal Framing	Negative Goal Framing
Things can <i>stay right</i> only if good food safety practices are followed.	Things can really <i>go wrong</i> if good food safety practices are <i>not</i> followed.
With the HACCP process, astronauts could enjoy safe food in space and <i>stay healthy!</i>	Without the HACCP process, astronauts would <i>fail</i> to enjoy safe food in space and could <i>get sick!</i>
By establishing a HACCP plan to monitor temperature in food, restaurants can <i>reduce</i> food safety hazards resulting from time-temperature abuse.	By <i>not</i> establishing a HACCP plan to monitor temperature in food, restaurants <i>fail to reduce</i> food safety hazards resulting from time-temperature abuse.

### ***Video***

The two goal framing animation videos were developed from the two goal framing articles. The length for each video was three and half minutes. We used the same script for the article and the video. For details of the development process, please refer to the attribute framing video development we have discussed in Chapter 3.

### **Procedure**

The procedures in goal framing study and attribute framing study were identical. Survey invitations were sent to a list of another 200 people via email. Participants that clicked on the survey links were randomly assigned to one of the four experimental



conditions by Qualtrics. The only difference between surveys in Study II and Study I was the manipulation question. To see a detailed description of experimental procedure, please refer to the procedure section for Study 1 in Chapter 3.

## **Measures**

### ***Manipulation check***

Manipulation check was used to assess the degree to which participants perceived the HACCP intervention placed emphasis on the positive (negative) proportion of the information. In both the article and video interventions, we used a 7-point bipolar scale as the manipulation check question. Participants were asked to rate whether the article (video) placed emphasis on the negative consequences of not implementing HACCP versus the positive consequences of implementing HACCP. See manipulation check result in Appendix A.

### ***Attitude***

Attitude toward HACCP was adapted from Maheswaran & Meyers-Levy (1990) and was measured via a 4 item, 7-point, semantic differential scale (not at all useful/extremely useful; extremely unfavorable/extremely favorable; extremely bad idea/extremely good idea; not at all important/very important).

### ***Behavioral Intention***

Behavioral intention toward HACCP was measured via a 5-item, 5-point Likert scale anchored at 1= very unlikely and 5= very likely. These behavioral measures included likelihood to discuss HACCP information with others, to inquire about HACCP implementation in restaurants, to recommend restaurants that had implemented HACCP to others, and to search for HACCP information.

### ***Involvement***

The involvement scale was adopted from Zaichkowsky (1994) and was measured via a 10-item, 7-point, semantic differential scale (important/unimportant; boring/interesting; relevant/irrelevant; exciting/unexciting; means nothing/means a lot; appealing/unappealing; fascinating/mundane; worthless/valuable; involving/uninvolving; not needed/needed). Participants were asked how the HACCP article (video) appealed to her/him.

## **Results**

The goal framing data set contained three independent variables: valence (positive vs. negative), delivery form (article vs. video) and involvement (10-item, 7-point scale); and contained two dependent variables: attitude (4-item, 7-point scale) and behavioral intention (5-item, 5-point scale). See Table 4.3 for a summary of the variables and Appendix C for survey questions.

Similar to our previous analyses in attribute framing study, involvement, attitude, and behavior were not averaged or summed up, because each item in the scale should be viewed as ordinal rather than continuous (Gaito, 1980; Göb et al., 2007; Shah & Madden, 2004; Zimmerman & Zumbo, 1992). This resulted in ten involvement variables (involvement\_1, 2... 10), four attitude variables (attitude\_1, 2, 3, 4), and five behavioral intention variables (behavior\_1, 2, 3, 4, 5). We tested them separately.

**Table 4.3 Summary of Variables**

<b>Variable</b>	<b>Label</b>	<b>Description</b>
Attitude	Attitude_1	Not at all useful - Extremely useful
	Attitude_2	Extremely unfavorable- Extremely favorable
	Attitude_3	Extremely bad idea - Extremely good idea
	Attitude_4	Not at all important - Very important
Behavioral Intention	Behavior_1	Talk to others about HACCP information in this intervention
	Behavior_2	Ask server or restaurant manager whether HACCP has been implemented in the establishment
	Behavior_3	Recommend a restaurant to others because it has implemented HACCP to ensure food safety
	Behavior_4	Search for more HACCP information, for example, Google HACCP online
	Behavior_5	Choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP

<b>Variable</b>	<b>Label</b>	<b>Description</b>
Involvement	Involvement_1	Unimportant - Important
	Involvement_2	Boring - Interesting
	Involvement_3	Irrelevant - Relevant
	Involvement_4	Unexciting - Exciting
	Involvement_5	Means nothing - Means a lot
	Involvement_6	Unappealing - Appealing
	Involvement_7	Mundane - Fascinating
	Involvement_8	Worthless - Valuable
	Involvement_9	Uninvolving - Involving
	Involvement_10	Not needed - Needed

### **Valence on Attitude and Behavioral Intention**

First, we investigated the effect of valence on attitude and behavioral intention. A K Independent Samples tests, including a Kruskal-Wallis test and a median test, were conducted with the four attitude variables and five behavior variables as test variables, and valence as a grouping variable. No significance was found in the two tests (see Table 4.4 and Table 4.5). The results failed to support **H2** that in the context of goal framing, negative frame would elicit more favorable consumer attitude and behavioral intention toward HACCP than positive frame.

**Table 4.4 Krustal-Wallis Test Grouped by Valence**

Test Statistics <sup>a,b</sup>									
	Attitude _1	Attitude _2	Attitude _3	Attitude _4	behavior _1	behavior _2	behavior _3	behavior _4	behavior _5
Chi-Square	1.416	.744	1.620	1.387	.203	.592	.152	.335	1.479
df	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.234	.388	.203	.239	.652	.442	.697	.563	.224

a. Kruskal Wallis Test

b. Grouping Variable: Valence

**Table 4.5 Medan Test Grouped by Valence**

Test Statistics <sup>a</sup>									
	Attitude _1	Attitude _2	Attitude _3	Attitude _4	behavior _1	behavior _2	behavior _3	behavior _4	behavior _5
N	85	85	85	85	85	85	85	85	85
Median	6.00	6.00	7.00 <sup>b</sup>	7.00 <sup>b</sup>	3.00	3.00	4.00	3.00	4.00
Chi-Square	2.166	1.023			.588	.225	.508	.638	2.173
df	1	1			1	1	1	1	1
Asymp. Sig.	.141	.312			.443	.635	.476	.425	.140
Yates' Chi-Square	1.560	.625			.302	.044	.142	.307	1.485
Continuity Correction	1	1			1	1	1	1	1
Asymp. Sig.	.212	.429			.583	.834	.707	.579	.223

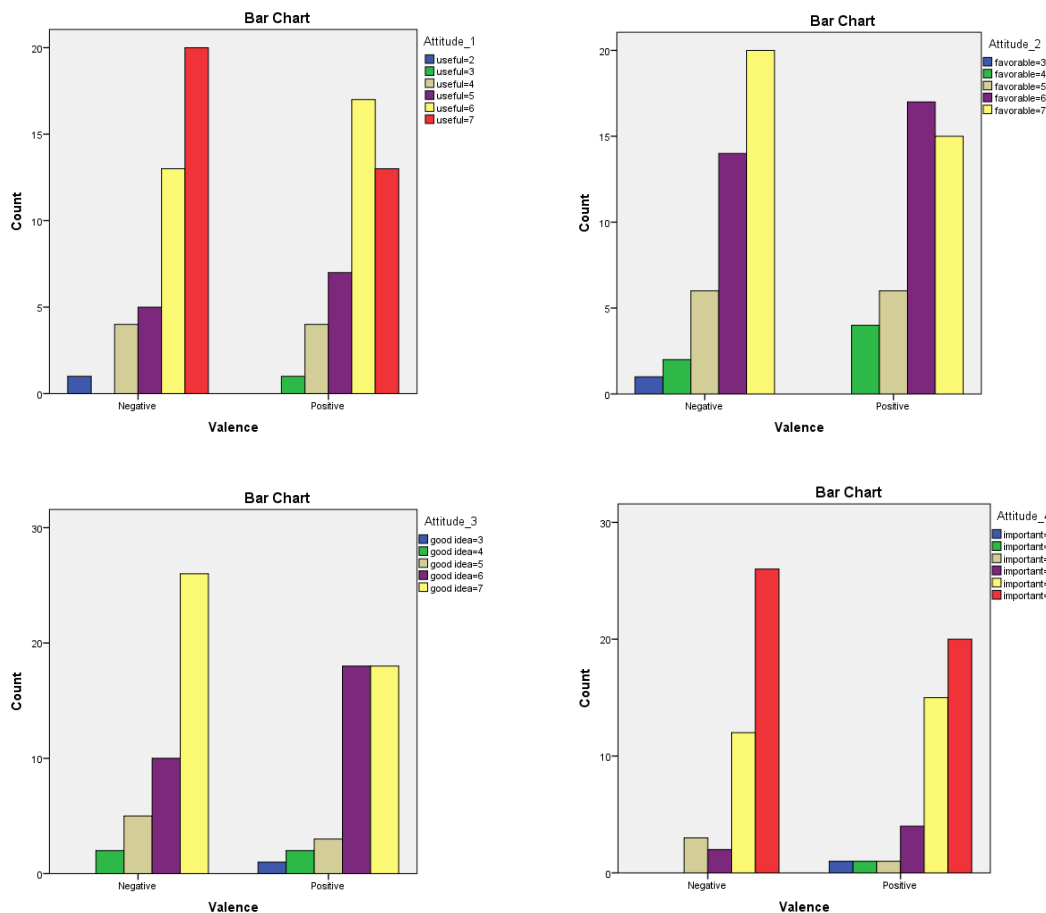
a. Grouping Variable: Valence

b. All values are less than or equal to the median. Median Test cannot be performed.

Although no significance was found, we further looked at the distribution of attitude and behavioral intention responses to gain insight into the effectiveness of the HACCP intervention. In the attitude survey questions, selecting a higher category on the scale represented that the respondent had a more favorable attitude toward the implementation of HACCP in foodservice businesses. The bar charts for attitude by valence were highly left-skewed, indicating that no matter which valence respondents

were assigned to, most of them had very favorable attitude toward HACCP (see Figure 4.1).

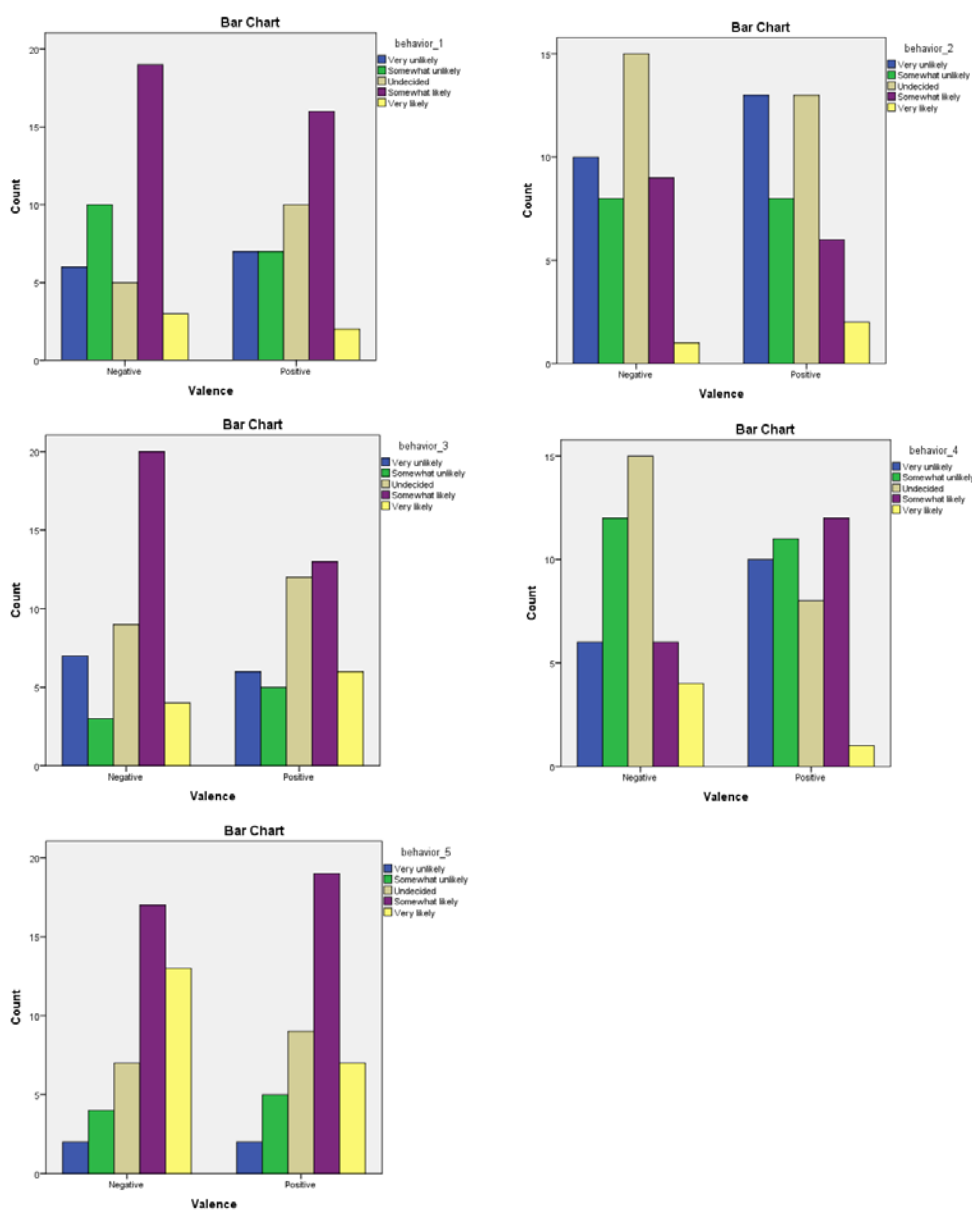
**Figure 4.1 Bar Charts for Attitude by Valence**



In addition, we explored the distribution of respondents' behavioral intention toward the implementation of HACCP in foodservice businesses by valence. In the behavioral intention survey questions, selecting a higher category on the scale represented that the respondent had a more favorable behavioral intention toward the implementation of HACCP. The bar charts for behavioral intention by valence suggested that respondents chose more favorable responses on behavior\_1, behavior\_3, and behavior\_5 (see Figure 4.2). The results indicated that respondents who participated in

our HACCP intervention showed favorable intention to talk to others about HACCP information in our intervention (behavior\_1), to recommend a restaurant to others because it has implemented HACCP to ensure food safety (behavior\_3), and to choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP (behavior\_5).

**Figure 4.2 Bar Charts for Behavioral Intention by Valence**



## Delivery Form on Attitude and Behavioral Intention

Furthermore, we investigated the effect of delivery form on attitude and behavioral intention. A K-Independent Samples tests, including a Kruskal-Wallis test and a median test, were conducted with the four attitude variables and five behavior variables as test variables, and delivery form as a grouping variable. No significance was found in these two tests (see Table 4.6 and Table 4.7), supporting **H6** that the effects of goal framing on attitude and behavioral intention toward HACCP are not different when the framing messages are delivered via article or video form.

**Table 4.6 Kruskal-Wallis Test Grouped by Delivery Form**

Test Statistics <sup>a,b</sup>									
	Attitude _1	Attitude _2	Attitude _3	Attitude _4	behavior _1	behavior _2	behavior _3	behavior _4	behavior _5
Chi-Square	.016	.037	.032	1.003	.555	.040	.282	.177	.805
df	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.900	.848	.858	.317	.456	.841	.595	.674	.370

a. Kruskal Wallis Test

b. Grouping Variable: Delivery Form

**Table 4.7 Medan Test Grouped by Delivery Form**

Test Statistics <sup>a</sup>									
	Attitude _1	Attitude _2	Attitude _3	Attitude _4	behavior _1	behavior _2	behavior _3	behavior _4	behavior _5
N	85	85	85	85	85	85	85	85	85
Median	6.00	6.00	7.00 <sup>b</sup>	7.00 <sup>b</sup>	3.00	3.00	4.00	3.00	4.00
Chi-Square	.019	.017			.944	.345	1.922	.032	.927
df	1	1			1	1	1	1	1
Asymp. Sig.	.892	.897			.331	.557	.166	.859	.336
Yates' Chi-Square	.007	.008			.569	.104	1.102	.004	.500
Continuity df	1	1			1	1	1	1	1
Corrected Asymp. Sig.	.931	.928			.451	.748	.294	.947	.480

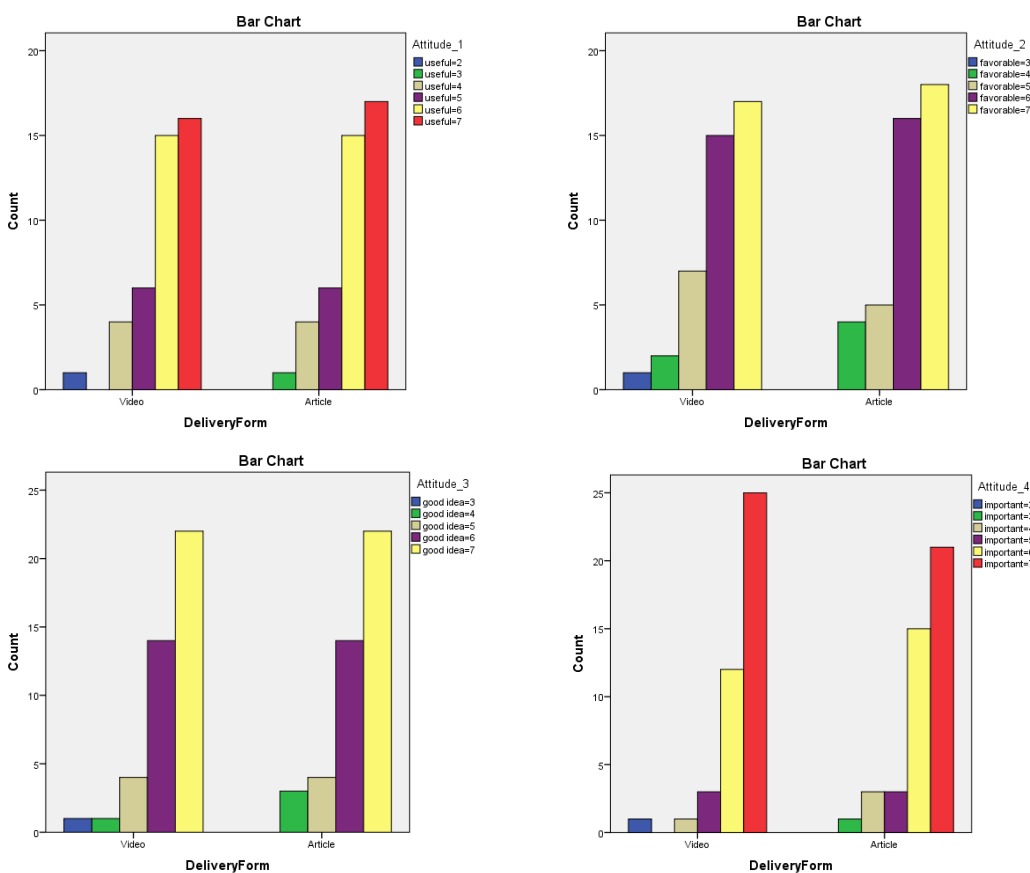
a. Grouping Variable: Delivery Form

b. All values are less than or equal to the median. Median Test cannot be performed.



In addition, similar to the results in previous valence analysis, the bar charts for attitude by delivery form were highly left-skewed, indicating that no matter which delivery form respondents were assigned to, most of them had very favorable attitude toward HACCP (see Figure 4.3).

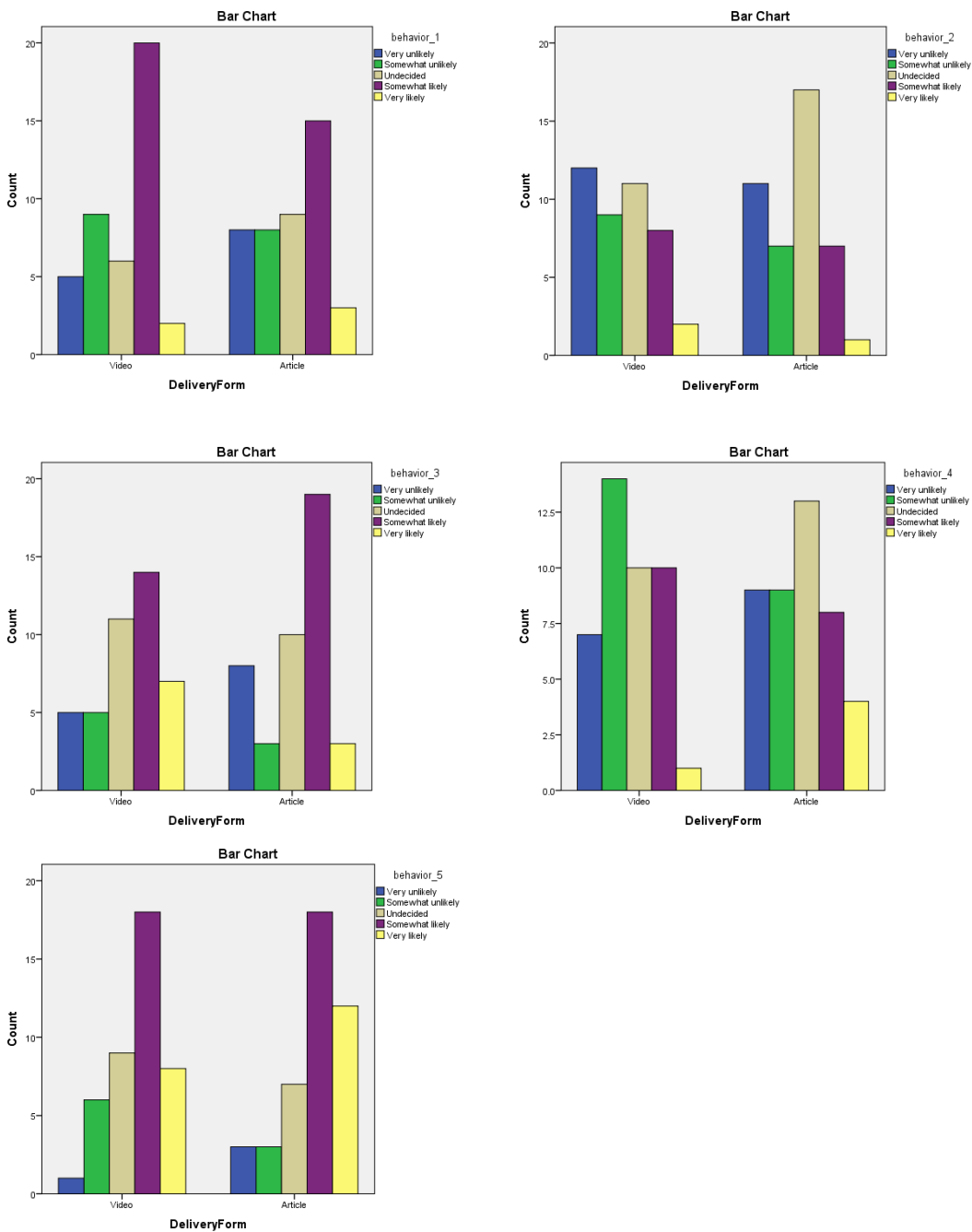
**Figure 4.3 Bar Charts for Attitude by Delivery Form**



Similar to results in previous valence analysis, the bar charts for behavioral intention suggested that respondents placed more favorable responses on behavior\_1, behavior\_3, and behavior\_5 (see Figure 4.4). The results revealed that respondents who participated in our HACCP intervention showed favorable intention to talk to others about HACCP information in our intervention (behavior\_1), to recommend a restaurant

to others because it has implemented HACCP to ensure food safety (behavior\_3), and to choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP (behavior\_5).

**Figure 4.4 Bar Charts for Behavioral Intention by Delivery Form**



### **Involvement × Valence Interaction**

The moderating effect analyses were identical to that in attribute framing study. We conducted a series of ordinal logistic regressions using the complementary log-log model to analyze the moderating effect of involvement. These included forty ordinal logistic regressions performed with attitude variables, and fifty ordinal logistic regressions performed with behavioral intention variables. The independent variables were valence, and involvement\_1-10. The dependent variables included attitude\_1-4, and behavior\_1-5.

Complementary log-log Model:

$$\log\{-\log[1 - \pi(x)]\} = X_{p \times n}^T \beta_{p \times l}$$

We conducted ordinal logistic regressions with each of the four attitude variables. In each regression, we used valence, one of the ten involvement variables, and interaction between valence and involvement. This resulted ten regressions for each attitude variable, and forty regressions in total because there were four attitude variables. Similarly, we regressed each of the five behavioral intention variables on valence, each of the ten involvement variables, and interaction between the two, resulting fifty separate logistic regressions.

The results were synthesized into Table 4.8, Table 4.9, Table 4.10 and Table 4.11 to reduce complexity. In general, the results indicated that the overall models were significant. The Goodness-of-Fit tests suggested that these ordinal regression models were well fitted. The Pseudo R-Squares valuables were acceptable for behavioral research. Test of Parallel Lines tested the proportional odds assumption in ordinal

regression. The null hypothesis stated that the slope coefficients in the model were the same across response categories. Results indicated that the assumption of proportional odds held in these models. In conclusion, the ordinal regression models were significant.

**Table 4.8 Ordinal Regression Results for Attitude (Part 1)**

			Attitude_1	Attitude_2	Attitude_3	Attitude_4
Involvement_1	<b>Model Fitting</b>	Final	38.314**	38.688**	61.017**	39.398**
	<b>Goodness-of-Fit</b>	Pearson	24.326	15.077	38.365	40.209
		Deviance	19.381	16.177	24.972	26.210
	<b>Test of Parallel Lines</b>	General	61.207*	38.688	39.697	28.787
	<b>Pseudo R-Square</b>	Cox and Snell	.363	.532	.512	.371
Involvement_2	<b>Model Fitting</b>	Final	34.901**	34.764**	24.321*	27.925**
	<b>Goodness-of-Fit</b>	Pearson	37.365	35.809	30.137	39.255
		Deviance	33.619	34.818	26.279	27.216
	<b>Test of Parallel Lines</b>	General	25.227	30.857	13.712	25.173
	<b>Pseudo R-Square</b>	Cox and Snell	.337	.336	.249	.280
Involvement_3	<b>Model Fitting</b>	Final	34.431**	48.555**	38.291**	34.693**
	<b>Goodness-of-Fit</b>	Pearson	23.995	20.773	32.125	31.349
		Deviance	27.470	24.291	28.102	31.323
	<b>Test of Parallel Lines</b>	General	18.987	60.361**	29.463	32.402
	<b>Pseudo R-Square</b>	Cox and Snell	.333	.435	.363	.335
Involvement_4	<b>Model Fitting</b>	Final	41.481**	34.154**	20.343	20.733
	<b>Goodness-of-Fit</b>	Pearson	35.365	23.531	30.087	48.299
		Deviance	27.651	23.382	32.566	42.573
	<b>Test of Parallel Lines</b>	General	25.886	21.023	35.448	33.607
	<b>Pseudo R-Square</b>	Cox and Snell	.386	.331	.213	.216
Involvement_5	<b>Model Fitting Info</b>	Final	114.537**	105.050**	71.830**	61.822**
	<b>Goodness-of-Fit</b>	Pearson	23.529	14.418	80.616	71.758
		Deviance	23.136	17.795	23.454	22.755
	<b>Test of Parallel Lines</b>	General	.000	.000	33.109	28.983
	<b>Pseudo R-Square</b>	Cox and Snell	.740	.709	.570	.517

Table 4.9 Ordinal Regression Results for Attitude (Part 2)

			Attitude_1	Attitude_2	Attitude_3	Attitude_4
<b>Involvement_6</b>	<b>Model Fitting</b>	Final	24.233*	30.135**	25.985*	21.782
	<b>Goodness-of-Fit</b>	Pearson	71.523*	38.861	42.927	46.564
		Deviance	33.700	34.924	38.449	33.552
	<b>Test of Parallel Lines</b>	General	29.966	26.446	38.259	70.601*
	<b>Pseudo R-Square</b>	Cox and Snell	.248	.298	.263	.226
<b>Involvement_7</b>	<b>Model Fitting</b>	Final	27.235*	35.094**	20.087	16.317
	<b>Goodness-of-Fit</b>	Pearson	46.878	40.312	32.283	50.226
		Deviance	33.080	31.227	31.247	34.081
	<b>Test of Parallel Lines</b>	General	33.043	28.922	33.932	23.683
	<b>Pseudo R-Square</b>	Cox and Snell	.274	.338	.210	.175
<b>Involvement_8</b>	<b>Model Fitting</b>	Final	105.718**	101.124**	84.251**	99.603**
	<b>Goodness-of-Fit</b>	Pearson	17.575	13.788	33.215	42.390
		Deviance	21.874	17.880	25.567	29.524
	<b>Test of Parallel Lines</b>	General	.000	.000	14.082	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.712	.696	.629	.690
<b>Involvement_9</b>	<b>Model Fitting</b>	Final	21.792	27.063*	15.710	13.308
	<b>Goodness-of-Fit</b>	Pearson	39.845	86.976**	41.966	31.261
		Deviance	29.696	25.604	35.079	25.524
	<b>Test of Parallel Lines</b>	General	30.632	26.990	50.126	26.233
	<b>Pseudo R-Square</b>	Cox and Snell	.226	.273	.169	.145
<b>Involvement_10</b>	<b>Model Fitting</b>	Final	26.918**	32.204**	35.574**	39.824**
	<b>Goodness-of-Fit</b>	Pearson	26.126	25.487	23.807	37.452
		Deviance	26.661	29.422	24.740	32.131
	<b>Test of Parallel Lines</b>	General	20.212	16.715	20.706	28.475
	<b>Pseudo R-Square</b>	Cox and Snell	.271	.315	.342	.374

Note: <sup>†</sup>p < .10, \*p < .05, \*\*p < .01.

**Table 4.10 Ordinal Regression Results for Behavioral Intention (Part 1)**

			Behavior_ 1	Behavior_ 2	Behavior_ 3	Behavior_ 4	Behavior_ 5
<b>Involvement_1</b>	<b>Model Fitting</b>	Final	120.553**	104.933**	118**	57.266**	97.313**
	<b>Goodness-of-Fit</b>	Pearson	21.351	15.229	25.717	28.154	42.807
		Deviance	25.854	19.274	30.870	31.760	47.102
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	54.966*	39.157
		<b>Pseudo R-Square</b>	Cox and Snell	.758	.709	.753	.490
<b>Involvement_2</b>	<b>Model Fitting</b>	Final	137.437**	28.256**	32.204**	35.574**	39.824**
	<b>Goodness-of-Fit</b>	Pearson	24.645	29.375	25.487	23.807	37.452
		Deviance	27.814	27.660	29.422	24.740	32.131
	<b>Test of Parallel Lines</b>	General	.000	9.453	16.715	20.706	28.475
		<b>Pseudo R-Square</b>	Cox and Snell	.801	.283	.315	.342
<b>Involvement_3</b>	<b>Model Fitting</b>	Final	83.613**	102.149**	40.260	27.602**	101.398**
	<b>Goodness-of-Fit</b>	Pearson	27.136	14.590	28.492	28.356	27.880
		Deviance	32.124	19.468	34.138	34.703	26.714
	<b>Test of Parallel Lines</b>	General	34.578	.000	60.120**	30.259	19.992
		<b>Pseudo R-Square</b>	Cox and Snell	.626	.699	.377	.277
<b>Involvement_4</b>	<b>Model Fitting</b>	Final	72.354**	63.973**	58.118**	60.778**	43.327**
	<b>Goodness-of-Fit</b>	Pearson	22.239	23.374	34.495	28.625	51.562
		Deviance	28.260	27.765	37.679	36.692	38.577
	<b>Test of Parallel Lines</b>	General	43.548	48.826	55.457*	32.290	28.112
		<b>Pseudo R-Square</b>	Cox and Snell	.573	.529	.495	.511
<b>Involvement_5</b>	<b>Model Fitting</b>	Final	114.752**	118.841**	131.516**	121.828**	60.635**
	<b>Goodness-of-Fit</b>	Pearson	13.681	14.081	42.409	29.837	60.964**
		Deviance	18.010	18.176	40.985	36.196	49.678+
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	51.397*
		<b>Pseudo R-Square</b>	Cox and Snell	.741	.753	.787	.761

**Table 4.11 Ordinal Regression Results for Behavioral Intention (Part 2)**

			Behavior _1	Behavior _2	Behavior_ 3	Behavior_ 4	Behavior_ 5
<b>Involvement_6</b>	<b>Model Fitting</b>	Final	69.150**	61.117	57.111**	133.703**	37.116**
	<b>Goodness-of-Fit</b>	Pearson	29.919	30.015	32.973	32.648	48.799
		Deviance	39.081	36.953	35.546	38.205	44.995
	<b>Test of Parallel Lines</b>	General	46.783	35.666	55.802*	.000	63.461**
	<b>Pseudo R-Square</b>	Cox and Snell	.557	.513	.489	.793	.354
<b>Involvement_7</b>	<b>Model Fitting</b>	Final	30.535**	109.221**	139.782**	33.108**	33.108**
	<b>Goodness-of-Fit</b>	Pearson	32.365	13.794	40.659	33.107	33.107
		Deviance	40.537	17.018	44.653	37.835	37.835
	<b>Test of Parallel Lines</b>	General	26.992	51.284	.000	49.438	49.438
	<b>Pseudo R-Square</b>	Cox and Snell	.302	.723	.807	.323	.323
<b>Involvement_8</b>	<b>Model Fitting</b>	Final	111.219**	105.134**	119.915**	116.884*	117.264**
	<b>Goodness-of-Fit</b>	Pearson	15.572	15.183	20.348	30.344	25.100
		Deviance	19.166	16.451	26.998	32.448	26.644
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.73	.710	.756	.747	.748
<b>Involvement_9</b>	<b>Model Fitting</b>	Final	18.702	28.180**	21.580+	28.768**	32.748**
	<b>Goodness-of-Fit</b>	Pearson	44.221	43.049	36.810	37.927	36.850
		Deviance	49.408	42.811	41.630	45.688	35.898
	<b>Test of Parallel Lines</b>	General	34.322	90.475**	36.845	31.180	57.569
	<b>Pseudo R-Square</b>	Cox and Snell	.197	.282	.224	.287	.320
<b>Involvement_10</b>	<b>Model Fitting</b>	Final	120.824**	108.065**	126.650**	114.198**	129.066**
	<b>Goodness-of-Fit</b>	Pearson	26.130	18.420	28.876	31.519	39.065
		Deviance	32.471	25.220	31.118	36.967	39.243
	<b>Test of Parallel Lines</b>	General	.000	.000	.000	.000	.000
	<b>Pseudo R-Square</b>	Cox and Snell	.759	.720	.775	.739	.781

Note: +p < .10, \*p < .05, \*\*p < .01.

Our interest was in the interaction terms between valence and each involvement variable. The ordinal regressions revealed many significant and interesting interactions (see Table 4.12). We grouped the results by dependent variables for the purpose of simplicity.

**Table 4.12 Significant Interactions in Goal Framing Study**

<b>DV</b>	<b>Interaction</b>	<b>Estimate</b>	<b>Exponential</b>
<b>Attitude_1</b>	Valence*Involvement_1=3	-2.899	5.51E-02*
	Valence*Involvement_5=2	-4.789	8.32E-03*
	Valence*Involvement_8=2	-4.089	1.68E-02*
	Valence*Involvement_8=4	4.150	6.34E+01*
<b>Attitude_2</b>	Valence*Involvement_1=3	-3.970	1.89E-02*
	Valence*Involvement_1=5	-2.636	7.16E-02*
	Valence*Involvement_5=2	-5.588	3.74E-03**
<b>Attitude_3</b>	Valence*Involvement_8=2	-5.359	4.71E-03*
	Valence*Involvement_1=3	-5.205	5.49E-03**
<b>Attitude_4</b>	Valence*Involvement_1=3	-3.604	2.72E-02*
	Valence*Involvement_8=2	-3.645	2.61E-02*
<b>Behavior_1</b>	Valence*Involvement_2=3	-3.685	2.51E-02*
	Valence*Involvement_10=3	-3.249	3.88E-02*
	Valence*Involvement_7=1	-17.439	2.67E-08**
	Valence*Involvement_7=2	-17.930	1.63E-08**
	Valence*Involvement_7=3	-17.001	4.14E-08**
	Valence*Involvement_7=4	-17.016	4.07E-08**
	Valence*Involvement_7=5	-16.710	5.53E-08**
	Valence*Involvement_7=6	-15.729	1.48E-07**
<b>Behavior_2</b>	Valence*Involvement_2=2	-2.528	7.98E-02*
	Valence*Involvement_4=1	6.557	7.04E+02*
	Valence*Involvement_4=2	5.545	2.56E+02*
	Valence*Involvement_4=3	5.417	2.25E+02*
	Valence*Involvement_4=4	6.661	7.81E+02*
	Valence*Involvement_4=5	6.748	8.52E+02*
	Valence*Involvement_4=6	5.506	2.46E+02*
<b>Behavior_3</b>	Valence*Involvement_10=3	-4.362	1.28E-02*
	Valence*Involvement_1=3	-3.245	3.90E-02*
	Valence*Involvement_2=2	-2.609	7.36E-02*
	Valence*Involvement_3=6	-1.363	2.56E-01*
	Valence*Involvement_7=1	-17.588	2.30E-08**
	Valence*Involvement_7=2	-18.535	8.92E-09**
	Valence*Involvement_7=3	-17.690	2.08E-08**
	Valence*Involvement_7=4	-17.424	2.71E-08**
	Valence*Involvement_7=5	18.643	1.25E+08**
	Valence*Involvement_9=1	-16.664	5.79E-08**
	Valence*Involvement_9=2	-17.437	2.67E-08**
Valence*Involvement_9=3	-17.843	1.78E-08**	



DV	Interaction	Estimate	Exponential
Behavior_4	Valence*Involvement_9=4	-17.540	2.41E-08**
	Valence*Involvement_9=5	-17.797	1.87E-08**
	Valence*Involvement_10=3	-3.175	4.18E-02*
	Valence*Involvement_2=3	-2.230	1.08E-01*
	Valence*Involvement_4=1	5.010	1.50E+02*
	Valence*Involvement_4=2	4.654	1.05E+02*
	Valence*Involvement_4=3	4.640	1.04E+02*
	Valence*Involvement_4=4	5.658	2.87E+02*
	Valence*Involvement_4=5	6.989	1.08E+03**
	Valence*Involvement_4=6	5.390	2.19E+02*
Behavior_5	Valence*Involvement_9=2	0.254	1.29E+00*
	Valence*Involvement_2=2	-3.646	2.61E-02**
	Valence*Involvement_2=3	-3.984	1.86E-02**
	Valence*Involvement_3=3	-3.363	3.46E-02**
	Valence*Involvement_4=1	24.948	6.84E+10*
	Valence*Involvement_4=2	23.399	1.45E+10*
	Valence*Involvement_4=3	24.734	5.52E+10*
	Valence*Involvement_4=4	23.899	2.39E+10*
	Valence*Involvement_4=5	24.462	4.20E+10*
	Valence*Involvement_4=6	24.217	3.29E+10*
	Valence*Involvement_5=2	-3.856	2.12E-02*
	Valence*Involvement_4=6	-2.266	1.04E-01*
	Valence*Involvement_7=1	-17.264	3.18E-08**
	Valence*Involvement_7=2	-19.987	2.09E-09**
	Valence*Involvement_7=3	-17.510	2.49E-08**
	Valence*Involvement_7=4	-17.577	2.32E-08**
	Valence*Involvement_7=5	-19.244	4.39E-09**
Valence*Involvement_9=1	-17.974	1.56E-08**	
Valence*Involvement_9=2	-18.644	8.00E-09**	
Valence*Involvement_9=3	-17.718	2.02E-08**	
Valence*Involvement_9=4	-17.390	2.80E-08**	
Valence*Involvement_9=5	-18.369	1.05E-08**	

Note: \*p < .05, \*\*p < .01.

To interpret these interactions, we referred to the survey questions (see Appendix B or Table 4.3). The results of the logistic regression with attitude (attitude\_1-4) and behavioral intention (behavior\_1-5) as the dependent variables, suggested the following interactions between involvement and valence assignments:

1) **Attitude\_1** (“not at all useful-extremely useful”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of attitude\_1 scale than those assigned to the positive condition if they chose the:

vii) fourth category of involvement\_8 (“worthless-valuable”).

In contrast, those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of attitude\_1 scale than those assigned to the positive condition if they chose the:

i) third category of involvement\_1 (“unimportant-important”);

ii) second category of involvement\_5 (“means nothing-means a lot”);

iii) second or fourth category of involvement\_8 (“worthless-valuable”).

Other interactions between involvement variables (involvement\_2, 3, 4, 6, 7, 9, and 10) and valence were not statistically significant with attitude\_1.

### **Summary**

The respondents who found the intervention neither worthless nor valuable in the negative valence condition were more likely than those in the positive valence condition to find HACCP useful. On the contrary, the respondents who found the intervention unimportant, meaningless, and worthless in the negative valence condition were less likely than those in the positive valence condition to find HACCP useful.

2) **Attitude\_2** (“extremely unfavorable-extremely favorable”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of attitude\_2 scale than those assigned to the positive condition if they chose the:

- iv) third or fifth category of involvement\_1 (“unimportant-important”);
- v) second category of involvement\_5 (“means nothing-means a lot”);
- vi) second category of involvement\_8 (“worthless-valuable”).

Other interactions between involvement variables (involvement\_2, 3, 4, 6, 7, 9, and 10) and valence were not statistically significant with attitude\_2.

### **Summary**

The respondents who generally found the intervention unimportant, meaningless, and worthless in the negative valence condition were less likely than those in the positive valence condition to find HACCP favorable. In other words, although respondents perceived the HACCP intervention to be unimportant, meaningless, and worthless, the intervention was still able to enhance the favorableness attitude with messages in positive valence.

3) **Attitude\_3** (“extremely bad idea-extremely good idea”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of attitude\_3 scale than those assigned to the positive condition if they chose:

- iii) third category of involvement\_1 (“unimportant-important”).

Other interactions between involvement variables (involvement\_2, 3, 4, 5, 6, 7, 8, 9, and 10) and valence were not statistically significant with attitude\_3.

### **Summary**

The respondents who generally found the HACCP intervention unimportant in the negative valence condition were less likely than those in the positive valence condition to consider HACCP a good idea. In other words, although respondents perceived the HACCP intervention to be unimportant, the intervention was able to make respondents consider HACCP as a good idea by including messages framed in positive valence.

4) **Attitude\_4** (“not at all important-very important”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of attitude\_4 scale than those assigned to the positive condition if they chose the:

- iii) third category of involvement\_1 (“unimportant-important”);
- iv) second category of involvement\_8 (“worthless-valuable”).

Other interactions between involvement variables (involvement\_2, 3, 4, 5, 6, 7, 9, and 10) and valence were not statistically significant with attitude\_4.

### Summary

The respondents who thought the HACCP intervention was unimportant and worthless in the negative valence condition were less likely than those in the positive valence condition to find HACCP important. In other words, although respondents perceived the HACCP intervention to be unimportant and worthless, the intervention was able to make respondents find HACCP important by including messages framed in positive valence.

5) **Behavior\_1** (“talk to others about HACCP information in this intervention”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of behavior\_1 scale than those assigned to the positive condition if they chose the:

- ii) third category of involvement\_2 (“boring-interesting”);
- iii) first through sixth of involvement\_7 (“mundane-fascinating”);
- iv) third category of involvement\_10 (“not needed-needed”).

Other interactions between involvement variables (involvement\_1, 3, 4, 5, 6, 8, and 9) and valence were not statistically significant with behavior\_1.

### Summary

The respondents who found the HACCP intervention boring, mundane, and ‘not needed’ in the negative valence condition were less likely than those in the positive valence condition to talk to others about HACCP information in this intervention. In

other words, although respondents perceived the HACCP intervention to be boring, mundane, and ‘not needed’, the intervention was able to make respondents to talk to others about HACCP information in this intervention by using messages framed in positive valence.

6) **Behavior\_2** (“ask server or restaurant manager whether HACCP has been implemented in the establishment”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_2 scale than those assigned to the positive condition if they chose the:

- ii) first through sixth category of involvement\_4 (“unexciting-exciting”).

In contrast, those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of behavior\_2 scale than those assigned to the positive condition if they chose the:

- i) second category of involvement\_2 (“boring-interesting”).

Other interactions between involvement variables (involvement\_1, 3, 5, 6, 7, 8, 9, and 10) and valence were not statistically significant with behavior\_2.

### **Summary**

The respondents who found the HACCP intervention unexciting in the negative valence condition were more likely than those in the positive valence condition to ask their server or restaurant manager whether HACCP had been implemented in the establishment. On the contrary, the respondents who found the HACCP intervention

boring in the negative valence condition were less likely than those in the positive valence condition to ask their server or restaurant manager whether HACCP had been implemented in the establishment. In sum, to elicit behavioral intention such as “to ask server or restaurant manager whether HACCP had been implemented in the establishment”, the negative frame had advantages when respondents perceived the intervention as unexciting, whereas the positive frame had advantages when respondents perceived the intervention as boring.

7) **Behavior\_3** (“recommend a restaurant to others because it has implemented HACCP to ensure food safety”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_3 scale than those assigned to the positive condition if they chose the:

iii) fifth category of involvement\_7 (“mundane-fascinating”).

In contrast, those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of behavior\_3 scale than those assigned to the positive condition if they chose the:

- i) third or fifth category of involvement\_1 (“unimportant-important”);
- ii) second category of involvement\_2 (“boring-interesting”);
- iii) sixth category of involvement\_3 (“irrelevant-relevant”);
- iv) first through fourth category of involvement\_7 (“mundane-fascinating”);
- v) first through fifth category of involvement\_9 (“uninvolving-involving”).

Other interactions between involvement variables (involvement\_4, 5, 6, 8, and 10) and valence were not statistically significant with behavior\_3.

### **Summary**

The respondents who found the HACCP intervention moderately fascinating in the negative valence condition were more likely than those in the positive valence condition to ask their server or restaurant manager whether HACCP had been implemented in the establishment. On the contrary, the respondents who found the HACCP intervention boring, mundane, and uninvolved in the negative valence condition were less likely than those in the positive valence condition to do so. Therefore, to induce consumers to ask their server or restaurant manager whether HACCP had been implemented in the establishment, positively framed messages may work better.

7) **Behavior\_4** (“search for more HACCP information”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_4 scale than those assigned to the positive condition if they chose the:

- iii) first through sixth category of involvement\_4 (“unexciting-exciting”);
- iv) second category of involvement\_9 (“uninvolved-involved”).

In contrast, those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of behavior\_4 scale than those assigned to the positive condition if they chose the:



- iii) third category of involvement\_2 (“boring-interesting”);
- iv) third category of involvement\_10 (“not needed-needed”).

Other interactions between involvement variables (involvement\_1, 2, 5, 6, 7, and 8) and valence were not statistically significant with behavior\_4.

### **Summary**

The respondents who found the HACCP intervention unexciting and uninvolved in the negative valence condition were more likely than those in the positive valence condition to search for more HACCP information. On the contrary, those who found the HACCP intervention moderately boring and ‘not needed’ in the negative valence condition were less likely than those in the positive valence condition to search for more HACCP information.

9) **Behavior\_5** (“choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP”), involvement (1-10) \* valence (negative vs. positive):

Those respondents assigned to negative condition had a *higher* likelihood to choose a higher category of behavior\_5 scale than those assigned to the positive condition if they chose the:

- i) first through sixth category of involvement\_4 (“unexciting-exciting”).

In contrast, those respondents assigned to negative condition had a *lower* likelihood to choose a higher category of behavior\_5 scale than those assigned to the positive condition if they chose the:

- i) second or third category of involvement\_2 (“boring-interesting”);
- ii) third category of involvement\_3 (“irrelevant-relevant”).

### **Summary**

The respondents who found the HACCP intervention unexciting in the negative valence condition were more likely than those in the positive valence condition to choose a restaurant that had implemented HACCP over a comparable restaurant that had not implemented HACCP. On the contrary, the respondents who found the HACCP intervention boring and irrelevant in the negative valence condition were less likely than those in the positive valence condition to do so. In sum, the negative frame had advantages when respondents perceived the intervention as unexciting, whereas the positive frame had advantages when respondents perceived the intervention as boring and irrelevant.

## Chapter 5

### DISCUSSION

In this thesis, we investigated the impact of message framing on consumer attitude and behavioral intention toward the implementation of HACCP in foodservice businesses. Attribute framing effects were examined in Study I, while goal framing effects were examined in Study II. In each study, we used two message delivery forms, article and video, to introduce HACCP and provide food safety knowledge to consumers.

#### Attribute Framing Study

The attribute framing study was designed to test the following hypotheses:

- H1:** In the context of *attribute framing*, positive frame will elicit more favorable consumer attitude and behavioral intention toward HACCP than negative frame.
- H3:** In the context of *attribute framing*, Involvement moderates the effect of valence on a focal consumer's attitude and behavioral intention toward HACCP. As involvement increases, framing effect weakens.
- H5:** The effects of *attribute framing* on a focal consumer's attitude and behavioral intention toward HACCP are not different when framing messages are delivered via article or video form.

In the attribute framing study, we found that positive frame and negative frame were equivalently effective in eliciting favorable attitude and behavioral intention toward

HACCP implementation in foodservice businesses. Thus, Hypothesis 1 was not supported. In addition, no matter which valence or delivery form respondents were assigned to, most of them had very favorable attitude toward HACCP. The results also indicated that respondents who participated in our HACCP intervention showed favorable intention to talk to others about HACCP information in our intervention, to search for more HACCP information, and to choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP. Moreover, test results revealed that the article delivery form might be more effective than video form in eliciting behavioral intention such as to ask server and restaurant manager whether HACCP has been implemented in the establishment, and to choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP. However, this effect was marginally significant. Therefore, hypothesis 5 was supported.

To analyze the moderating effect of involvement, we conducted a series of ordinal logistic regressions using the complementary log-log model. The forty-three significant interactions between valence and involvement items provided extensive evidence to support hypothesis 3.

Specifically, we found that involvement item “unimportant-important” moderated the framing effect on attitude toward usefulness of HACCP. Involvement item “boring-interesting” moderated the framing effect on attitude toward usefulness and goodness of HACCP, and behavioral intention to choose a restaurant that had implemented HACCP over a comparable restaurant that had not implemented HACCP. Involvement item “irrelevant-relevant” moderated the framing effect on attitude toward usefulness and

favorableness of HACCP. Involvement item “means nothing-means a lot” moderated the framing effect on attitude toward usefulness, favorableness, and importance of HACCP, and behavioral intention to search for more HACCP information. Involvement item “unappealing-appealing” moderated the framing effect on attitude toward favorableness of HACCP, and behavioral intention to search for more HACCP information. Involvement item “mundane-fascinating” moderated the framing effect on behavioral intention to ask server or restaurant manager whether HACCP had been implemented in the establishment, and to search for more HACCP information. Involvement item “worthless-valuable” moderated the framing effect on attitude toward usefulness of HACCP, and behavioral intention to search for more HACCP information. Involvement item “unappealing-appealing” moderated the framing effect on attitude toward favorableness of HACCP, and behavioral intention to search for more HACCP information. Involvement item “uninvolving-involving” moderated the framing effect on attitude toward usefulness of HACCP, and behavioral intention to talk to others about HACCP information in this intervention. Involvement item “not needed-needed” moderated the framing effect on attitude toward favorableness, goodness, and importance of HACCP, and behavioral intention to talk to others about HACCP information in this intervention, and to recommend a restaurant to others because it had implemented HACCP to ensure food safety.

In summary, involvement moderated the attribute framing effect on attitude and behavioral intention toward the implementation of HACCP in foodservice establishments.

## Goal Framing Study

The goal framing study was designed to test the following hypotheses:

- H2:** In the context of *goal framing*, negative frame will elicit more favorable consumer attitude and behavioral intention toward HACCP than positive frame.
- H4:** In the context of *goal framing*, Involvement moderates the effect of valence on a focal consumer's attitude and behavior intention toward HACCP. As involvement increases, framing effect weakens.
- H6:** The effects of *goal framing* on a focal consumer's attitude and behavioral intention toward HACCP are not different when framing messages are delivered via article or video form.

In the goal framing study, we found no difference between positive frame and negative frame in eliciting favorable attitude and behavioral intention toward HACCP implementation in foodservice businesses. Therefore, hypothesis 2 was rejected. In addition, article form and video form were as effective as each other. The effects of goal framing on attitude and behavioral intention toward HACCP are not different when the framing messages are delivered via article or video form. Thus, hypothesis 6 was accepted. In addition, no matter which delivery form respondents were assigned to, most of them had very favorable attitude toward HACCP. Respondents who participated in our HACCP intervention showed favorable intention to talk to others about HACCP information in our intervention, to recommend a restaurant to others because it has

implemented HACCP to ensure food safety, and to choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP.

To analyze the moderating effect of involvement, we conducted a series of ordinal logistic regressions using the complementary log-log model. The seventy significant interactions between valence and involvement items provided extensive evidence to support hypothesis 4.

Specifically, we found that involvement item “unimportant-important” moderated the framing effect on attitude toward usefulness, favorableness, goodness, and importance of HACCP, and behavioral intention to recommend a restaurant to others because it had implemented HACCP to ensure food safety. Involvement item “boring-interesting” moderated the framing effect on behavioral intention to talk to others about HACCP information in this intervention, to ask server or restaurant manager whether HACCP had been implemented in the establishment, to recommend a restaurant to others because it had implemented HACCP to ensure food safety, to search for more HACCP information, and to choose a restaurant that had implemented HACCP over a comparable restaurant that had not implemented HACCP. Involvement item “unexciting-exciting” moderated the framing effect on behavioral intention to ask server or restaurant manager whether HACCP had been implemented in the establishment, to search for more HACCP information, and to choose a restaurant that had implemented HACCP over a comparable restaurant that had not implemented HACCP. Involvement item “means nothing-means a lot” moderated the framing effect on attitude toward usefulness and favorableness of HACCP, and behavioral intention to choose a restaurant that had implemented HACCP

over a comparable restaurant that had not implemented HACCP. Involvement item “mundane-fascinating” moderated the framing effect on behavioral intention to talk to others about HACCP information in this intervention, to recommend a restaurant to others because it had implemented HACCP to ensure food safety, and to choose a restaurant that had implemented HACCP over a comparable restaurant that had not implemented HACCP. Involvement item “worthless-valuable” moderated the framing effect on attitude toward usefulness, favorableness, and importance of HACCP. Involvement item “uninvolving-involving” moderated the framing effect on behavioral intention to recommend a restaurant to others because it had implemented HACCP to ensure food safety, to search for more HACCP information, and to choose a restaurant that had implemented HACCP over a comparable restaurant that had not implemented HACCP. Involvement item “not needed-needed” moderated the framing effect on behavioral intention to talk to others about HACCP information in this intervention.

In summary, involvement moderated the attribute framing effect on attitude and behavioral intention toward the implementation of HACCP in foodservice establishments.

### **Theoretical Implication**

This thesis study contributes to message framing literature in two ways. First, this study provides substantial evidence to support the moderating role of involvement in message framing. Results in the attribute framing study and goal framing study demonstrate that involvement level significantly predicts consumer attitude and



behavioral intention. Especially, results suggest that each of the ten dimensions of the involvement scale has its own prediction effect on attitude and behavioral intention.

Second, this thesis study demonstrates the appropriate statistical methods to analyze ordinal scales. As a matter of fact, Likert scales and semantic differential scales generate ordinal data rather than interval data. Several research studies treat ordinal scales as continuous scales without justifying such usage, or explicitly discussing the implications on statistical analysis of assuming ordinal as continuous data. This thesis serves as an example of using non-parametric and ordinal regression models to analyze ordinal data in the framing literature.

### **Practical Implication**

Valence main effects are found insignificant in this thesis study. This result implies that while message-framing effects can be observed in lab experiments where only a few framed sentences are shown to participants, it is also possible that framing effects are not strong enough to affect consumers' decisions in real-life settings. In this thesis, we have incorporated positively and negatively framed messages separately into HACCP educational interventions, and tested in two delivery methods (article and video) that are commonly seen in real life. However, valence effects were not significant in either delivery form. The practical implication is that the significance of framing effects in real-life settings should be carefully reconsidered and further investigated. More discussion on this issue is presented in the future research section.

## **Future Research**

In both attribute framing and goal framing studies, no valence effect was found. “Ceiling effect” due to multiple exposures to persuasive arguments could be an explanation for the absence of valence effect. In traditional framing experiments, participants were usually asked to read a short advertisement or a few sentences about a target concept or product. Evaluations were made immediately after a short exposure. However in this thesis study, strong arguments about the benefits of implementing HACCP in foodservice businesses were presented many times in the HACCP intervention (the article contained at least 4 pages, and the video lasted at least 3 minutes), potentially reaching the ceiling of persuasion effectiveness. In other words, although there might be a difference in persuasiveness of a positively framed message and a negatively framed message when the message was presented only once; however, after repetitive presentations of persuasive messages, the accumulated effect of persuasion reached its ceiling, thus no difference could be found between positively framed messages and negatively framed messages. Future research can investigate whether as exposure frequency increases, message framing effect becomes weakened.

We did not manipulate involvement in this study. Therefore, the conclusion we could draw regarding involvement was associational rather than causal. Celsi and Olson (1988) categorize intrinsic sources of personal relevance (ISPR) and situational sources of personal relevance (SSPR). Many decision making studies manipulate involvement via situational sources of personal relevance by telling participants the target concept affects (vs. does not affect) the participant’s demographic group, or by telling participants they

will (vs. will not) need to make purchase decision regarding the target product. However, this kind of manipulation is not viable in our food safety context. First of all, food safety is relevant to everybody regardless of their demographic status. Most people highly value their health and avoid eating unsafe food. It would be odd to instruct participants to think the food safety practice HACCP is not relevant to them. Secondly, the nature of the “Cost-Benefit Assessment of HACCP Implementation in Commercial Retail Foodservice Operations” project determines that we were more interested in consumer’s intrinsic perceived personal relevance with HACCP rather than situational source of personal relevance. Therefore, assessing rather than manipulating involvement in this thesis study was appropriate. However, involvement can be manipulated into low and high levels in future studies. One future research opportunity is to further explore the moderating role of involvement by employing a full factorial design in other framing context, such as financial decisions, food purchase, or time allocation, etc.

### **Limitation**

Reused sample might be a limitation of this thesis study. All of our participants have participated in another HACCP study conducted in a restaurant in 2010, in which they were acknowledged what HACCP was and were asked to order from menus that contained HACCP food items. Thus, those participants’ information processing and decision making mechanism regarding HACCP may be different from the general population that did not participate in the previous HACCP study. As a result, their reported attitude and behavioral intentions toward HACCP may be distorted by other

factors beyond message framing. For example, it was possible that some participants already held favorable attitude and behavioral intention toward HACCP at the time they participated in this thesis study. It was also likely that some participants thought the purpose of this follow-up study was to further promote HACCP, so that they gave higher scores to “support” the experimenters. In an experimental design setting, when participants in all conditions all inflate their ratings, a “ceiling effect” may occur, and may result in insignificant mean difference across conditions. In this sense, new participants may be a better sample for this thesis study.

In addition, in both studies, female respondents dominated the sample (78.9% and 67.1%). Thus, the sample we used may not represent the gender composition of the American population. Moreover, study suggested that compared to men, women responded less favorably toward negatively framed attribute and goal appeals (Putrevu, 2010). Therefore, we should be careful when generalizing the conclusions drew in this thesis to the American population. Lastly, the sample size (31 observations) under the video condition was a bit small in the attribute framing study. A sample size that could match the sample size (around 40 observations) under the article condition would be better in the experimental setting.

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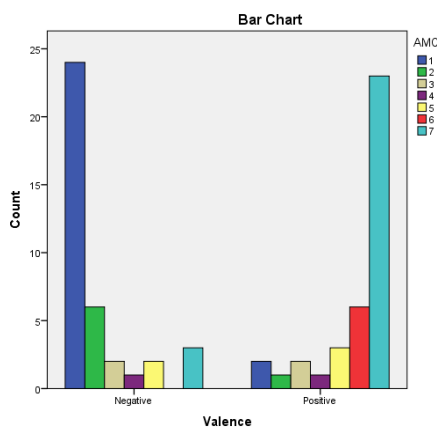
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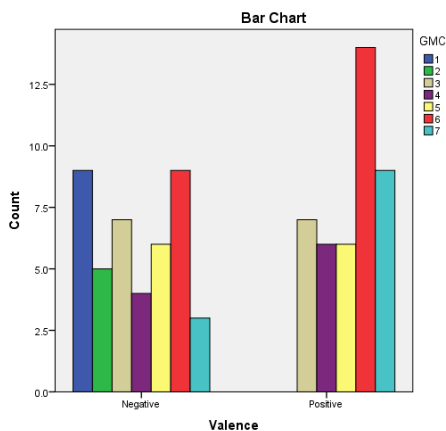
## Appendix A – Manipulation Checks

We used descriptive statistics to check respondents' perceived valence of messages in the HACCP interventions. Selecting a higher category on the manipulation check scale represented that the message was perceived to be more positive. The bar charts below suggested that as expected, respondents in the positive frame condition perceived the messages to be more positive than the respondents in the negative frame condition.

### Manipulation Check for Attribute Framing Study



### Manipulation Check for Goal Framing Study



## Appendix B – Sample Article

(Article page 1)

### HACCP: Your Food Safety Guard



Remember the last time you had to cook for a crowd? Food was everywhere, the refrigerator was overflowing and keeping track of everything seemed nearly impossible. Cooking and serving food safely is not easy.

Now imagine a restaurant where dozens of dishes are prepared by many different cooks for hundreds of people each day. **Things can really go wrong if good food safety practices are not followed.**

So how do foodservice establishments ensure serving safe food?

(Article page 2)

By using **HACCP** (pronounced "has-sip")!

It's simple...even though it is rocket science! Thanks to NASA, the HACCP process was developed to ensure food safety when astronauts were space traveling. **Without the HACCP process, astronauts would fail to enjoy safe food in space and could get sick!**



### **HACCP: Hazard Analysis and Critical Control Points**

HACCP is a preventative system used by the food industry to ensure food safety through the analysis and control of biological, chemical, and physical hazards from raw material production to consumption of the finished product.

Based on HACCP principles, restaurants can establish a HACCP plan that is specific to the establishment's menu, equipment, and processes.

(Article page 3)

#### **Here are some examples of Critical Control Points:**

1) Poultry, stuffed meat, fish, or pasta should be cooked to a minimum internal temperature of 165°F for fifteen seconds.

**If your food is NOT cooked to the minimum required temperature and time, some harmful microorganisms will STAY ALIVE in your food!**

2) Food temperature danger zone: 41°F ~135°F.

This zone is favorable to the growth of microorganisms. When cooling, reheating, and serving, restaurants should avoid food held in this zone.

**By NOT establishing a HACCP plan to monitor temperature in food, restaurants FAIL to reduce food safety hazards resulting from time-temperature abuse.**

3) Proper hand washing.



Does every employee know how to wash hands? After applying soap, hands should be vigorously scrubbed for ten to fifteen seconds. Employees should clean under fingernails and between fingers as well!

**NOT washing hands properly THREATENS food safety!**



A HACCP (Hazard Analysis and Critical Control Points) plan analyzes all the potential hazards and identifies critical control points. It establishes critical limits to monitor each critical control point, corrective actions once there is deviation from a critical limit, and record keeping and validation processes.

(Article page 4)

So next time you eat out, ask your server or the manager if they are using HACCP in the operation.

Let your favorite places to eat know that you care. You care about safe food and they should too!

Remind them they should learn about and use a HACCP process.

---end---

## Appendix C – Measurements in Survey

### 1. Attitude Measurement

After reading this article (watching this video), what is your attitude toward the implementation of HACCP in foodservice businesses?

Not at all useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely useful
Extremely unfavorable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely favorable
Extremely bad idea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely good idea
Not at all important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very important

### 2. Behavioral Intention Measurement

After reading this article (watching this video), how likely are you to...

	Very unlikely	Somewhat unlikely	Undecided	Somewhat likely	Very likely
...talk to others about HACCP information in this article	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...ask your server or restaurant manager whether HACCP has been implemented in the establishment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...recommend a restaurant to others because it has implemented HACCP to ensure food safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... search for more HACCP information, for example, Google HACCP online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..choose a restaurant that has implemented HACCP over a comparable restaurant that has not implemented HACCP	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



## Appendix D – ANCOVA Results for STUDY I

### Reliability of Scales

	Cronbach's $\alpha$
Attitude	0.889
Behavioral Intention	0.864
Involvement	0.940

### Manipulation Check

The independent sample t-test result suggested that respondents in the positive frame condition ( $M = 5.95$ ,  $SD = 1.754$ ) perceived the messages to be significantly more positive than the respondents in the negative frame condition ( $M = 2.03$ ,  $SD = 1.823$ ),  $t(74) = -9.533$ ,  $p < .001$ .

### ANCOVA Results for Attitude

Dependent Variable: Attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	71.867 <sup>a</sup>	7	10.267	18.883	.000
Intercept	22.491	1	22.491	41.365	.000
Valence	3.183	1	3.183	5.853	.018
Delivery Form	.388	1	.388	.715	.401
Involvement	51.124	1	51.124	94.030	.000
Valence * Involvement	4.514	1	4.514	8.303	.005
Delivery Form * Involvement	.083	1	.083	.153	.697
Valence * Delivery Form	3.491	1	3.491	6.420	.014
Valence * Delivery Form * Involvement	3.283	1	3.283	6.038	.017
Error	36.972	68	.544		
Total	2803.000	76			
Corrected Total	108.839	75			

a. R Squared = .660 (Adjusted R Squared = .625)

### ANCOVA Results for Behavioral Intention

Dependent Variable: Behavioral Intention

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	37.671 <sup>a</sup>	7	5.382	10.128	.000
Intercept	.027	1	.027	.050	.823
Valence	.155	1	.155	.292	.591
Delivery Form	.054	1	.054	.102	.750
Involvement	32.475	1	32.475	61.117	.000
Valence * Involvement	.377	1	.377	.710	.402
Delivery Form * Involvement	.127	1	.127	.239	.627
Valence * Delivery Form	.033	1	.033	.062	.805
Valence * Delivery Form * Involvement	.032	1	.032	.059	.808
Error	36.133	68	.531		
Total	726.960	76			
Corrected Total	73.804	75			

a. R Squared = .510 (Adjusted R Squared = .460)

## Appendix E – ANCOVA Results for STUDY II

### Reliability of Scales

	Cronbach's $\alpha$
Attitude	0.927
Behavioral Intention	0.905
Involvement	0.936

### Manipulation Check

The independent sample t-test result suggested that respondents in the positive frame condition ( $M = 5.29$ ,  $SD = 1.402$ ) perceived the messages to be significantly more positive than the respondents in the negative frame condition ( $M = 3.75$ ,  $SD = 2.036$ ),  $t(74.64) = -4.073$ ,  $p < .001$ .

### ANCOVA Results for Attitude

Dependent Variable: Attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	27.185 <sup>a</sup>	6	4.531	8.438	.000
Intercept	65.615	1	65.615	122.194	.000
Valence	.350	1	.350	.651	.422
Delivery Form	.780	1	.780	1.453	.232
Involvement	24.946	1	24.946	46.458	.000
Valence * Involvement	.535	1	.535	.997	.321
Delivery Form * Involvement	.474	1	.474	.883	.350
Valence * Delivery Form *	.258	1	.258	.480	.491
Involvement					
Error	41.884	78	.537		
Total	3299.375	85			
Corrected Total	69.069	84			

a. R Squared = .394 (Adjusted R Squared = .347)

### ANCOVA Results for Behavioral Intention

Dependent Variable: Behavioral Intention

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	47.237 <sup>a</sup>	6	7.873	16.412	.000
Intercept	.059	1	.059	.123	.727
Valence	.761	1	.761	1.586	.212
Delivery Form	.810	1	.810	1.689	.198
Involvement	46.051	1	46.051	96.002	.000
Valence * Involvement	.830	1	.830	1.730	.192
Delivery Form * Involvement	.414	1	.414	.864	.356
Valence * Delivery Form * Involvement	.451	1	.451	.941	.335
Error	37.416	78	.480		
Total	864.120	85			
Corrected Total	84.652	84			

a. R Squared = .558 (Adjusted R Squared = .524)