DOES CONSUMER WILLINGNESS TO PAY CHANGE OVER TIME IN RESPONSE TO FOOD SCARES?

by

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ABSTRACT

Using poultry as a case study, this research uses experimental auctions to examine the short and longer term impacts of media information on consumer behavior. Adult subjects were presented with negative food safety information from a leading consumer magazine, and their WTP was elicited for two types of chicken. The first chicken was from a leading brand, which the article stated has a high incidence of campylobacter and salmonella bacteria. The second was from a relatively unknown brand of chicken, which the article reported was relatively free of harmful bacteria. Results from two limit tobit regressions indicate that food safety information significantly impacts consumer WTP for safe chicken in the short run, but its effect disappears over time while the negative information persists throughout the study period.

INTRODUCTION

In the United States, the Center for Disease Control (CDC) estimates that there are approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths annually caused by food-borne diseases (Mead et al., 1999). The USDA Economic Research Service estimates that food-borne illnesses from the top five pathogens affecting humans cost society $6.9 billion annually (Crutchfield and Roberts, 2000). A more recent study estimates that food-borne illness has a societal cost of $357 billion annually (Roberts, 2007). Food borne illnesses are a health risk as well as an economic burden on society. The effect of food borne illness on consumer behavior is less well understood. How quickly consumers return to normal behavior after a food scare is important to consider when studying the effect of information on consumers' purchasing behaviors. Food producers are impacted from negative food safety information concerning their products. If the effect is short term, it may be best for a producer to merely consider this a necessary cost of doing business. If the effect is long term, it may be beneficial for producers to work to reduce the prevalence of food safety scares. This latter option is clearly more beneficial to society. Research is scarce concerning the decay rate of impacts of food safety information. A better understanding of consumer reaction to food scares over time is the focus of this study.

An example of a recent food scare is the 2006 spinach E.coli outbreak. The outbreak resulted in 204 illnesses, 104 hospitalizations, and 3 deaths (Calvin, 2007). In September, 2006 the FDA advised consumers not to eat bagged spinach and the following day expanded the warning to fresh spinach. This resulted in a five day period where no fresh spinach was sold in the US, while California spinach remained off the market for 10 days (Calvin, 2007). The long term effects of the food scare continued to affect the bagged spinach industry for months afterwards. "During the period January 24 - February 24, 2007, 5 months after the outbreak, the

value of retail sales of bagged spinach was still down 27 percent from the same period a year ago" (Calvin, 2007). The case of the spinach E. coli food scare of 2006 demonstrates the severe effect a food scare can have on industry.

Media attention is important in order for consumers to become aware of food safety issues. Food scares can sometimes be well publicized based on imperfect information. Given that information consumers receive can sometimes be false or misleading (as shown in the following example regarding California strawberries), the impact of information on consumer behavior. At other times, media attention can be directed elsewhere when a more sensational story is available. When information is imperfect or irregular it is often not the fault of the media. Government regulatory agencies such as the CDC and the U.S. Food and Drug Administration (FDA) periodically issue warnings about specific food products. For instance, the CDC reports that in the year 2006, there were 1247 foodborne outbreaks (CDC). Advisories are issued as information becomes available that food borne illnesses are occurring. Warnings from regulatory agencies often become important news stories carried widely by the media. However, information contained in these government warnings and advisories and the subsequent media stories that result are not always correct. Consumers may receive information from the media and make purchasing decisions based on what may sometimes be incorrect information. Moreover information may often be short-lived and consumers are left to continue making food purchasing decisions without continuing information from the media regarding the safety of food products. Little is known about how consumers react in this void of information. The short term effect on consumer decisions is often reported in the event of a food scare, but less is known about long term consumer reaction.

Government agencies' advisories and subsequent media stories may not always contain correct information. In 2008, an outbreak of the Saintpaul Salmonella strain caused the CDC and the FDA to issue advisories urging consumers to avoid certain types of tomatoes. A month later, new advisories advised against jalapeno and serrano peppers. Eight days after the pepper advisory the tomato advisory was lifted. The CDC reports that 1442 people were infected with the salmonella strain from the outbreak, 286 were hospitalized and it might have caused two deaths (Center for Disease Control, 2008). While tomatoes were originally implicated, peppers from Mexico were the actual contaminated products. Losses to the tomato industry are estimated to be over $100 million (Thompson, 2008). Another classic example of the imperfect information that consumers can receive is the 1996 case of Guatemalan raspberries and California strawberries. In June, 1996, the Texas Department of Health erroneously issued a warning in response to a large outbreak in food-borne illnesses advising consumers to avoid California strawberries. Powell (2005) estimates that this warning cost the California strawberry industry between $20 and $40 million in lost sales. Subsequently, the CDC announced that the outbreak was most likely due to Guatemalan raspberries rather than California strawberries (Calvin, 2004). By the time strawberries were cleared of culpability, the damage had already been done to the California strawberry industry. Research is not available on whether the consumer aversion to strawberries caused by this scare was long lasting. The case of the California strawberries indicates the impact of food scares on consumer behavior and on the respective food industry even when that food industry was not at fault.

Information, whether factual or specious, can impact consumer behavior. A better understanding of the long term effect of information on consumer behavior may help government agencies make decisions concerning the importance of factual information.

Estimates of the economic loss to industry are important to understand the magnitude of the problem. Consumers have a strong incentive to monitor food scares since they suffer the effects of food borne illness directly if they purchase unsafe food. Accurate information can help consumers to make the safest possible purchasing decisions. More information regarding the long term effect of information on consumer behavior can help guide government regulatory agencies decisions regarding the issuance of advisories and warnings.

This study seeks to better understand short and long term consumer responses to food scares by eliciting WTP for poultry products from 110 adult subjects. Using an experimental economics setting participants were divided into two treatment groups and participated in three sessions over seven weeks. Food safety information was presented to half of participants who were randomly placed in a treatment group. The other half were placed in a control group and were given no food safety information. The media information presented from a Consumer Reports Magazine article stated that Leading brand chicken (defined as Purdue, Tyson, Foster Farms, and Pilgrim's Pride) was highly contaminated with harmful bacteria and that Ranger brand chicken was relatively clean (Consumer Reports, 2007). Analysis of the WTP data indicated that participants in the treatment group were willing to pay less for Leading brand chicken (a negatively impacted product). This negative impact was long lasting and endured for the duration of the study, seven weeks. WTP from the treatment group for Ranger brand chicken was notably higher than for the control group in the first session. By one week later, WTP for the treatment group was almost identical to WTP for the control group. The positive impact from the food safety information on Ranger brand resulted in increased WTP, but was short lasting as it was no longer evident a week later. Results from this study indicate that consumers are strongly affected by food safety information and will adjust their behaviors in the long term

to avoid negatively impacted food products. For positively impacted products, consumers will be willing to change their purchasing behaviors to incorporate the positively impacted product, but will do so only temporarily. The novel approach employed here was to examine the change in consumer purchasing behavior (as measured by WTP methodology in the experimental lab) over time in response to both positive and negative food safety media information.

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LITERATURE REVIEW

The impact of food safety information on consumers' WTP has been well established. Hayes et al. (1995) demonstrated that the availability of information may change consumers' purchasing habits in reaction to perceived risk. Results of the study indicated that consumers are willing to pay a premium for safer food. The authors also found that experimental subjects tend to underestimate the probabilities of food-borne illness. Hobbs et.al (2005) discovered a premium in consumers' WTP for food safety in a Canadian study using red meat. Consumers in the study were willing to pay a premium for traceability, indicating that information is also a strong factor affecting consumers' decisions in the meat industry.

Negative information can decrease consumer WTP, but positive information has been shown to increase consumer WTP. Lusk et al. (2001) found a premium involving positive information in studying tenderness of steak. Consumers were willing to pay a premium when given a taste test including information concerning the tenderness of a steak as compared to just the taste test. Results of the study indicate that consumers value quality (as indicated by tenderness in this study) in the beef market. These findings provide further evidence that product information can be extremely important in effecting consumers' behavior. In another study concerning consumer WTP, Stenger (2000) found that information resulted in significant increases in WTP for vegetables grown without the use of sewage sludge as a fertilizer over current spending levels for fruits and vegetables and that initial risk perception was low.

When consumers receive information about food safety, it is often a combination of positive and negative information. Several studies have found that negative information has a stronger affect than positive information (for example Fox, Hayes, and Shogren, 2002; Hu,

Zhong, and Ding, 2006). Fox, Hayes, and Shogren's (2002) study of irradiated pork tested whether favorable or unfavorable information had a stronger effect on consumers' WTP at the time of purchase. Using three treatments, a treatment which received negative information, a treatment which received positive information, and a balanced treatment which received both, results indicated that the unfavorable information had a much stronger influence. Of the 34 subjects in the balanced treatment, 16 reduced their bids after receiving the information and the other 18 (12 of which bid zero) did not change their bids (Fox, Hayes, and Shogren 2002). In a study using real-life case reports about GM modified foods, Hu, Zhong, and Ding (2002) found that reports involving positive information did not significantly affect participants' WTP. Those reports that had negative information were found to significantly decrease participants' WTP.

Messer, Kaiser, and Schulze (2008) found that although negative information can greatly reduce consumers' WTP, a combination of positive generic advertising and negative food safety information offsets much of the decline in consumer WTP. Given the recent prevalence of food scares, increased media focus, and heightened consumer awareness, producers can benefit by continuing to emphasize the positive attributes of their product and appealing to the consumer on the emotional level. Messer, Kaiser, and Schulze showed that positive information in the form of advertising helps to protect producers from negative food safety information such as the erroneous negative information regarding California strawberries in 1996. However, the impact of such efforts remains uncertain. Research to date has helped little in understanding how long consumers are affected by information regarding food safety, positive or negative.

In their study of over forty second-price auctions, List and Shogren (1999) find that some non-price effects such as familiarity with products or information regarding the product can supersede price effects in experimental auction studies. List and Shogren's findings indicate that

there are strong incentives for producers to provide more rather than less information about their products. Thomsen, Shiptsova, and Hamm's (2006) frankfurter study found that in the face of a brand specific frankfurter recall, sales fell for the recalled brand only. Other brands did not suffer in the same way as the brand that experienced the recall. There was no perceived spillover effect. The study found that brand names can insulate firms from food safety scares. Other brands of the same food product do not suffer from a recall of a specific brand. Thomsen, Shiptsova, and Hamm's results indicated that brand loyalty is a strong market indicator. Strong brand recognition leads consumers to consider a food product sold by a specific brand differently than the same food product sold under a different name. Food safety scares regarding specific brands are less probable as they are more likely to result in a recall than a large scale food scare as is often the case when a "undifferentiated commodity product (Thomsen, Shiptsova, and Hamm)" such as strawberries or tomatoes is found to be unsafe. Providing information to consumers is in industry's best interest in order to minimize damage in the event of a food scare.

Given the strong effect information has on consumers' food purchasing behavior, food scares can be expected to change behavior. As a food scare loses its novelty in the media and information becomes less readily available over time, little is known about how consumer behavior changes. Brown, Cranfield, and Henson (2005) found that as participants become more risk tolerant, their WTP shows a marked decrease. Their study involved an experimental auction with pre and post survey questionnaires to measure change in risk assessment. Their results indicate that consumers who initially overvalue the risk of food borne illness tend to increase their WTP with increased risk tolerance. The study did not contain any long term time component to determine if participants returned to previous levels of risk tolerance over time. Thomsen, Shiptsova, and Hamm's (2006) study found that sales for the recalled brand remained

affected for approximately eight to twelve weeks. Sales did not recover fully for four to five months. These results were specific to a particular brand affected by a recall. In this case consumers had a substitute brand available. Thomsen, Shiptsova, and Hamm suggest that their findings concerning the long term effect on sales does not pertain to non-branded food commodity markets.

Experimental economics offers a unique opportunity to study consumer behavior following a food scare event. Studies using observational methodology have indicated that consumer behavior is affected by the passage of time. Thomsen, Shiptsova, and Hamm found that a brand recall can result in negative impacts on sales for up to five months. Chang and Just's (2007) study of egg consumption found that the effect caused by health information on egg sales only causes changes in consumers WTP for several weeks without continual information. Beach et al.'s (2008) study demonstrated that negative information can affect industry sales for up to five weeks. Media information had a persistent effect lasting for as long as five weeks in their study of the influence of newspaper stories about Avian Influenza on Italian poultry sales. The reasons for such variation in length of impact on consumer behavior are difficult to unravel. Specific focuses such as the focus on branded products in Thomsen, Shiptsova, and Hamm's study may account for some of this difference. Other differences may be inherent in observational studies due to lack of control of outside influences. In observational studies, a key concern is whether consumers have the same ability to access information concerning the safety of food products. In order to control for as much outside influence as possible, this study uses the experimental economics lab to study the effect of time on consumer behavior. In order to perform a repeated experimental study to study the effect of time, participants were also exposed to outside influences in this study. However, influences were minimized due to the control

imposed when they were in the lab participating in the experiment. Using an experimental economics laboratory setting, this study finds that in this controlled setting, both positive and negative information affect consumer WTP. The effect of negative information is long lasting while the effect of positive information is short.

EXPERIMENTAL DESIGN

One hundred ten adult participants participated in this experiment which followed techniques designed by Kanter, Messer and Kaiser (2009). Participants were recruited via e-mail from University of Delaware staff and faculty as well as from attendees of the university's Academy of Lifelong Learning (an age 50 and over campus). Public attendees of the university's Ag Day were also invited in person to participate. Experiments were conducted from April – July, 2008. Participants were pre-screened to ensure that they only participated once in the experiment. The subject pool was not meant to be representative of the entire population, but the diversity achieved in the subject pool was considered sufficient to serve the goals of the study. The main focus of this study was to measure consumers' change in WTP over time. Participants earned approximately $60 in cash and/or products for this experiment. Participants were divided into a treatment group, which received media food safety information and a control group, which received no media information. Both written and oral instructions were given to all participants in order to maximize their chances of understanding. Questions were encouraged during all stages of the experiment.

In order to examine short and long term impacts on WTP, the experiment consisted of three sessions. In the first session, participants' WTP was elicited for each of the products (see table 1 for list of products) for both treatments. This was followed by a second session, which was held at the same time and place one week after the first session. No further information was given to the participants no matter their treatment. Participants repeated part B of the experiment (see table 1), bidding on the four products. Participants in neither group received any

information. The third session was held 28 days later for half the participants and 49 days later for the other half. Part B was again repeated and no further information was presented. The second and third sessions were included to determine whether the impact of food safety information decayed over time. The payment for all participants was as follows: session 1 ($11 in cash and/or products, 1 hour), session 2 ($10 in cash and/or products, 15 minutes), session 3 (remaining payment in cash and/or products, 15 minutes.)

One-half of participants were in a control group (n=54) without food safety information and one-half were in a treatment group (n=56) that was exposed to food safety information. The sealed-bid English auction mechanism was considered the best choice for this study because it is demand revealing and incentive compatible. Using the sealed-bid English auction, subjects' incentives were to bid their highest WTP, therefore revealing their true demand preferences. In comparison to second-price auctions, English auctions are better able to measure participants' WTP (Bernard, 2006). Bernard's study indicated that many historical studies including Kagel et al. (1987) find the English auction to perform better than Vickrey and other second-price auctions as there is the tendency for participants in second-price auctions to submit bids greater than their value. To assist participants unfamiliar with this type of auction, participants were informed during the experiment instructions (both written and oral, see appendix for full written instructions) that the optimal strategy was to bid their actual highest WTP for each product. Following Messer et al. (2009), an initial practice round was used with participants bidding on a pen in order to further ensure that participants were familiar with the bidding process. The *highest rejected bid* determined the market price. The number of purchasers was determined randomly by having a volunteer roll a six sided die. The number of purchasers therefore ranged from 1 to 6. In sessions with smaller numbers of participants, a four sided die was used instead.

For sessions with less than 7 participants, the maximum number of purchasers was k-1 where k was the number of participants. Due to the mechanism of the determination of the market price, participants' best strategy was to bid their highest WTP. The average number of participants in a session was nine with a range from three to sixteen. At the end of each auction, bids were arranged in order from highest to lowest and the number of purchasers was calculated. The subject with the highest bid was the first purchaser and so on until the number of purchasers (as determined by the result of the die roll) was satisfied. For example if the number of participants was 16, and the result of the die roll was 6, the six highest bidders were purchasers, and the price was equal to the bid of the seventh highest bidder.

Participants were advised to determine their highest WTP for the product being auctioned and were then asked to bid that amount. A computer program which used Excel spreadsheets programmed using Visual Basic was used to confidentially record participants' WTP. The program showed a screen with a $0 price and a button marked "START". Participants were instructed to wait for the administrator before clicking on the "START" button. When they did so, the program began increasing the price in one cent increments at a uniform time interval until the participant clicked a button marked "WITHDRAW". If the "WITHDRAW" button was never clicked on, the program would record the maximum bid allowed ($10.00). The maximum price was always equal to the participants' initial balance. Participants were instructed to stop the program when the displayed price reached her/his maximum WTP.

The experiment was divided into two parts (see table 1 for full details). For the first part (Part A) the product auctioned was a pen. This part of the experiment was included for training purposes to ensure that participants understood how the bidding process worked and were able to stop the computer program at their desired WTP. For the pen, the initial balance provided to

each subject was $1. The minimum value participants were permitted to bid was $0 and the maximum value was $1. Participants were instructed to bid zero if they valued the product at $0 or less and were instructed to bid $1 if they valued the product at $1 or higher. If their value for the pen was between $0 and $1, then they were instructed to stop the computer program at the price that represented their highest WTP. Participants were repeatedly encouraged to ask questions during the experiment. After the test round involving the pen, questions were answered in order to ensure that participants understood the program and procedure.

For the second part of the experiment (Part B) (see table1), the initial balance was $10 for each product. Participants were permitted to bid from $0 to $10. In part B, four products were auctioned. These were identified to all participants as:

- *Product #1:* "Frozen boneless skinless chicken breasts from a Leading brand – such as Fosters Farms, Perdue, Pilgrim's Pride, or Tyson (approx. 1½ pounds)"
- *Product #2:* "Frozen boneless skinless chicken breasts from Ranger (approx. 1½ pounds)[1]"
- *Product #3:* "Eggs (one dozen size large)"
- *Product #4:* "Fettuccine pasta (one pound)"

All original packaging information was removed from the products prior to the experiment in order to control for any reaction individuals might have to the packaging. The Leading brand chicken, Ranger brand chicken, and the pasta were all displayed in clear one gallon sealed freezer bags. The eggs were displayed in unmarked egg cartons without any brand information. Before the bidding began, an administrator walked around the room and displayed

[1] Approximately 72 pounds (48 packages) of Ranger brand frozen boneless skinless chicken breast was sent overnight from Bellingham, Washington specially packaged in dry ice and in freezer containers. Ranger brand chicken is only available in the Pacific Northwest, so while the acquisition of the Ranger brand chicken cost the project almost $1000, it was necessary in order to provide a positive alternative to participants.

each of the products to each participant. They were asked not to touch the product since the products would be distributed after the experiment to the purchasers, but were permitted to inspect each of them as closely as they wished.

Participants bid on all four products, but only one of the products was actually purchased, or binding, similar to the procedures designed by Bernard, Zhang, and Gifford (2006). The purchased product was randomly pre-determined using a four-sided die and was written on an index card, sealed in an envelope, and opened by a volunteer after all auctions were completed. Evidence shows that in a multiple-round auction such as this one, randomly determining the product that is purchased helps to elicit actual WTP among participants (see Lusk, Feldkamp, and Schroeder, 2004; Hayes et. al, 1995; Kanter, Messer, and Kaiser, 2009). This helps to compensate for a wealth effect caused by a subject purchasing a product in one session and therefore decreasing her or his WTP in subsequent sessions. In this multi-round experiment, the binding product was randomly determined for each session. Therefore it was possible that the same product be binding in more than one session. This made the random determination of the binding product all the more important to lessen the potential wealth effect caused by a subject receiving a product in one session and needing to bid again for that product in subsequent sessions. After all four auctions were completed, the pre-determined product was distributed to purchasers and used to calculate cash earnings. Then a short survey was distributed in each session to collect demographic data and to further test whether participants understood the experiment mechanism.

All participants received information via written instructions, a PowerPoint presentation, and verbal communication with the administrator. An article published in *Consumer Reports*

magazine concerning bacteria in chicken was used as the source of food safety information for participants. Placement into the treatment group or the control group was randomly determined before the experiment. The 2007 article reported that in Leading brand chicken, "campylobacter was present in 81 percent of the chickens, salmonella in 15 percent; and both bacteria in 13 percent." Regarding Ranger brand chicken, the article indicated that "Ranger … was extremely clean. Of the ten samples analyzed, 0 percent had salmonella and only 20 percent had campylobacter."

One of the major benefits of using experimental economics techniques is the control possible in such studies. In case participants' bidding might be affected by their placement in the lab, the computer they used, or the order of presentation of the products, several efforts were made to randomize effects for participants. To prevent any potential order effects, dice were rolled at each session in order to randomize the placement of participants at the various computers around the lab. The order in which the products were displayed was determined using Latin squares. Treatment and control sessions were also randomly determined whenever possible by rolling a die. This randomization was constrained by the need to keep the two groups as equal as possible. In order to facilitate privacy in bidding, privacy screens were used for all computers.

Participants were instructed to bid their highest WTP for each of four products. The treatment group received the following information about the four products:

"Product #1: **Frozen boneless skinless chicken breasts from a Leading brand – such as Fosters Farms, Perdue, Pilgrim's Pride, or Tyson (approx. 1½ pounds)**

According to *Consumer Reports Magazine*, a recent study of broiler chicken revealed that "campylobacter was present in 81 percent of the chickens, salmonella in 15 percent; and both bacteria in 13 percent. … Both salmonella and campylobacter can cause intestinal distress, and campylobacter can also lead to meningitis, arthritis, and Guillain-Barré syndrome, a neurological disorder… Among all brands, 84 percent of the salmonella and 67 percent of the campylobacter organisms (tested) showed resistance to one or more antibiotics. … The findings suggest that some people who are sickened by chicken might need to try several antibiotics before finding one that works. … No major brand fared better than others overall. Foster Farms, Pilgrim's Pride, and Tyson chickens were lower in salmonella incidence than Perdue, but they were higher in campylobacter."

Consumer Reports concludes that their tests reveal that if you eat undercooked chicken (less than 165^0 F) or have cross-contamination to other foods from mishandling the chicken, "you have a good chance of feeling miserable.[2]"

Product #2: **Frozen boneless skinless chicken breasts from Ranger (approx. 1½ pounds)**

Consumer Reports Magazine reports that "there was an exception to the poor showing of most premium chickens. As in our previous tests, Ranger … was extremely clean." Of the ten samples analyzed, 0 percent had salmonella and only 20 percent had campylobacter.

Product #3: **Eggs (one dozen size large)**

Product #4: **Fettuccine pasta (one pound)**

[2] See appendix for full instructions provided to participants in the treatment group

RESULTS

Results from WTP data for Leading brand and Ranger brand chicken indicate that participants were strongly affected by food safety information. The data was analyzed in several different ways. Figures 1-3 show graphically participants' WTP for both brands of chicken. Figure 1 shows that participants were willing to pay less for Leading brand chicken when they received negative food safety information (were in the treatment group) about the product in session one. This effect was long lasting, affecting participants' WTP for at least the seven weeks during which this study lasted (see figure 2). Participants who received food safety information (treatment group) were initially willing to pay a premium for Ranger brand chicken which was presented as a safer alternative (figure 1). However, this premium quickly disappeared over time (see figure 3). Soon after the first session the premium for Ranger brand disappeared. By session 2, Ranger brand WTP for the treatment group was almost identical (not statistically different)[3] to that of the control group. The effect of negative food safety information in this study was long lasting but the effect of positive food safety information was temporary (figures 2 and 3).

The WTP data gathered during this study was also analyzed using sample statistics (table 2) and formal tests for statistical significance. The nonparametric Wilcoxon rank-sum test was used to analyze differences between the treatment groups and the Wilcoxon signed-rank test was used to test for statistical significance between sessions and between WTP for different products.

[3] The result of a Wilcoxon Mann Whitney non parametric test whether there was a difference resulted in a p value of 0.8146

The Wilcoxon rank-sum test is the nonparametric equivalent to an ordinary two sample t test. The Wilcoxon signed-rank test is the nonparametric equivalent of the paired Student's t test. Nonparametric tests were used due to the non-normal distribution of the data. Normality tests were performed on WTP data for Leading brand chicken and Ranger brand chicken using STATA's sktest which measure skewness and kurtosis to test for normality. Results indicate that the data is not normally distributed and therefore non-parametric Wilcoxon tests were used to determine statistical significance[4].

As apparent from figure 1, the participants who were given food safety information from a popular consumer magazine were willing to pay $0.66 less for Leading brand chicken in session 1 than participants who were not given this information. This difference was statistically significant ($p = 0.0219$) using a Wilcoxon Mann Whitney non parametric test. The food safety information indicated that Ranger brand chicken is a safer alternative than Leading brand chicken. Participants in the information treatment had higher mean WTP, capturing most ($0.58) of the difference lost for Leading brand chicken in session 1. For Ranger, WTP in the treatment group was not significantly different using a Wilcoxon non parametric test from WTP in the control group ($p = 0.2821$). However, a $0.58 difference is a notable difference. Figures 1-5 show participant demand generated by plotting WTP on the y axis against the percentage of participants willing to pay at a given price on the x axis. Figure 1 shows WTP for session 1 for both chicken brands. For Leading Brand, WTP was higher for the control group among high bidders and low bidders, but the difference was more pronounced among low bidders. Also

[4] Results from the sk test for Leading brand were: Pr(Skewness) : 0.000, Pr(Kurtosis): 0.034, adj $chi^2(2)$: 28.32, and Prob>chi^2 : 0.0000. For Ranger the results were: Pr(Skewness): 0.000, Pr(Kurtosis): 0.004, adj $chi^2(2)$: 31.17, and Prob>chi^2: 0.0000. Significance indicates non-normality.

evident in figures 1-5, many participants bid $0 for products throughout the experiment. Figure 1 also shows that members of the treatment group bid $0 more often than did those in the control group. For session 1, 34% of participants in the treatment group bid zero for Leading brand, while only 13% of the control group bid zero. Within the information treatment, participants' WTP for session 1 was consistently higher for Ranger brand chicken than for Leading brand chicken (figure 1). Session one WTP for participants in the information treatment was higher than any other group or subsequent session for more than fifty percent of participants. For Ranger brand, 32% of participants in the treatment group bid zero compared to 17% of the control group. The incidence of zero bids was much higher for the treatment group for both chicken brands. This further indicates the effect of the food safety information in participants' WTP decisions.

Differences in WTP for Leading brand chicken between the control and the treatment group lasted for all three sessions ($0.57 in session 2 and $0.58 in session 3) showing that the effect of negative food safety information on participants' WTP is long term. The difference was significant in session one ($p = 0.0219$). The differences in session 2 ($p = 0.0929$) and session 3 (0.0691) were only moderately significant. For Ranger brand chicken, however, the difference for Ranger brand chicken disappeared by session 2. In session 2, the difference between the two treatments for Ranger brand chicken was only $0.03. In session 3, the difference between the treatments was $0.06 with the control group now bidding higher than the treatment group. None of the differences between the treatment group and the control group were significant using Wilcoxon nonparametric tests. The difference between participants WTP for Leading brand chicken and Ranger brand chicken effectively shows the premium that exists for Ranger brand chicken in session 1. There was a highly significant $0.95 ($p = 0.000$) difference between WTP

in the treatment group for Ranger brand and Leading brand. Participants were initially willing to pay more for a safer alternative during this experiment, but very quickly (by session 2, 7 days later) reverted to WTP levels almost identical to the control group. Participants were affected in the long term with a lasting reaction to the negative information about Leading brand chicken. The effect of the positive information about Ranger brand chicken was temporary, lasting only for session 1. The percentage of nonzero bids (as shown in figures 2 and 3) for both chicken products remained relatively constant over the three sessions. The percentage of nonzero bids for Ranger brand decreased from 83% in session 1 to 80% in session 2 and then to 70% in session 3, signaling participants were no longer willing to pay a premium for Ranger brand.

Figure 3 shows a clear pattern when observing how WTP for Ranger brand chicken changed over time. While session 1 WTP for the control group is slightly higher, session 1 for the treatment group shows much higher WTP than sessions 2 and 3, especially among higher bidders. WTP for Ranger shows a clear decay from session one to subsequent sessions. Wilcoxon significance tests also show this to be the case. The difference between session 1 and 2 for the control group is not significantly different ($p = 0.2159$), but in the treatment group, session 1 WTP for Ranger is significantly different from session 2 ($p = 0.0018$) and from session 3 ($p = 0.0171$). None of the other differences between sessions are significantly different for WTP for Ranger. From figure 2 it is difficult to see any change in WTP for Leading brand from session to session in either treatment. WTP for Leading brand chicken (figure 2) shows no decay with the demand curves for all sessions for the information treatment intersecting each other every few percentage points. Using Wilcoxon significance tests, what is evident from the graphs in figure 2 can be confirmed. None of the differences between sessions are significant for WTP for Leading brand chicken.

The use of Wilcoxon nonparametric formal significance tests allows us to test four important hypotheses. Table 3 shows the eight important hypotheses tested in this study. Hypotheses 1-4 were tested using Wilcoxon significance tests. Hypothesis 1 is that consumers' WTP is the same for Leading brand chicken and Ranger brand chicken in the control group. Given the result of the test ($p = 0.0196$) this hypothesis can be rejected. Thomsen, Shiptsova, and Hamm's study discussed above demonstrate how important brand loyalty is in understanding consumers' decision. Given that Ranger brand chicken is available only in the Pacific Northwest and that the experiments were conducted in the mid-Atlantic region of the US, it is not surprising that participants' WTP was significantly higher for a brand they recognize as compared to a brand that they are not familiar with. Hypothesis 2 is that consumers' WTP is the same for Leading brand chicken and Ranger brand chicken in the treatment group. Given the food safety information presented to participants in the treatment group, the result is not surprising and the null hypothesis can be rejected. Hypotheses 3 and 4 concern session 1 only. Hypothesis 3 compares the two treatment groups for Leading brand and hypothesis 4 compares the treatments for Ranger. There is a significant difference ($p = 0.0219$) in session one for Leading brand, but not for Ranger ($p = 0.2821$). Therefore the null hypothesis can be rejected for hypothesis 3, but not for hypothesis 4. The results for Leading brand are consistent with the literature (see Hayes et al., 1995 and Hobbs et al. 2005) in that negative information decreases WTP. While the positive information given about Ranger does not corroborate the information found in Lusk et al. (2001) and Stenger (2000), the true findings concerning Ranger are in comparison to WTP for Leading brand as shown in hypothesis 2.

During the experiment, participants responded to demographic and lifestyle questions in survey form. Of the 110 participants in this study, 7 responded to survey questions regarding

their dietary choices and restrictions that they were vegetarians. As the primary focus of this article is two chicken products and since these seven participants responded that they do not eat chicken, data for these participants was removed before conducting analysis of the data. Distinguishing whether someone bids $0 because they are a vegetarian or for other reasons were not a focus of this study. Given the clear indication from the seven vegetarians that they would always bid $0 for chicken, the decision was made to remove them from the analysis to get a clearer understanding of how information affects consumer demand for chicken.

Following Messer et al (2009), two limit tobit regression models were used for further analysis since participants' bids were constrained at $0 and $10 in the experiment. Tobit regression models were a better choice for this data than a more ordinary OLS regression model since OLS assumes a continuous non-bounded distribution of the dependent variable. This was not the case for the data collected in this study. Participants were permitted only to bid between $0 and $10. Therefore the tobit regression model was a better choice for accurately analyzing this data. The models were controlled for random effects to account for participants bidding on multiple products. The data set is a panel data set with the same people bidding on three different occasions for four different products. In order to account for each individual having twelve different observations in the dataset, random effects models were used. Marginal effects models were used to translate the regression coefficients into WTP. All regression analysis was performed using STATA software version 9. The dependent variable in model 1 is WTP for Leading brand chicken, and the dependent variable for model 2 is WTP for Ranger brand chicken. The independent variables of primary importance in terms of the focus of this article are: INFO (a dummy variable coded 1 for the treatment group and zero otherwise), DAYS (number of days since session 1), $DAYS^2$ (number of days since the original session squared),

DAYS*INFO (interaction of DAYS and INFO), and $DAYS^2$*INFO (interaction of $DAYS^2$ and INFO). See table 3 for further information regarding the regression variables. The variables P_CHICKENSAFE and P_CHICKENSAFE*INFO were constructed using survey responses from participants indicating whether they considered chicken to be a safe product. A Hausman test for endogeneity indicated that these variables were endogenous. For Leading brand chicken the residual term was a significant predictor of the dependent variable for Leading brand ($p = 0.023$) as well as for Ranger brand ($p = 0.022$). Therefore P_CHICKENSAFE and P_CHICKENSAFE*INFO are predicted variables corrected for endogeneity.

The model for Leading brand chicken was:

$$WTPLEADING = \beta_0 + \beta_1 (INFO) + \beta_2 (DAYS) + \beta_3 (DAYS^2) + \beta_4 (DAYS*INFO) + \beta_5 (DAYS^2*INFO) + \beta_6 (AGE) + \beta_7 (AGE*INFO) + \beta_8 (FEMALE) + \beta_9 (FEMALE*INFO) + \beta_{10} (CHILDREN) + \beta_{11}(CHILDREN*INFO) + \beta_{12} (PRIMARY\_SHOPPER) + \beta_{13} (PRIMARY\_SHOPPER*INFO) + \beta_{14} (EDUCATION) + \beta_{15} (EDUCATION*INFO) + \beta_{16} (NONWHITE) + \beta_{17} (NONWHITE*INFO) + \beta_{18} (INCOME) + \beta_{19} (INCOME*INFO) + \beta_{20} (OFTENCHICK) + \beta_{21} (OFTENCHICK*INFO) + \beta_{22} (P\_CHICKENSAFE) + \beta_{23} (P\_CHICKENSAFE*INFO) + \varepsilon.$$

As shown in figure 6, the independent variable DAYS, $DAYS^2$, DAYS*INFO, $DAYS^2$*INFO are all interactive. In order to help with the interpretation of these variables, figure 6 shows each of their distributions as WTP changes over time from the mean WTP in session 1 for each of the treatments for both chicken brands. The moderate significance of DAYS ($p = 0.057$) demonstrates the effect time had on participants' WTP. The variables CHILDREN ($p = 0.047$), CHILDREN*INFO ($p = 0.021$), and OFTENCHICK*INFO ($p = 0.006$) were also significant variables in model 1. Participants with children under 18 living at home were willing to pay $1.25 more on average for Leading brand chicken all else held equal. Those in the treatment group with children living at home were willing to pay $2.42 less on average when compared to their counterparts in the control group. OFTENCHICK was a variable

constructed from participants' survey responses indicating how often the participant ate chicken. It is a categorical variable with six categories ranging from a response of "daily" to "never". The significance of the OFTENCHICK*INFO variable indicates that participants in the treatment who ate chicken more often were willing to pay $0.88 less than their counterparts in the control group. Since INFO was interacted with all other variables, a model specification F test based on an OLS regression was used to determine that INFO was statistically significant at the $p < .01$ significance level (see table 5 for further information). The sum of all info coefficients was -1.267. The formula for the derivative of INFO is as follows (see table 5 for all coefficients) :

$$-1.267 = (4.337)(INFO) + (-0.028)(DAYS*INFO) + (0.001)(DAYS^2*INFO) + (-0.004)(AGE*INFO) + (0.281)(FEMALE*INFO) + (-2.415)(CHILDREN*INFO) + (-0.784)(NONWHITE*INFO) + (-0.773)(PRIMARY\_SHOPPER*INFO) + (-0.730)(EDUCATION*INFO) + (0.175)(P\_CHICKENSAFE*INFO) + (-0.875)(OFTENCHICK*INFO) + (-0.101)(INCOME*INFO)$$

The significance of INFO shows the importance of food safety information on participants' WTP for Leading brand chicken. Participants in the information treatment group were willing to pay $-1.27 less on average than those in the information group ceteris paribus.

The model for Ranger brand chicken was:

$$WTPRANGER = \beta_0 + \beta_1 (INFO) + \beta_2 (DAYS) + \beta_3 (DAYS^2) + \beta_4 (DAYS*INFO) + \beta_5 (DAYS^2*INFO) + \beta_6 (AGE) + \beta_7 (AGE*INFO) + \beta_8 (FEMALE) + \beta_9 (FEMALE*INFO) + \beta_{10} (CHILDREN) + \beta_{11}(CHILDREN*INFO) + \beta_{12} (PRIMARY\_SHOPPER) + \beta_{13} (PRIMARY\_SHOPPER*INFO) + \beta_{14} (EDUCATION) + \beta_{15} (EDUCATION*INFO) + \beta_{16} (NONWHITE) + \beta_{17} (NONWHITE*INFO) + \beta_{18} (INCOME) + \beta_{19} (INCOME*INFO) + \beta_{20} (OFTENCHICK) + \beta_{21} (OFTENCHICK*INFO) + \beta_{22} (P\_CHICKENSAFE) + \beta_{23} (P\_CHICKENSAFE*INFO) + \varepsilon$$

The variables CHILDREN*INFO ($p = 0.002$) and OFTENCHICK*INFO (0.000) were significant ($p = 0.042$) for model 2. The variables DAYS ($p = 0.051$), $DAYS^2$ ($p = 0.066$), PRIMARY_SHOPPER ($p = 0.054$), OFTENCHICK ($p = 0.052$), INCOME ($p = 0.052$), and EDUCATION*INFO ($p = 0.084$) were all moderately significant. The variables DAYS,

$DAYS^2$, DAYS*INFO, and $DAYS^2$*INFO indicate the importance of time on participants' WTP for Ranger in the information treatment. As with model 1 for Leading brand chicken, for the interpretation of the four DAYS variables, see figure 6. The moderate significance of the DAYS and $DAYS^2$ variables indicates the correlation between time and participants' WTP. The significance of the CHILDREN*INFO variable suggests that participants in the treatment group bid on average $2.61 less than their counterparts in the control group. Similarly, the significance of OFTENCHICK*INFO indicates that participants in the treatment group were willing to pay $1.31 less than their counterparts in the control group. The moderate significance of the variable PRIMARY_SHOPPER indicates that participants who considered themselves primary shoppers in their households were willing to pay $1.18 more on average than those who did not consider themselves to be the primary shoppers in their households. The moderate significance of EDUCATION*INFO indicates that for participants in the treatment group, more highly educated participants were willing to pay on average $0.44 less ($0.73 less + $0.29 from the coefficient for the EDUCATION variable). The moderate significance of the OFTENCHICK variable indicates that those who ate chicken more often were more likely to pay for Ranger brand chicken, in this case an average of $0.38 more. Since all variables were interacted with INFO, the derivative of INFO was calculated by adding the coefficient for INFO and all variables interacted with INFO as shown below.

$$2.606 = (8.027)(INFO) + (-0.053)(DAYS*INFO) + (0.001)(DAYS^2*INFO) + (0.000)(AGE*INFO) + (0.169)(FEMALE*INFO) + (-2.614)(CHILDREN*INFO) + (-0.008)(PRIMARY\_SHOPPER*INFO) + (-0.726)(EDUCATION*INFO) + (0.880)(NONWHITE*INFO) + (-0.781)(P\_CHICKENSAFE*INFO) + (-1.313)(OFTENCHICK*INFO) + (-0.183)(INCOME*INFO)$$

A model specification F test indicated that INFO was significant at the $p < 0.01$ significance level (see table 5). The significance of INFO demonstrates the effect of the food safety information on participants' WTP for Ranger.

Demographic variables were largely insignificant in both models 1 and 2 for the two chicken brands. This was surprising and contrary to expectations. However, closer analysis shows that for model 1, the variables INCOME ($p = 0.131$), AND EDUCATION*INFO ($p = 0.149$) were not far from statistical significance. With a larger sample these variables would surely have been significant. For Leading brand chicken, race, gender, and age had little effect on participants' WTP as they were highly insignificant. For model 2 for Ranger brand chicken, CHILDREN ($p = 0.133$), P_CHICKENSAFE ($p = 0.109$), P_CHICKENSAFE*INFO ($p = 0.155$), and INCOME*INFO ($p = 0.168$) would all be likely to show significance with a slightly larger sample. As with model 1, results from this study show that WTP for Ranger brand chicken is not affected by race or gender or age.

Hypotheses 4 – 8 are best tested using the tobit regression models 1 and 2. Hypotheses 5 and 6 concern WTP for Leading brand. Hypothesis 5 tests change in WTP over time for the control group and hypothesis 6 tests change in WTP over time for the treatment group. For neither of these hypotheses can we reject the null hypothesis though for the control group, the DAYS variable shows moderate significance ($p = 0.057$). Similar tests for Ranger in hypotheses 7 and 8, show very different results. For the control group for Ranger brand again the null hypothesis cannot be rejected with only moderate significance ($p = 0.051$) of the DAYS variable in model 2. The null hypothesis for hypothesis 8 also cannot be rejected as the variable DAYS*INFO is not significant ($p = 0.128$) in model 2. While WTP for Leading brand does not

show a significant change over time, for Ranger brand, WTP for the treatment group does change significantly over time.

Four products were used during this study to better understand consumer WTP for food products during and after a food scare. During the experiment, participants were asked to bid on all four products. The WTP bids for the two chicken products have been discussed at length above. The last two products, one dozen eggs, and a pound of fettuccine pasta have had little discussion thus far. The rationale for including the eggs was to measure if there was a spillover effect affecting indirectly related products. In the case of the eggs, eggs are a product of chickens so therefore could be considered unsafe by consumers with a low risk tolerance given that they had just received information that chicken is dangerous to their health. However, all food safety information that participants received specifically targeted raw chicken meat. No mention of eggs was made in the media information provided. Therefore the eggs were included in this study in order to understand if consumers would change their WTP for a related product for which participants received no information. In other words is there a spillover effect to other products in the event of a food scare? If so, such a change in WTP for eggs would represent such a spillover effect. In Thomsen, Shiptsova, and Hamm's study regarding a specific brand, no spillover effect was evident. Eggs were included to determine if there were spillover effects for non-branded commodities.

The pasta was included for similar reasons. Pasta was chosen as the fourth product for this study for its lack of connection to chicken. From an economic standpoint, it is not a substitute or a complement, it is not a poultry product, and it does not have any strong association with chicken known to the researchers. Therefore pasta is able to capture a spillover effect not related to chicken itself but instead to increased consumer awareness of food safety

information. No information was provided to the participants about the eggs or the pasta other than that the eggs were size large and the pasta was one pound of fettuccine pasta (see appendix for full instructions to participants). All packaging was removed before displaying the products to participants. Before the bidding began, an administrator walked around the room displaying the products. The pasta was displayed in a non branded clear one gallon freezer bag. The eggs were transferred to specially purchased egg cartons free of any brand markings before the experiment. The eggs and pasta were included in this study in order to learn more about consumer reactions to products not directly related to the product involved in a food scare. Little is known about long term consumer reaction to indirectly related and non-related food products in the event of a food scare.

Results show that initially the food safety information presented to the treatment group had little effect on participants' WTP decisions. In session one, participants in the treatment group bid slightly more than participants in the control group for both eggs and pasta, though neither difference was statistically significant (see table 5). Figure 4 shows the demand curve for eggs from all three sessions. A few participants were willing to bid more than $3 for the dozen eggs with one participant bidding $10. Bids above $3 only existed in the treatment group for pasta.

Bids from the control group for both eggs and pasta changed very little over the three sessions (see figures 4 and 5). Differences in mean WTP from session 1 to 2, 1 to 3, and 2 to 3 were not large, nor were they statistically significant differences. However, for the treatment group, session two WTP for eggs was significantly lower than WTP in session 1. Mean WTP for pasta in the treatment group was much higher in session 2 than in session 1, though not a statistically significant difference as seen in table 5. While for eggs participants in both the

control and the treatment group bid less than in session 1, for pasta mean WTP for the treatment group actually rose. In session 2, mean bids for pasta in the treatment group were $0.35 higher. In comparison to the control group (in which mean WTP decreased $0.05 from session 1,) the treatment group's mean WTP was $0.61 higher than in the control group for session 2. This difference was significant ($p = 0.0425$). Recall that in figure 2 above, bids for Ranger brand chicken decreased sharply from session 1 to session 2. From the significant difference in session 2 for WTP for pasta in the treatment group, it is apparent that participants in the treatment group were willing to pay a premium for Ranger brand chicken in session 1, willing to pay a premium for pasta in session 2, and then by the third session all premiums disappeared with no statistical differences from session 2 apparent in session 3. Little of note happened in session 3 for any of the four products. Mean WTP for eggs was statistically less than mean WTP in session 1 ($p = 0.0392$ for control group and $p = 0.0492$ for the treatment group). WTP bids were generally lowest in session 3, for all four products, though not significantly.

As with the two chicken products, Wilcoxon nonparametric significance tests were performed for the differences in treatments and the differences in sessions. Two limit tobit regression models were also constructed for both eggs and pasta (table 6). As with the two chicken products, participants were permitted to bid from $0 to $10 for the eggs and the pasta, requiring the use of two limit tobit regressions. All variables in the regression models are the same as those used in the chicken regression models for comparison. Like with the chicken models, a Hausman test for endogeneity was performed on the variables EGGS_SAFE and PASTA_SAFE since these variables were suspected to be endogenous. The Hausman test results indicate that they were endogenous, therefore corrected variables, P_EGGSSAFE, and P_PASTASAFE were used in the models. For the eggs model, OFTENEGGS measures how

often the participants eats eggs and OFTENPASTA measures how often the participant eats pasta. These are the only different variables not used in the chicken models used here in the tobit regression models for eggs and pasta. Few variables are significant in these models. None of the time variables of primary importance (DAYS, $DAYS^2$, DAYS*INFO, and $DAYS^2$*INFO) were significant in either the eggs or the pasta model. F test results indicate that INFO did have a significant effect however. From the regression results this indicates that holding all else equal, there was no overall significant difference in WTP for eggs or pasta between the control and the treatment group nor over time.

For the eggs model, PRIMARY_SHOPPER ($p = 0.048$), and EDUCATION*INFO ($p = 0.015$) were significant (table 6). These results indicate that participants who consider themselves to be the primary shopper in their household were willing to pay $0.79 more for eggs on average. More highly educated participants in the treatment group were willing to pay $0.57 less for eggs than their counterparts in the control group. For pasta, only AGE and AGE*INFO were significant. Older participants were willing to pay on average $0.21 more for pasta than younger participants. However, older participants in the treatment group were willing to pay $0.22 less than their counterparts in the control group. Older participants were affected by food safety information when bidding for pasta.

While the regression results indicate some interesting demographic findings about participants' WTP for eggs and pasta, none of the variables of primary importance except for INFO were significant. Therefore, the best measure of DAYS, $DAYS^2$, DAYS*INFO, and $DAYS^2$*INFO come from Wilcoxon significance tests. For eggs, the treatment group's WTP was significantly higher in session one than in session two ($p = 0.0362$) or three ($p = 0.0492$). These results indicate that the food safety information presented to participants in the treatment

group resulted in participants being willing to pay a premium of $0.44 over session 2 and $0.41 over session 3. As with the Ranger brand chicken, this premium disappears after session 1. There is a significant decay effect in the effect of food safety information for WTP for eggs. For pasta there is an interesting result not seen for any of the other products. In session 1, there is no significant difference ($p = 0.2940$) between mean WTP for the treatment group and for the control group. There is a significant difference between session 1 and session 2 ($p = 0.0319$), of $0.35. However, the most interesting result from the pasta data is that there is a significant difference between the treatments for session 2 ($p = 0.0425$). Participants in the treatment group were willing to pay a premium of $0.61 in session 2 over participants in the control group. There is also a strongly significant premium ($p = 0.0019$) of $0.55 over session 3 WTP for the treatment group. In session 3, there was no significant difference between the control and the treatment groups ($p = 0.2283$). These results indicate an interesting finding. Participants were affected by the food safety information. WTP was higher for the treatment group for both session 1 and session 2. For session 3, this premium that the treatment group was willing to pay disappeared. With respect to the results for all four of the products, these results indicate that initially participants in the treatment group were willing to pay a premium for Ranger brand chicken, eggs, and pasta. Then between session 1 and session 2, the premium for Ranger and eggs disappeared but the premium for an unrelated product, the fettuccine pasta prevailed. By session 3, all premiums have disappeared and participants were bidding lower for all four products.

CONCLUSION

Negative information regarding food safety has a long lasting, negative impact on demand. Positive information has a short lasting positive impact on demand. These results were some of the important discoveries of this study. One hundred ten adults participated in this experimental economics research study to test the effects of negative and positive information over time on consumers' purchasing behavior (as measured by WTP). Participants were asked to repeat the experiment twice after the initial session in order to measure participants' change in WTP over time. During each session WTP data was collected on both Leading brand chicken and Ranger brand chicken as well as demographic information. The food safety information used in the study came from a 2007 Consumer Reports Magazine article stating that Leading brand chicken contained harmful bacteria. The article also stated that another brand, Ranger, was relatively clean.

Results from the study indicated that information does have an effect on consumers' WTP. Participants were more strongly influenced by negative information than by positive information. Participants' WTP for Leading brand was significantly lower for those in the treatment group through session 3. For Ranger, mean WTP for the treatment group was markedly higher for session 1 and significantly higher than WTP in the treatment group for Leading brand. By session 2, a week later, this difference disappeared and WTP for Ranger was almost identical for the two treatments. These results indicate that after receiving negative food safety information, participants were willing to pay significantly less for the negatively impacted product, Leading brand chicken. This negative effect was long lasting and endured throughout the experiment which lasted seven weeks. Participants were initially (in session 1) willing to

shift their purchasing behavior to include a positive alternative (the safer Ranger brand chicken). This effect decayed rapidly lasting less than one week and had disappeared by the second session, a week later.

Based on this study's findings, consumers' behavior is affected by negative food safety information that occurs during a food scare. Consumers are willing to alter their purchasing behavior to include a positive alternative but only in the short term. The negative effects are long lasting. Consumers are strongly impacted by information about the safety of their food. Given that food safety information is often imperfect, and rarely long lasting, consumers should be aware that their behaviors are impacted by food safety information. Before modifying their behavior drastically based on media information, they should get as much information as possible from many sources, not just popular media. For example, based on results from this study, consumers are willing to make choices about eggs and pasta without receiving any specific information about these products based on information about chicken meat. Consumers suffer directly from unsafe food. It benefits consumers to be affected by accurate food safety information and to change their purchasing behavior accordingly. Consumers' best strategy remains to gain as much information as possible as indicated by the significant response consumers show in this study when receiving food safety information. Researching all food products not merely through the main stream media can give consumers much higher chances of eating healthy foods.

For industry, these results give little assistance in formulating best practices for avoiding the damage caused by food scares. Like consumers, industry can also be severely affected by food scares. Consumers are affected by negative food safety information and their behavioral

changes resulting in lower WTP are long lasting. This can be especially devastating to a seasonal agricultural industry. Introducing safer alternative products can help capture the premiums that are lost during a food scare, but this will only help during the short term. If this is financially infeasible or otherwise not possible, our results indicate that diversifying by offering safe alternatives (such as Ranger brand chicken), indirectly related products (such as eggs), and unrelated products (such as pasta) to consumers as well may help to capture as many premiums as possible while profits for the product involved in the food scare remain affected. Results from this study indicate that product diversification will help alleviate the damage an industry may suffer during a food scare. The long term effect on Leading brand chicken in the study suggests that negatively impacted food products will result in much lower sales for producers. It remains in industry's best interests to avoid food safety scares as the effect of negative food safety information is significant and long term. Therefore it is in industry's best interests to strive to maintain the safety of their products in order to help to reduce the risk of a food scare.

Government regulators should help industry to realize the best ways to ensure safe products. Regulators may increase health benefits to consumers by helping them to know if there are safer alternatives available and can work to improve the availability of information to consumers. A better understanding of the effects on consumers' purchasing behaviors during and after food scares will help to promote better consumer and industry response as well as better regulation and policy. Results from this study indicate that consumers are willing to change their purchasing behaviors at least in the short term to avoid unsafe products, but without accurate information, this is often a difficult decision for consumers. Information from regulators on safe alternatives may help consumers to make these difficult choices.

Our study looked at the effects of food safety information over a seven week period. Further research is necessary to determine how long negatively impacted products are affected. Our study was unable to determine if WTP for Leading brand chicken returns to levels seen in session one. Information on the actual length of the impact would be very compelling in guiding policy as well as industry practices. Another important area for further research is a more comprehensive study involving nationwide representative samples in order to determine the actual premium that is lost to food safety scares. This information could be considered in conjunction with the health effects caused by food scares to get a more accurate assessment of the risk caused by food borne illness.

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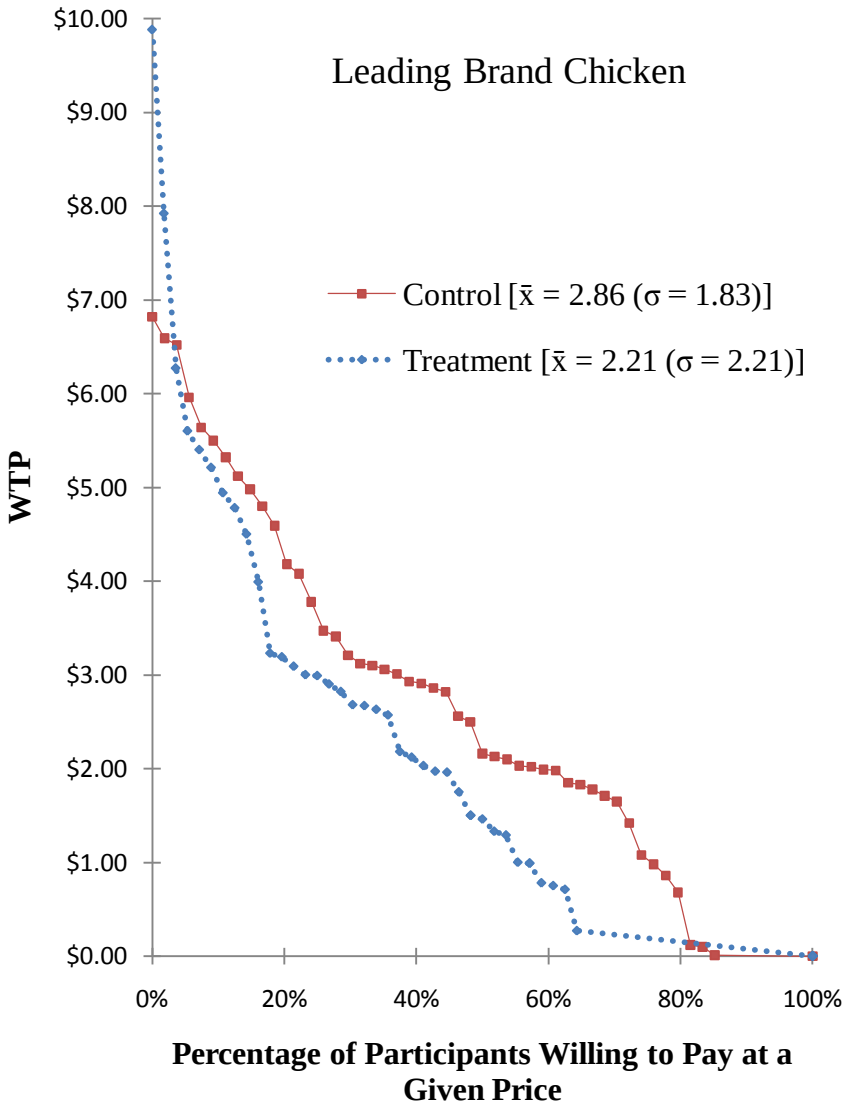


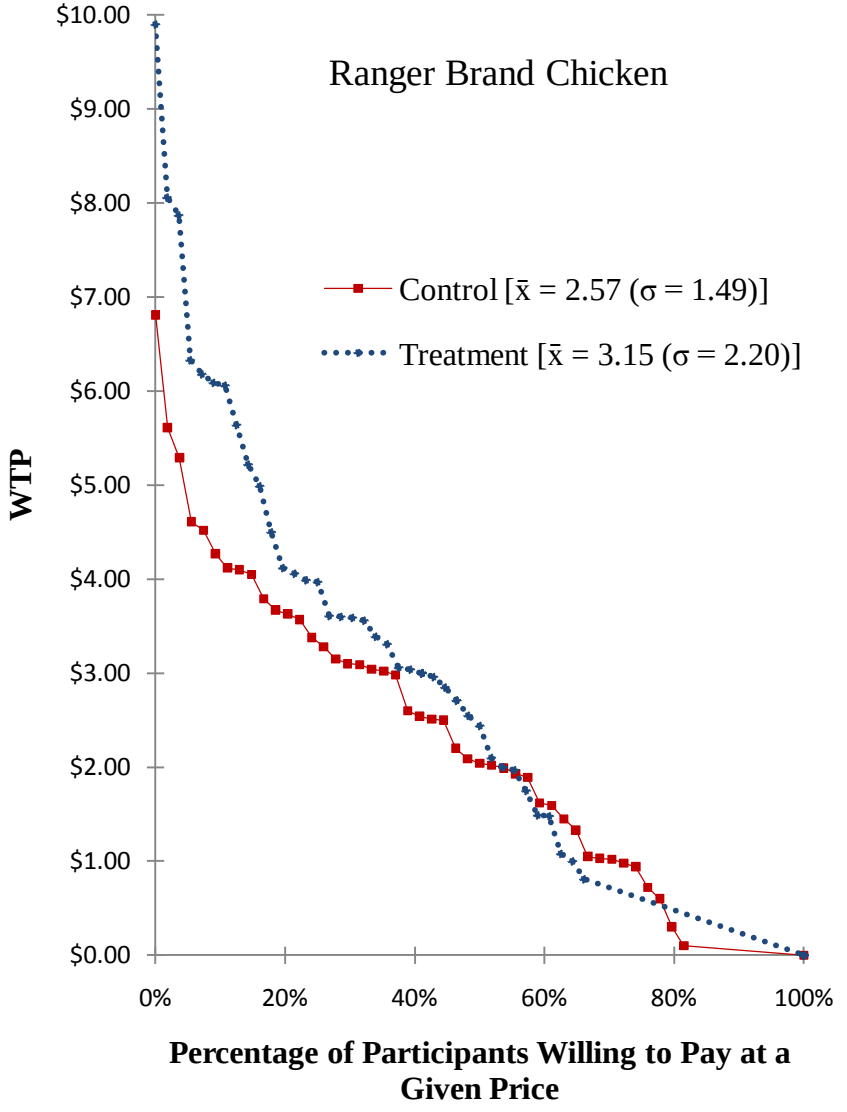
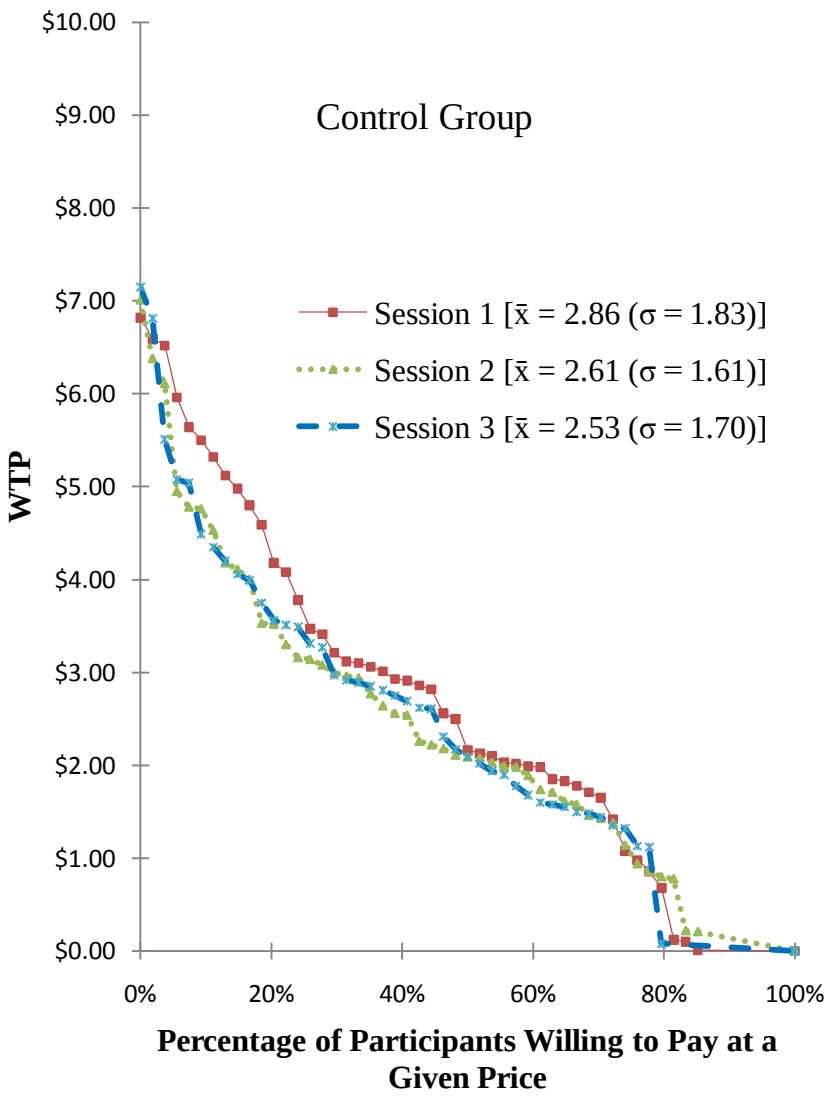


Figure 1. Session One WTP for Both Chicken Brands.



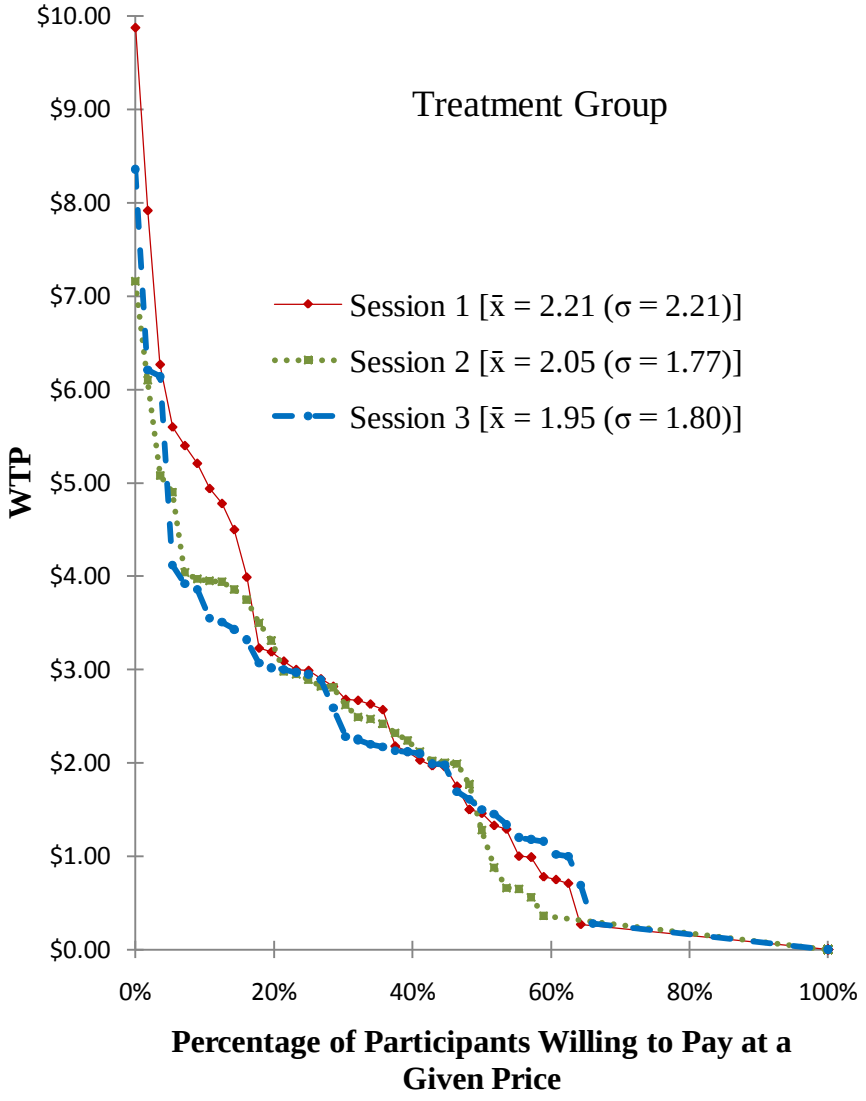
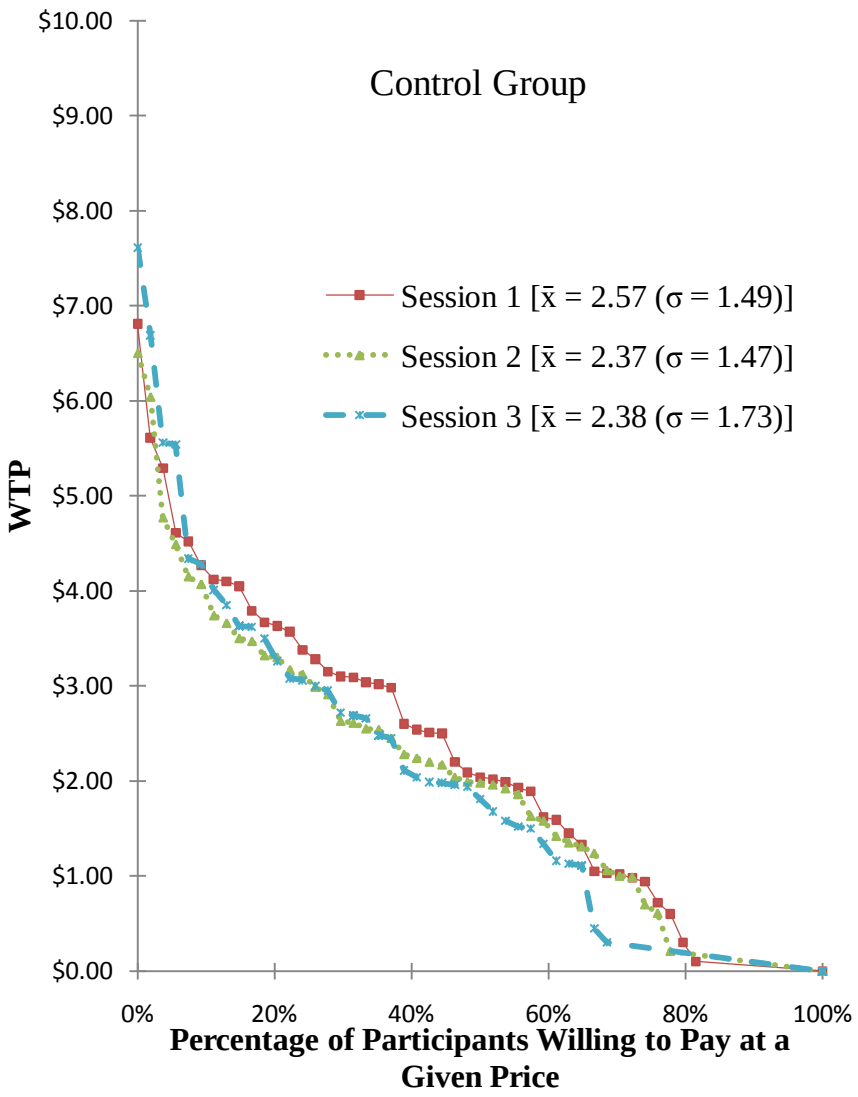


Figure 2. WTP for Leading brand Chicken



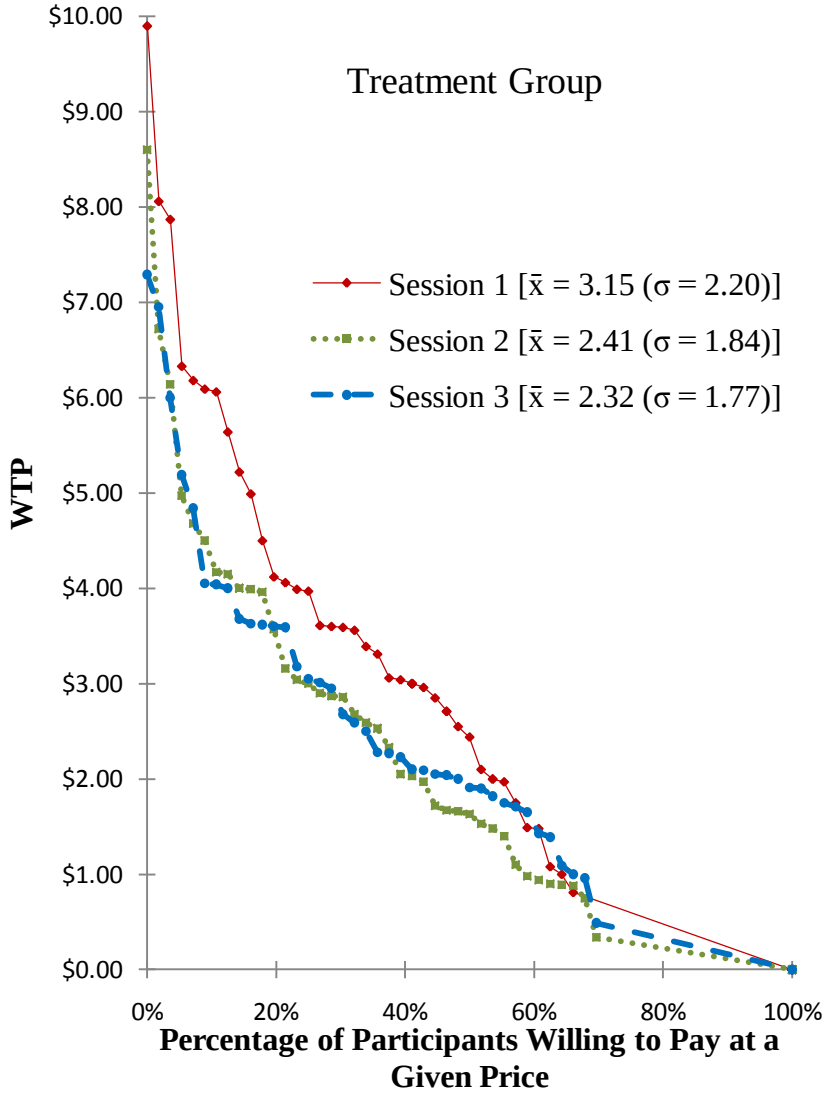
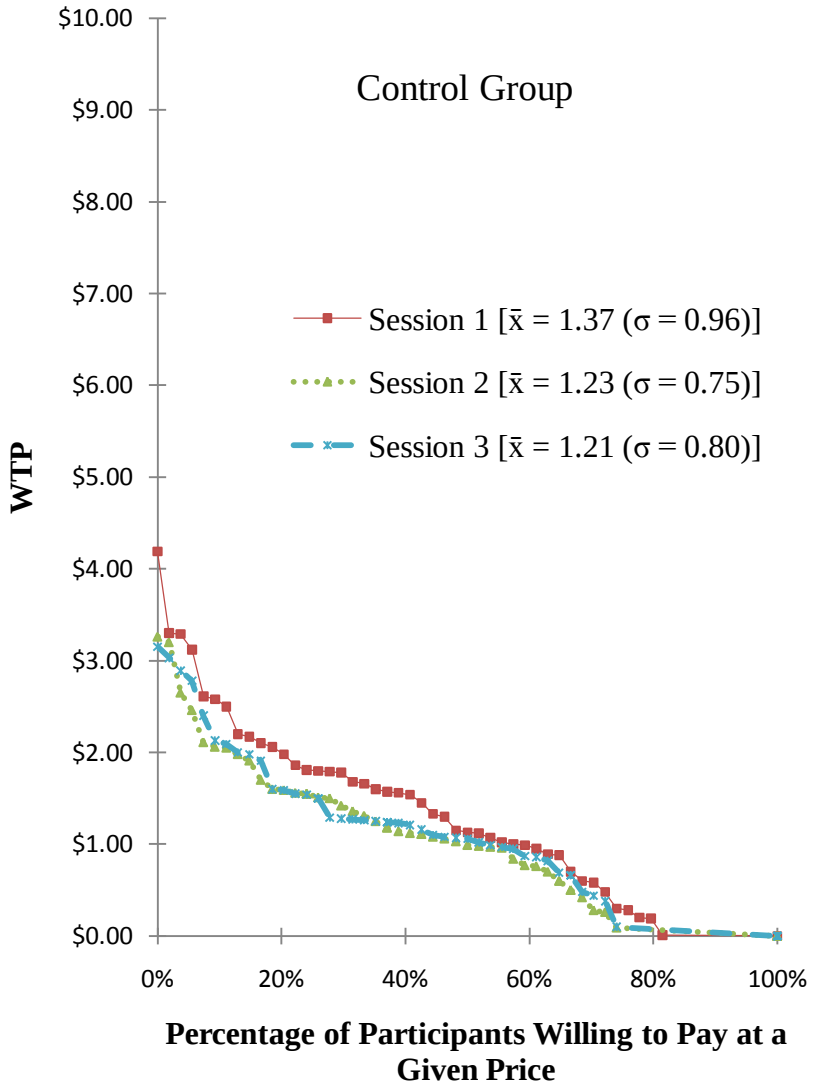


Figure 3. WTP for Ranger brand Chicken



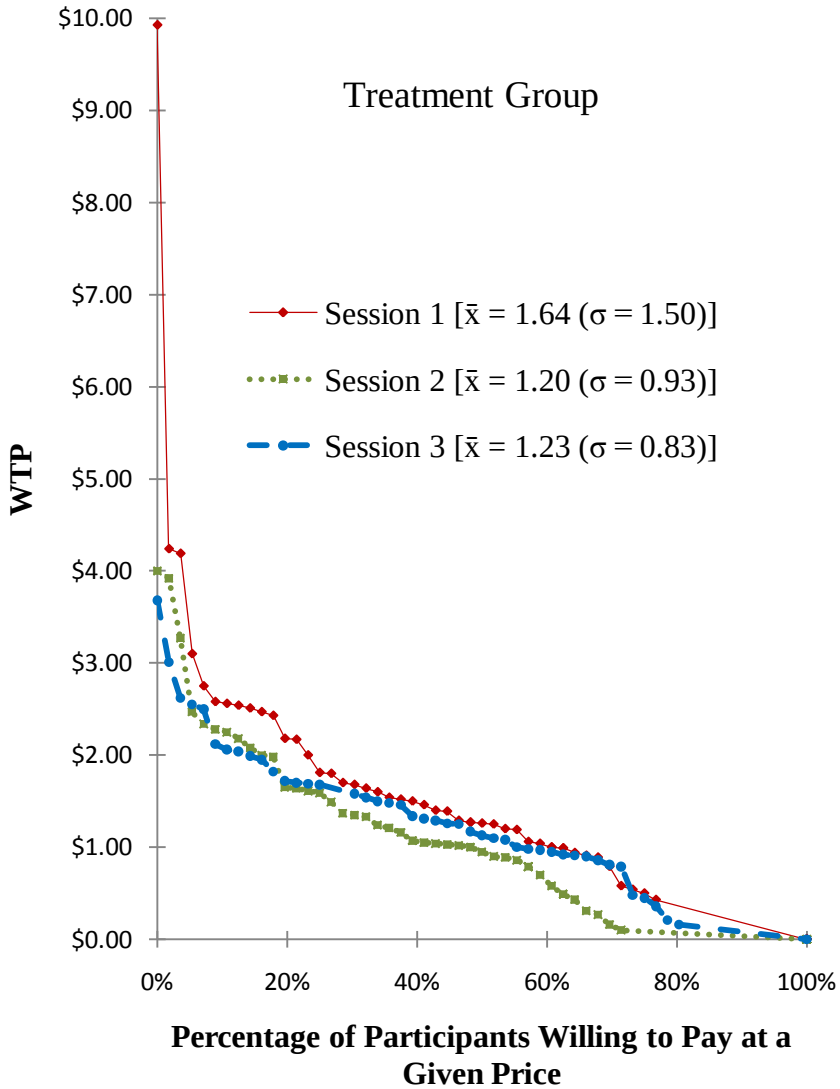
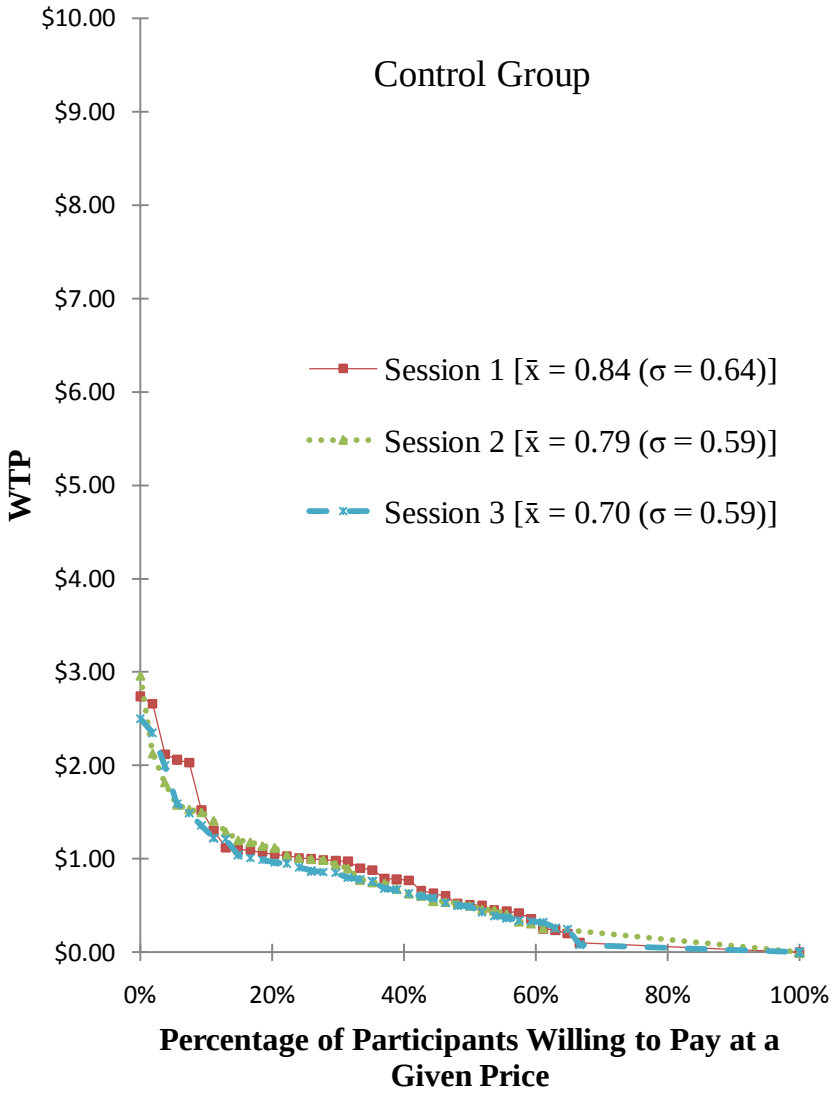


Figure 4. WTP for Eggs



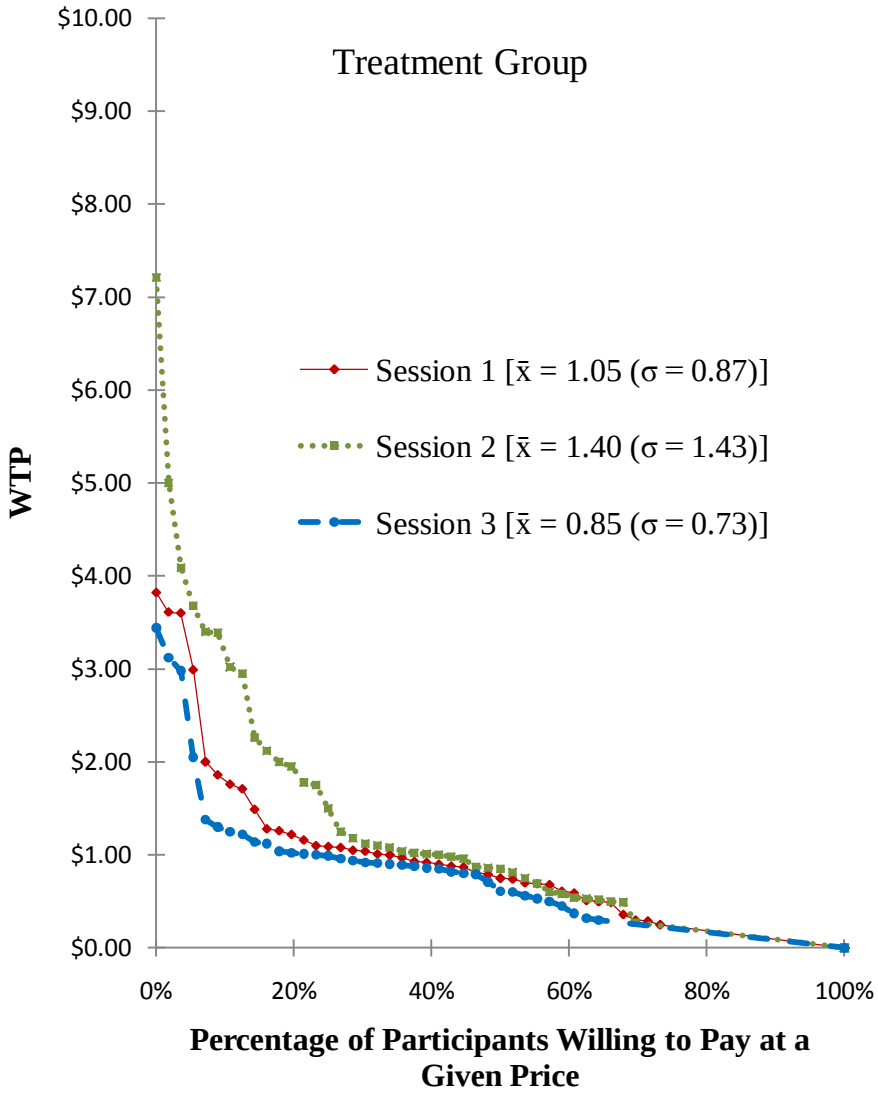


Figure 5. WTP for Pasta

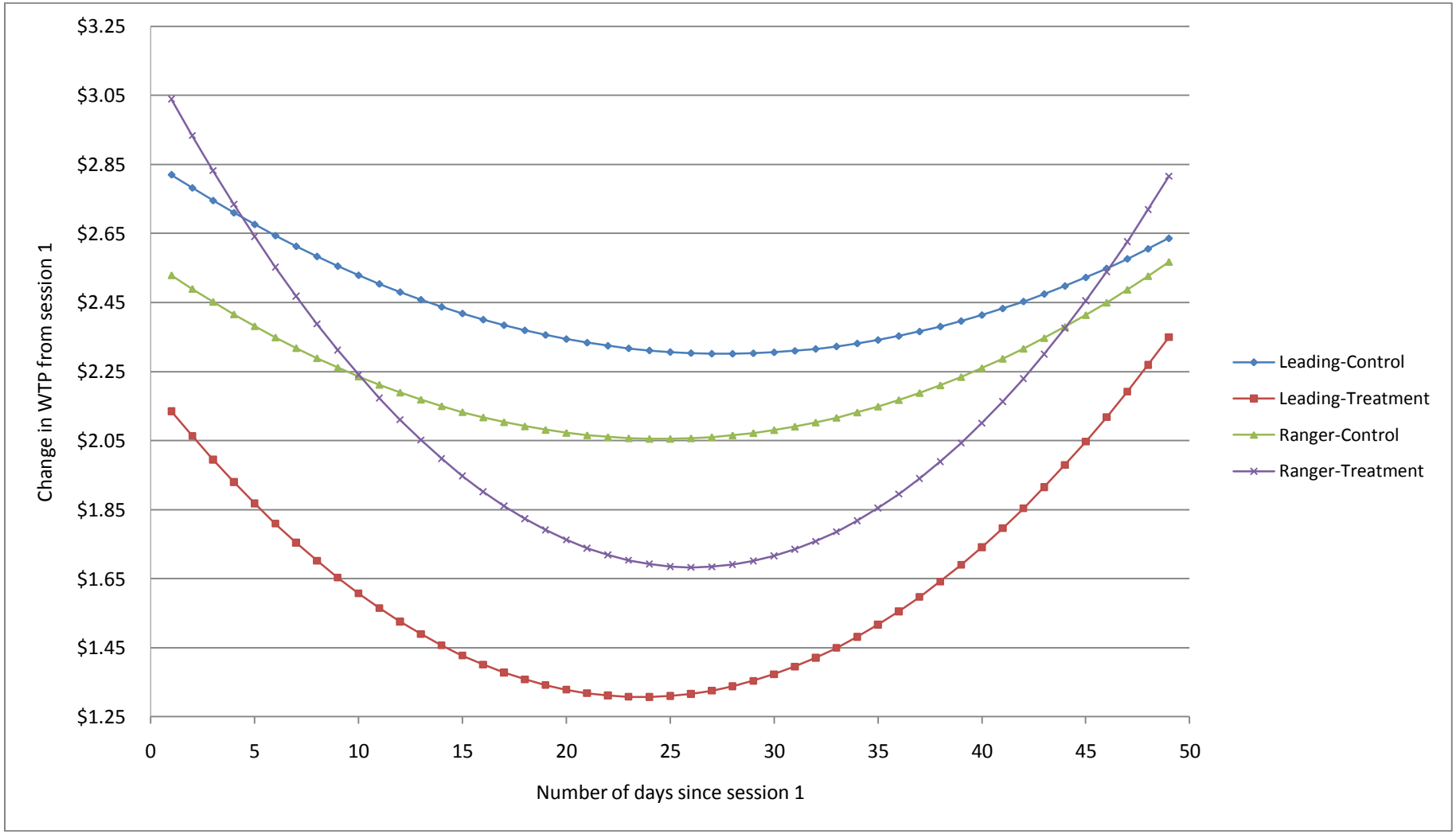


Figure 6. Additive Effects of DAYS, DAYS^2, DAYS*INFO, and DAYS^2*INFO variables

Table 1. Experiment Structure

Session 1 (1 hour)

Part A

- Participants read instructions
- Verbal instructions
- Training round WTP bid for pen

Part B

- Participants read instructions
- Verbal instructions
- Presentation of food safety information if session is Treatment group
- Presentation of products to participants
- WTP bids for Leading brand chicken, Ranger brand chicken, fettuccine pasta, and one dozen eggs

Session 2 (7 days later, 15 minutes)

Part B only, no additional information

- Participants read instructions
- Verbal instructions
- WTP bids for all four products

Session 3 (28 days or 49 days later, 15 minutes)

Part B only, no additional information

- Participants read instructions
- Verbal instructions
- WTP bids for all four products

TABLE 2: SUMMARY STATISTICS

		Session 1					Session 2					Session 3			
		n	Mean	Std. Dev.	Median		n	Mean	Std. Dev.	Median		n	Mean	Std. Dev.	Median
Leading brand chicken	Control	54	2.86	1.83	2.82		54	2.61	1.61	2.24		54	2.53	1.7	2.46
	Treatment	56	2.21	2.21	1.86		56	2.05	1.77	2.07		56	1.95	1.8	1.98
Ranger brand chicken	Control	54	2.57	1.49	2.54		54	2.37	1.47	2.22		54	2.38	1.73	2.28
	Treatment	56	3.15	2.2	3		56	2.41	1.84	2.19		56	2.32	1.77	2.09
Eggs	Control	54	1.37	0.96	1.3		54	1.23	0.75	1.13		54	1.21	0.8	1.19
	Treatment	56	1.64	1.5	1.34		56	1.2	0.93	1.04		56	1.23	0.83	1.17
Pasta	Control	54	0.84	0.64	0.79		54	0.79	0.59	0.71		54	0.7	0.59	0.65
	Treatment	56	1.05	0.87	0.89		56	1.4	1.43	0.99		56	0.85	0.73	0.85

TABLE 3: HYPOTHESES

	Hypothesis	Hypothesis Test	Result	Difference/Coeff[5]	P > |z|
1	WTP is the same for Leading brand chicken and Ranger brand chicken in the control group.	$H_0 : WTP_{Control}^{Leading} = WTP_{Control}^{Ranger}$ $H_a : WTP_{Control}^{Leading} \neq WTP_{Control}^{Ranger}$	Reject	Difference = \$0.23	0.0196
2	WTP is the same for Leading brand chicken and Ranger brand chicken in the treatment group.	$H_0 : WTP_{Treatment}^{Leading} = WTP_{Treatment}^{Ranger}$ $H_a : WTP_{Treatment}^{Leading} \neq WTP_{Treatment}^{Ranger}$	Reject	Difference = \$0.55	0.0000
3	WTP for Leading brand chicken is the same in session one regardless of information.	$H_0 : WTP_{Control}^{Leading} = WTP_{Treatment}^{Leading}$ $H_a : WTP_{Control}^{Leading} \neq WTP_{Treatment}^{Leading}$	Reject	Difference = \$0.66	0.0219
4	WTP for Ranger brand chicken is the same in session one regardless of information.	$H_0 : WTP_{Treatment}^{Leading} = WTP_{Treatment}^{Ranger}$ $H_a : WTP_{Treatment}^{Leading} \neq WTP_{Treatment}^{Ranger}$	Fail to Reject	Difference = \$0.58	0.2821
5	WTP for Leading brand chicken does not change over time in the control group.	$H_0 : \frac{\Delta WTP_{Control}^{Leading}}{\Delta DAYS} = 0$ $H_a : \frac{\Delta WTP_{Control}^{Leading}}{\Delta DAYS} \neq 0$	Fail to Reject	Coefficient = -0.042	0.057
6	WTP for Leading brand chicken does not change over time in the treatment group.	$H_0 : \frac{\Delta WTP_{Treatment}^{Leading}}{\Delta DAYS * INFO} = 0$ $H_a : \frac{\Delta WTP_{Treatment}^{Leading}}{\Delta DAYS * INFO} \neq 0$	Fail to Reject	Coefficient = -0.028	0.417
7	WTP for Ranger brand chicken does not change over time in the control group.	$H_0 : \frac{\Delta WTP_{Control}^{Ranger}}{\Delta DAYS} = 0$ $H_a : \frac{\Delta WTP_{Control}^{Ranger}}{\Delta DAYS} \neq 0$	Fail to Reject	Coefficient = -0.045	0.051
8	WTP for Ranger brand chicken does not change over time in the treatment group.	$H_0 : \frac{\Delta WTP_{Treatment}^{Ranger}}{\Delta DAYS * INFO} = 0$ $H_a : \frac{\Delta WTP_{Treatment}^{Ranger}}{\Delta DAYS * INFO} \neq 0$	Fail to Reject	Coefficient = -0.053	0.128

[5] Hypotheses 1 - 4 were tested using Wilcoxon significance tests. Hypotheses 5 – 8 were tested using tobit regressions.

TABLE 4. REGRESSION VARIABLES

Variable name	Mean	Std. Dev.	Min	Max
WTPLEADING	2.237	1.869	0.0	9.88
WTPRANGER	2.388	1.814	0.0	9.90
INFO	0.509	0.501	0.0	1
DAYS	15.039	17.592	0.0	49
$DAYS^2$	534.736	857.551	0.0	2401
DAYS*INFO	8.070	15.453	0.0	49
$DAYS^2$*INFO	303.203	725.857	0.0	2401
AGE	47.814	16.357	19.0	84.5
AGE*INFO	25.150	27.411	0.0	84.5
FEMALE	0.673	0.470	0.0	1
FEMALE*INFO	0.327	0.470	0.0	1
CHILDREN	0.182	0.386	0.0	1
CHILDREN*INFO	0.073	0.260	0.0	1
PRIMARY_SHOPPER	0.736	0.441	0.0	1
PRIMARY_SHOPPER*INFO	0.355	0.479	0.0	1
EDUCATION	1.355	0.817	0.0	2
EDUCATION*INFO	0.682	0.885	0.0	2
NONWHITE	0.100	0.300	0.0	1
NONWHITE*INFO	0.036	0.187	0.0	1
INCOME	3.333	2.451	0.0	10
INCOME*INFO	1.682	2.479	0.0	10
OFTENCHICK	2.500	1.428	1.0	6
OFTENCHICK*INFO	1.391	1.730	0.0	6
P_CHICKENSAFE	2.978	0.837	1.075	4.98
P_CHICKENSAFE*INFO	1.299	1.484	0.0	4.98

TABLE 5. REGRESSION RESULTS[6] FOR MODELS 1 AND 2

	Model 1 (Leading brand)			Model 2 (Ranger brand)		
Variable	Coef.	Std. Err.	P>|z|	Coef.	Std. Err.	P>|z|
CONSTANT	-1.651	2.197	0.452	-2.712	1.830	0.138
INFO	4.337	2.666	0.104	8.027	2.267	0.000
DAYS	-0.042	0.022	0.057	-0.045	0.023	0.051
$DAYS^2$	0.001	0.000	0.111	0.001	0.001	0.066
DAYS*INFO	-0.028	0.035	0.417	-0.053	0.035	0.128
$DAYS^2$*INFO	0.001	0.001	0.338	0.001	0.001	0.224
AGE	0.002	0.020	0.923	0.009	0.016	0.567
AGE*INFO	-0.004	0.027	0.877	0.000	0.022	0.985
FEMALE	0.015	0.668	0.982	-0.143	0.540	0.790
FEMALE*INFO	0.281	0.863	0.744	0.169	0.708	0.811
CHILDREN	1.251	0.630	0.047	0.775	0.516	0.133
CHILDREN*INFO	-2.415	1.042	0.021	-2.614	0.853	0.002
NONWHITE	0.294	0.701	0.675	-0.535	0.564	0.343
NONWHITE*INFO	-0.784	1.216	0.519	0.088	0.834	0.916
PRIMARY_SHOPPER	1.272	0.749	0.089	1.184	0.615	0.054
PRIMARY_SHOPPER*INFO	-0.773	1.014	0.446	-0.008	0.838	0.993
EDUCATION	0.258	0.356	0.468	0.287	0.292	0.327
EDUCATION*INFO	-0.730	0.505	0.149	-0.726	0.420	0.084
P_CHICKENSAFE	0.479	0.483	0.321	0.651	0.406	0.109
P_CHICKENSAFE*INFO	-0.175	0.642	0.785	-0.781	0.549	0.155
OFTENCHICK	0.268	0.237	0.257	0.377	0.194	0.052
OFTENCHICK*INFO	-0.875	0.320	0.006	-1.313	0.267	0.000
INCOME	0.162	0.107	0.131	0.172	0.089	0.052
INCOME*INFO	-0.101	0.159	0.525	-0.183	0.133	0.168
Sum of all INFO coefficients	-1.267			2.606		
F test statistic	2.624			2.840		
Wald chi^2 =	50.70			82.32		
Prob > chi^2 =	0.0007			0.0000		
Log likelihood =	-437.1			-442.3		
Left-censored observations	46			33		
Uncensored observations	221			234		
Right-censored observations	0			0		

[6] Two limit tobit regressions with random and marginal effects were used since subjects were permitted to bid from $0 to $10. Random effects account for the same subject bidding for multiple products in multiple rounds. Marginal effects translate regression coefficients into WTP.

TABLE 6. REGRESSION RESULTS[7] FOR MODELS 3 AND 4

	Model 3 (Eggs)			Model 4 (Pasta)		
Variable	Coef.	Std. Err.	P>|z|	Coef.	Std. Err.	P>|z|
CONSTANT	-0.072	1.092	0.948	-0.243	0.651	0.709
INFO	1.626	1.472	0.269	1.987	0.957	0.038
DAYS	-0.018	0.018	0.297	-0.017	0.012	0.167
$DAYS^2$	0.000	0.000	0.397	0.000	0.000	0.239
DAYS*INFO	-0.035	0.026	0.181	0.004	0.018	0.810
$DAYS^2$*INFO	0.001	0.001	0.221	0.000	0.000	0.691
AGE	0.010	0.008	0.212	0.021	0.008	0.007
AGE*INFO	-0.008	0.011	0.447	-0.022	0.011	0.042
FEMALE	-0.243	0.290	0.401	-0.008	0.273	0.978
FEMALE*INFO	0.450	0.379	0.235	0.479	0.361	0.185
CHILDREN	0.411	0.285	0.150	0.140	0.267	0.601
CHILDREN*INFO	-0.746	0.458	0.104	-0.461	0.441	0.296
NONWHITE	0.069	0.331	0.834	0.430	0.343	0.209
NONWHITE*INFO	-0.491	0.543	0.366	-0.294	0.559	0.599
PRIMARY_SHOPPER	0.787	0.399	0.048	0.151	0.323	0.640
PRIMARY_SHOPPER*INFO	-0.663	0.506	0.190	-0.110	0.406	0.787
EDUCATION	0.262	0.170	0.122	-0.037	0.153	0.808
EDUCATION*INFO	-0.567	0.232	0.015	-0.181	0.204	0.374
INCOME	0.017	0.051	0.741	0.007	0.051	0.890
INCOME*INFO	-0.058	0.073	0.421	0.000	0.071	0.994
P_EGGSSAFE	0.074	0.268	0.782			
P_EGGSSAFE*INFO	0.091	0.395	0.818			
OFTENEGGS	-0.135	0.099	0.171			
OFTENEGGS*INFO	0.010	0.131	0.940			
P_PASTASAFE				-0.005	0.043	0.906
P_PASTASAFE*INFO				-0.007	0.066	0.914
OFTENPASTA				-0.031	0.100	0.761
OFTENPASTA*INFO				-0.182	0.153	0.234
Sum of all INFO coefficients	-0.391			1.403		
F test statistic	2.69			2.06		
Wald chi^2 =	40.51			34.24		
Prob > chi^2 =	0.0135			0.0617		
Log likelihood =	-353.7			-278		
Left-censored observations	27			40		
Uncensored observations	234			221		
Right-censored observations	0			0		

[7] Two limit tobit regressions with random and marginal effects were used since subjects were permitted to bid from $0 to $10. Random effects account for the same subject bidding for multiple products in multiple rounds. Marginal effects translate regression coefficients into WTP.

APPENDIX

Instructions Provided to Control and Treatment Groups

Session I – Instructions

Part A

Welcome to an experiment in consumer decision making. In the course of this experiment, you will have opportunities to earn cash and purchase several products. Please read these instructions carefully and refrain from communicating with other participants. As stated in the Consent Form, your participation in this experiment is voluntary and you can withdraw from this experiment at any time.

Submitting Your Bid

In today's experiment, you will be asked to indicate the *highest* amount of money you would be willing to pay for different products. We will refer to this amount as your **bid**. You will indicate your bid via the computer.

When the administrator tells you to do so, please click the button labeled "Start Clock", which will show you a price that will increase in $0.01 increments starting at $0.00 until it reaches $1.00. When the displayed price reaches the highest amount you would be willing to pay for the item, click the button labeled "Withdraw from auction" which will stop the clock and display the bid you submitted. If you wish to bid $0.00 for the item, click the "Withdraw now" button.

Purchase Item -- a Pen

You will be given an **initial balance** of $1.00 and asked to submit a bid for a pen using the procedures described above. Once all the bids have been submitted, the administrator will rank all of the bids from highest to lowest. The subjects with the highest ranked bids will purchase the pen and have the **price** deducted from their initial balance. The number of purchasers will range from one to six and will be determined randomly for each product by having a volunteer roll a six-sided die. The number on the die will determine the number of purchasers. All purchasers of the pen will pay the same price as determined by the amount of the *highest rejected bid*.

Consider the following hypothetical example which has seven bids for the pen (ranked from the highest, $0.90, to the lowest, $0.30). In this example, the number of purchasers determined by a roll of the die is three. In this case, the subjects with the three highest bids would purchase the pen, but would pay a price equivalent to the highest rejected bid ($0.60). The purchasers would thus receive a pen and $0.40 cash ($1.00 - $0.60). The other four subjects who did not purchase the pen would receive the initial balance of $1.00.

Bid 1	Bid 2	Bid 3	Bid 4	Bid 5	Bid 6	Bid 7
$0.90	$0.80	$0.70	*$0.60*	$0.50	$0.40	$0.30

With this auction mechanism, it is in your best interest to submit a bid equal to the highest amount you would be willing to pay, since, if you purchase the pen, you will pay a price equal to the highest rejected bid, not necessarily of your bid.

Please make sure that you clearly understand these instructions.

Please raise your hand if you have any questions.

Part B:

This part of the experiment will operate in a similar manner to Part A, except that it will now involve four different products.

In this case, your starting balance will be $10.00 for each product. You can submit any bid between $0.00 and $10.00. The price of the product will again be determined based on the amount of the *highest rejected bid* and the number of purchasers will again be determined by a roll of a six-sided die by a volunteer subject. Only one of the four products will be randomly pre-selected to be purchased and determine cash earnings. The selected product will not be announced until after all the bids for all four items have been submitted. The four products are as follows:

Product #1: **Frozen chicken breasts from a leading brand – such as Fosters Farms, Perdue, Pilgrim's Pride, or Tyson (approx. 1½ pounds)**[*]

Product #2: **Frozen chicken breasts from Ranger (approx. 1½ pounds)**[8]

Product #3: **Eggs (one dozen)**

Product #4: **Fettuccine pasta (one pound)**

After all of the bids have been submitted, the administrator will announce which product has been randomly selected for purchase and cash earnings. At that time, your computer will display your earnings for the entire experiment. Please note that for this part of the experiment the computer program will run much more quickly than in the previous parts. Please watch closely and bid as closely to your highest value for the product as possible.

[8] A free bag filled with ice is available for anyone purchasing chicken to ensure that it remains frozen.

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Bid 1	Bid 2	Bid 3	Bid 4	Bid 5	Bid 6	Bid 7
$0.90	$0.80	$0.70	*$0.60*	$0.50	$0.40	$0.30

With this auction mechanism, it is in your best interest to submit a bid equal to the highest amount you would be willing to pay, since, if you purchase the pen, you will pay a price equal to the highest rejected bid, not necessarily of your bid.

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Part B:

This part of the experiment will operate in a similar manner to Part A, except that it will now involve four different products.

In this case, your starting balance will be $10.00 for each product. You can submit any bid between $0.00 and $10.00. The price of the product will again be determined based on the amount of the *highest rejected bid* and the number of purchasers will again be determined by a roll of a six-sided die by a volunteer subject. Only one of the four products will be randomly pre-selected to be purchased and determine cash earnings. The selected product will not be announced until after all the bids for all four items have been submitted. The four products are as follows:

Product #1: **Frozen chicken breasts from a leading brand – such as Fosters Farms, Perdue, Pilgrim's Pride, or Tyson (approx. 1½ pounds)***

Product #2: **Frozen chicken breasts from Ranger (approx. 1½ pounds)**[9]

Product #3: **Eggs (one dozen)**

Product #4: **Fettuccine pasta (one pound)**

After all of the bids have been submitted, the administrator will announce which product has been randomly selected for purchase and cash earnings. At that time, your computer will display your earnings for the entire experiment. Please note that for this part of the experiment the computer program will run much more quickly than in the previous parts. Please watch closely and bid as closely to your highest value for the product as possible.

[9] A free bag filled with ice is available for anyone purchasing chicken to ensure that it remains frozen.

PRODUCT INFORMATION

Product #1: Approximately 1.5 pounds of frozen chicken breast from a leading brand (such as Fosters Farms, Perdue, Pilgrim's Pride, or Tyson)

According to *Consumer Reports Magazine*[10], a recent study of broiler chicken revealed that "campylobacter was present in 81 percent of the chickens, salmonella in 15 percent; and both bacteria in 13 percent. … Both salmonella and campylobacter can cause intestinal distress, and campylobacter can also lead to meningitis, arthritis, and Guillain-Barré syndrome, a neurological disorder… Among all brands, 84 percent of the salmonella and 67 percent of the campylobacter organisms (tested) showed resistance to one or more antibiotics. … The findings suggest that some people who are sickened by chicken might need to try several antibiotics before finding one that works. … No major brand fared better than others overall. Foster Farms, Pilgrim's Pride, and Tyson chickens were lower in salmonella incidence than Perdue, but they were higher in campylobacter."

Consumer Reports concludes that their tests reveal that if you eat undercooked chicken (less than 165° F) or have cross-contamination to other foods from mishandling the chicken, "you have a good chance of feeling miserable."

Stricken by chicken?

WHO: Leighton Kunkle, 40, beauty-supply distributor, Perrysville, Ind.

What HAPPENED: Kunkle suspects that he was infected with campylobacter from undercooked chicken strips he ate at a Phoenix restaurant while on a family vacation in March 2002. "It was lukewarm," he said. "I was starving, so I really didn't care. I ate it." The initial gastrointestinal symptoms were bad, he recalls. Days later, he began to lose feeling in his feet and legs. He was diagnosed with Guillain-Barré syndrome, a severe nerve condition, and says he still has problems walking. A lawsuit he filed against the restaurant was settled out of court in April 2006 without admission of liability.

Product #2: Approximately 1.5 pounds of frozen chicken breast from Ranger

Consumer Reports Magazine reports that "there was an exception to the poor showing of most premium chickens. As in our previous tests, Ranger … was extremely clean." Of the ten samples analyzed, 0 percent had salmonella and only 20 percent had campylobacter.

Product #3: One dozen eggs

Product #4: One pound of fettuccine pasta

[10] All information from Consumer Reports Magazine, January 2007.

Session II -- Instructions

Welcome to the second session of this experiment in the economics of decision making. In the course of this experiment, you will have opportunities to again bid on various products. Please review these instructions carefully so that there is no confusion regarding the experiment procedure. Please do not communicate with other participants during the experiment. As stated in the Consent Form, your participation in this experiment is voluntary and you can withdraw from this experiment at any time.

In today's experiment, you will be again asked to indicate the *highest* amount of money you would be willing to pay for four different products. The experiment will operate identically to Part B of the experiment that you participated in previously.

As you may recall, your starting balance for each product will be $10 and you can submit any bid between $0 and $10. The price of the product will again be determined based on the amount of the *highest rejected bid*. The number of purchasers will again be between one and the maximum number on the die determined by a roll of the die by a volunteer subject. Only one of the four products will be purchased and will determine cash earnings. The selected product has been randomly pre-selected and will not be announced until after all the bids for all four items have been submitted.

Recall that it is important to wait for the administrator's signal before starting the auction. When the administrator tells you to do so, please click on either the "Start Clock" or the "Withdraw Now" button. The "Withdraw Now" button is for someone who wishes to bid zero. Unless you want to bid zero, please use the "Start Clock" button.

The products are as follows:

Product #1: Approximately 1.5 pounds of frozen boneless skinless chicken breast from a leading brand (such as Fosters Farms, Perdue, Pilgrim's Pride, or Tyson)

Product #2: Approximately 1.5 pounds of frozen boneless skinless chicken breast from Ranger

Product #3: One dozen eggs (size large)

Product #4: One pound of fettuccine pasta

After all of the bids have been submitted, the administrator will announce which product has been randomly pre-selected for purchase and cash earnings. At that time, your computer will display your earnings for the entire experiment.

Please make sure that you clearly understand these instructions.

Please raise your hand if you have any questions.

* A free bag filled with ice is available for anyone purchasing chicken to ensure that it remains frozen.

Session III -- Instructions

Welcome to the third session of this experiment in the economics of decision making. In the course of the experiment, you will have opportunities to again bid on various products. Please review these instructions carefully so that there is no confusion regarding the experiment procedure. Please do not communicate with other participants during the experiment. As stated in the Consent Form, your participation in this experiment is voluntary and you can withdraw from this experiment at any time.

In today's experiment, you will be again asked to indicate the *highest* amount of money you would be willing to pay for four different products. The experiment will operate identically to the last experiment that you participated in previously.

As you may recall, your starting balance for each product will be $10 and you can submit any bid between $0 and $10. The price of the product will again be determined based on the amount of the *highest rejected bid*. The number of purchasers will again be between one and six and will be determined by a roll of the dice by a volunteer subject. Only one of the four products will be purchased and will determine cash earnings. The selected product will be randomly pre-selected and will not be announced until after all the bids for all four items have been submitted.

Recall that it is important to wait for the administrator's signal before starting the auction. When the administrator tells you to do so, please click on either the "Start Clock" or the "Withdraw Now" button. The "Withdraw Now" button is for someone who wishes to bid zero. Unless you want to bid zero, please use the "Start Clock" button.

The products are as follows:

Product #1: Approximately 1.5 pounds of frozen chicken breast from a leading brand (such as Fosters Farms, Perdue, Pilgrim's Pride, or Tyson)

Product #2: Approximately 1.5 pounds of frozen chicken breast from Ranger

Product #3: One dozen eggs

Product #4: One pound of fettuccine pasta

After all of the bids have been submitted, the administrator will announce which product has been randomly selected for purchase and cash earnings. At that time, your computer will display your earnings for the entire experiment. In addition for completing all three sessions you will receive an additional $20 as a bonus for attending the entire experiment.

Please make sure that you clearly understand these instructions.

Please raise your hand if you have any questions.

* A free bag filled with ice is available for anyone purchasing chicken to ensure that it remains frozen.