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PART THREE: A Closer Look at Performing Contingent Valuation

14. Using Contingent Valuation Methods to Value the Health Risks from Pesticide Residues When Risks Are Ambiguous

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The debate about the optimal design of policies regarding pesticide residues in food has recently intensified. The controversy centers on whether policy makers should base policy design on consumers' concerns about pesticide residues, or on what is currently known by scientists about the risks from pesticide residues. These two approaches yield very different policy designs since consumers make decisions without full information about the health risks from pesticide residues. Furthermore, their interpretation of the risks they face often diverges significantly from that of scientists. Nonetheless, it is important to consider how consumers weigh the costs and benefits of policy changes. One approach to advising policy makers is to understand how much consumers value changes in risks from pesticide residues given their current risk perceptions, and then apply that information to the evaluation of policies based on scientific estimates of the risks. If we know, for example, how much consumers value risk changes from various baseline risks (e.g., the value of changing the risk of a health problem from pesticide residues from 1 in 100,000 to 1 in a million), we can extrapolate from that information how much they would value the changes in risks that scientists assert would be forthcoming with reduced pesticide residues in food.

This chapter describes an approach to measuring consumers' risk perceptions and explains the design of a constructed market for valuing risk reductions relevant to food-safety policy on pesticides. It also identifies the possible importance of consumer uncertainty (called "ambiguity") about the health risks from pesticide residues in determining the benefits of reduced pesticide residues. The value of two pesticide residue policies that reduce risk and/or ambiguity is sought. Policy I keeps the current federal standard for pesticide residues on food, but permits product claims to be made that the federal standard is met. Policy II toughens the federal residue standard and allows product claims that the new standard is met. We use a constructed market approach since markets for reduced pesticide residues do not currently exist.[1] The constructed market was presented to consumers using a contingent valuation survey instead of an experimental setting in which participants are offered actual products. This approach permits the use of a large and representative sample at lower cost than the equivalent experimental setting.

There are several approaches available for measuring how much consumers value changes in risks. One approach is to measure the savings of health care costs and lost wages that would result from risk reductions. However, this measure underestimates the true value of changes in risk since it values only the direct costs of changes in risks. It does not include the inherent value of a longer or more healthy life, for example. Another measure is the amount consumers are willing to give up to achieve risk reductions in labor markets or in markets for consumer products known to reduce risks (e.g., the market for smoke detectors). When using this approach, however, we do not know the exact risk reductions people think they are buying. This is particularly problematic if there is not a consensus or readily available information about risks. Furthermore, the risk reductions acquired in markets are often not comparable to risk reductions provided by a policy change. Reductions in cancer risks, for example, are not comparable to reductions in fatal accidents in the work place or to reductions of risks from fires.

Contingent valuation survey methods (CV) can be used to overcome these problems since they offer methods for measuring people's risk perceptions. We can then determine the risks people are actually valuing in either real or simulated markets. CV methods also allow us to measure consumers' willingness to pay for the type of risk reductions that are relevant to policy change.

The next section specifies the variables we were interested in measuring in this study. The third section describes the CV methods used to measure the variables (the text of the full survey appears in Appendix 14.A). Section four presents some results obtained from a random sample of Michigan households. The concluding section uses Carson's (1991) validity criteria to evaluate the major strengths and weaknesses of the research design.

Theoretical Framework

To reveal how much consumers are willing to pay for reduced risks from pesticide residues in food when risks are ambiguous, we need to model how consumer demand for food varies with the ambiguous risk attribute. To do this, we incorporated ambiguity into van Ravenswaay and Hoehn's (1991) model of consumer willingness to pay for reduced risks from pesticide residues.

In their model, a consumer is hypothesized to maximize utility from budget-constrained expenditures on a bundle of products offering certain amounts of *attributes* such as food calories, nutrients, cosmetic quality, and pesticide residues (Lancaster 1971). The consumer combines these product attributes into services such as hunger satisfaction, health maintenance, and health protection via a household production function. The consumer's choice problem is to select product attributes so as to maximize utility obtained from services. The attribute of interest in their study was pesticide residues, and, ultimately, the health risks consumers associate with different residue levels.

Van Ravenswaay and Hoehn (1991) develop a model of the demand for a single product, x_1^0, that has the vector of characteristics $\mathbf{a}_1 = (a_{11}...a_{1J})'$. The product x_1^0 is offered at price p_1^0. They show that if the true demand function for that product is linear or semi-logarithmic, willingness to pay for a change in the amount of one of its attributes from a_{11}^0 to a_{11}^1 is:

$$WTP = (p_1^1 - p_1^0) x_1^0 \tag{1}$$

where p_1^1 is the price of good x_1^0 when attribute a_{11}^1 is present and p_1^0 is the price of x_1^0 when attribute a_{11}^0 is present. The price p_1^1 is such that the quantity demanded remains at x_1^0 after the attribute change.

Van Ravenswaay and Hoehn (1991) estimate the shift in the demand curve due to changes in the levels of the pesticide residue. They use this shift to estimate willingness to pay for a change in pesticide residues. Weak complementarity allows us to use the area between the demand curves as a measure of households' willingness to pay for residue reductions *if* we can assume that the benefits of residue reductions accrue only to persons who purchase reduced residue products. Weak complementarity is said to occur when "the quantity demanded of a private good x_1 is zero, the marginal utility or marginal demand price of Q [the environmental attribute] is zero (Freeman 1979: 72)." We assume that consumers benefit from pesticide residue reductions only if they buy the reduced residue product (i.e., they do not experience any benefits from others' purchases).

To develop an estimate of the implicit value of risk reduction, it is necessary to know the health risks consumers perceive to be associated with different pesticide residue levels. The van Ravenswaay and Hoehn (1991) model incorporates perceived risk from total consumption of residue (r, where $0 \leq r_1 \leq 1$) into the model by assuming that risk is a product of the total amount of residue consumed, $a_{11}x_1$, and c_1, the factor of proportionality that translates dose into risk (i.e., a linear dose-response function with no threshold). A reduction in per unit residues from a_{11}^0 to a_{11}^1 results in a proportional change in risk from:

(2) $$r_1^0 = c_1 a_{11}^0 x_1^0$$

to

(3) $$r_1^1 = c_1 a_{11}^1 x_1^0.$$

Dividing WTP by the perceived change in risk reduction gives average willingness to pay for risk reduction:

(4) $$wtp = WTP/(r_1^1 - r_1^0).$$

In the survey described below, we observe both r_1^0 and r_1^1 (respondents' perceptions of the probability of an adverse health outcome associated with different levels of residues on food), as well as x_1^0 and x_1^1 (the quantities of each type of food purchased with different levels of residues). We systematically vary p_1^0 and p_1^1 (the prices of each type of food). All other food attributes ("a" $\forall$ a $\neq$ a_{11}) are held constant.

Adding Risk Ambiguity to the Model

Van Ravenswaay and Hoehn (1991) applied the model described in the previous section to a constructed market in which apples were labeled for different levels of pesticide residues (the questionnaire is described in the next section). They concluded that although the risk perceptions associated with each of these levels were statistically significant in determining purchases of labeled apples, risk perceptions could not account for the full impact of the labels on apple demand. Van Ravenswaay and Hoehn suggested that the value of the labels might stem from the reduction in the uncertainty consumers had about the risks they face from pesticide residues in food.

Consumers might be uncertain about the risks from pesticide residues for several reasons. They do not have perfect information about the levels of residues present in unlabeled food (variable "a" in the model above), nor do they have perfect information about the health effects of residues in either labeled or unlabeled foods (variable "c"). In fact, consumers regularly receive conflicting information from the media about the adequacy of government enforcement of residue standards and scientists' understanding of the health effects of pesticide residues.

If consumers do *not* know with certainty the probability of an adverse health outcome associated with pesticide residues, a point estimate of the probability may not capture all the information relevant to decision makers when they make choices under uncertainty. The term "ambiguity" refers to uncertainty about the probability of an outcome. Ambiguous probabilities are random variables; their probability distributions are called "second-order probability distributions

(SOPs)." If consumers perceive the level of risk to be uncertain, some measure of the spread of the SOP will be important in explaining consumer reactions to changes in pesticide residue policy.

The main conclusion of the literature on ambiguity is that when a decision maker is presented with two action choices—one where the possible set of outcomes and their probability distribution is known with certainty (nonambiguous, or pure risk), and the other where the set of possible outcomes is known, but the probability distribution is not known with certainty (ambiguous)—most people prefer the nonambiguous situation (Ellsberg 1961, Gärdenfors and Sahlin 1982, 1983, Einhorn and Hogarth 1985, Segal 1987).[2]

For example, if in one situation it is known with certainty that the probability of an adverse health outcome from pesticide residues is 1 in a million, but in another situation the probability is known to be somewhere between 1 in a billion and 1 in a thousand with a mean of 1 in a million, then consumers would prefer the situation with the known risk, even though the choices offer the same mean risk. If the ambiguity hypothesis is correct, consumers who perceive risks as ambiguous should be willing to pay more to avoid risks than consumers who perceive the same level of mean risk, but do not view the risk as ambiguous.

Ambiguity about risk may stem from either uncertainty about the level of residues present (a_{11}^{1}) or uncertainty about their health effects (c_1). Pesticide residue policies may reduce ambiguity by addressing one or both of these sources. For example, a policy may reduce ambiguity about the level of pesticide residues by requiring products to be tested and labeled for residue levels. A different policy may eliminate ambiguity about standards by funding more research in the area of risk assessments or by banning the use of chemicals for which the health risks are not well known. These types of policies reduce ambiguity about risks without necessarily changing the mean risk consumers perceive they face.

Design of the Contingent Valuation Survey

The questionnaire used in this study (see Appendix 14.A) built upon the questionnaire developed by van Ravenswaay and Hoehn (1991) to estimate consumer willingness to pay for reduced risks from pesticide residues in apples. Van Ravenswaay and Hoehn sought to simulate an actual shopping situation as closely as possible, while having results based on a large, representative sample of households. Since the majority of households purchase apples and associate apples with pesticide residues, apples offer a convenient commodity to study.

Since we used many of the same questions developed by van Ravenswaay and Hoehn, we will briefly describe the development of their questionnaire. First, van Ravenswaay and Hoehn conducted focus groups with consumers to understand how they shop for apples, the varieties of apples people buy, where they purchased them, whether they were purchased packaged or loose, and whether people commonly paid for apples by the pound or by the apple. Focus groups were also used to discern consumers' thoughts about pest damage, pesticide residues on apples, and their perceptions of the risks associated with pesticide residues. Several labels regarding pesticide residues in apples were also tested to determine consumer comprehension and to elicit respondents' perceptions of the perceived changes in risks associated with different labels.

The questions constructed from the focus groups were used to develop pretest questionnaires. These were pretested in a series of in-person interviews in which respondents were asked to describe how they interpreted each of the questions and why they chose particular responses. When no further changes were found to be needed in the pretest interviews, a pretest questionnaire was mailed to a random sample of 200 Michigan households. The data were analyzed to determine whether any unexpected results had been obtained. When none were found, the questionnaire was mailed to 2,200 randomly selected households nationwide.

The final questionnaire asked respondents about their current purchases of apples, their purchase intentions for regular apples at specified prices, and their purchase intentions for apples that were described as tested and certified to have "no pesticide residues," "no detectable pesticide residues," and "no pesticide residues above federal limits." Respondents were given a range of different prices and asked how many apples with and without the labels they would buy if they were planning to buy apples on a typical shopping occasion in the fall. The season was specified so that all respondents would be considering similar supply conditions.

Questions were also asked to elicit respondents' perceptions of the health risks associated with pesticide residues and the perceived changes in those risks with different residue labels. Respondents were asked the likelihood that a member of their household would experience any kind of health problem someday because of pesticide residues in foods. They could choose from the response categories: 1 in a million, 1 in 100,000, 1 in 10,000, 1 in 1,000, 1 in 100, 1 in 10, 1 in 5, 1 in 2, and certain to happen. Respondents were then asked to estimate the reduction in risks that would result when all foods were tested and certified to have the different levels of pesticide residues indicated above.

In the present research several modifications were made to the van Ravenswaay and Hoehn (1991) survey. First, our survey was conducted by telephone rather than by mail. The van Ravenswaay and Hoehn study required respondents to react to photographs of apples with pest damage; a mail survey was thus necessary. In the present research, however, no variations in visual aspects of apples were considered.

Telephone surveys offer several advantages over mail surveys. They allow the use of Random Digit Dialing (RDD) which ensures representative samples.

They also reduce nonresponse bias since interviewers are able to clarify questions and prompt respondents for further information. Complicated skip patterns can also be easily incorporated into the questionnaire design.

As in the van Ravenswaay and Hoehn (1991) questionnaire, the purchase intention questions in our survey were developed to reveal the *quantity* of apples respondents would likely buy at different prices during a typical grocery shopping occasion in the fall. However, in this survey respondents were given a choice between labeled and unlabeled apples, whereas the van Ravenswaay and Hoehn (1991) questionnaire did not offer this choice. In the previous survey, all apples were either all labeled or all unlabeled. Our modification allowed substitution possibilities to be explicitly measured. In the van Ravenswaay and Hoehn (1991) questionnaire, the consumer could substitute another fruit for apples, but the price and type of that fruit was unknown. In our survey, we assumed that the closest substitute to an unlabeled apple was an apple labeled for the level of pesticide residues. We offered respondents both products and specified their prices (prices varied across households). As in the van Ravenswaay and Hoehn (1991) survey, respondents were told to assume that all fruits other than apples were not labeled for pesticide residue levels.

The labels offered to respondents were also changed. We omitted the "no detectable residues" label since van Ravenswaay and Hoehn (1991) found it was statistically indistinguishable from the label "meets federal standards for pesticide residues." The label "no pesticide residues" was changed to "produced without pesticides" since it is impossible to guarantee "no pesticide residues" when pesticides may be airborne, waterborne, or soilborne at the farm where the apples were grown, the warehouse where they were stored, or the store where they are sold.

In order to make the questions shorter and more tractable, half the sample was given the label "produced without pesticides"; the other half received the label "no pesticide residues above federal limits." This design, plus the use of telephone rather than mail questionnaires, allowed for more randomization of the price combinations given to respondents. Each household received one of forty price combinations of certified and regular apples ranging from $0.49 to $1.19 for the unlabeled apples and $0.49 to $1.59 for the certified apples. Different subsamples of respondents were given different sets of prices and label combinations. Respondents were told that all apples would look the same as those they usually buy. They were then asked if they would buy all of one type of apple (labeled or unlabeled), some of both, or none at all, and the quantities of those apples they would likely buy at the stated prices.

Several improvements were also made to the method used to elicit risk perceptions. The van Ravenswaay and Hoehn (1991) study found that there was considerable variation across households in the actions households undertook to avoid pesticide residues. One-third of their sample reported that they washed fresh produce with soap and water, bought organic produce, or grew their own produce. A method needed to be developed to ensure that each household was comparing labeled apples to conventional apples rather than to apples that might have reduced pesticide residues because of its own actions. For example, a person who already bought organic would be likely to compare the labeled apples to organic apples unless we specified otherwise. This was accomplished by asking respondents to consider a person from a household like theirs that did *nothing at all* to avoid or reduce pesticide residues in food.

Another improvement in the risk perception questions was the increased specificity in the meaning of quantitative risk. In the van Ravenswaay and Hoehn (1991) survey, respondents were asked what the chances were that someone from *their* household would have a health problem someday because of pesticide residues in food. To ensure that respondents to the present survey were considering the risk to a person in the whole population, and not just the risk to themselves, we asked respondents in this survey to imagine that there were a million people from households *like theirs* that did nothing to reduce or avoid pesticide residues in food. We then asked them what they thought the chances are that a person from one of these households would have a health problem someday because of pesticide residues in food. The response categories used in the van Ravenswaay and Hoehn (1991) survey were modified to specify numbers of people out of one million who would be expected to have a health problem someday because of pesticide residues in food.

A third improvement to the risk perception questions was that respondents were asked for a *qualitative* statement of the risks from pesticide residues before being asked for a *quantitative* estimate. Respondents were asked whether they would say there is "no chance," "it is very unlikely," "somewhat unlikely," "somewhat likely," "very likely," or "certain to happen" that someone from a household like theirs would have a health problem someday because of pesticide residues in food. The interviewer used this qualitative answer to prompt the respondent for a quantitative estimate of risks. This approach enabled us to examine the correlation between a qualitative, but more easily understood estimate, and a quantitative, but more precise estimate. In fact, we found the two measures to be highly correlated.

Respondents were also asked an open-ended question about the types of health problems they associated with pesticide residues. The van Ravenswaay and Hoehn (1991) survey asked close-ended questions which may have prompted respondents to choose health effects they would not otherwise have thought of.

Finally, a method was developed to measure respondents' ambiguity about their qualitative and quantitative risk estimates. Since we generally do not know the exact specification of the respondents' second-order probability (SOP) distribution around the mean probability, measuring the variance, or spread, of the SOP is not generally feasible. Several alternative measures of ambiguity have been developed. For example, Becker and Brownson (1964) used the "range" of the SOP as a measure of ambiguity. They assume the SOP is a uniform distribution, the distance between the lowest and highest points on this distribution is the "range." The longer the range, the more ambiguity. Ambiguity can also be measured by the "degree of confidence" one has in the point estimate of the probability of an outcome (Ellsberg 1961). This approach assumes there is a confidence interval around the mean probability of an outcome. Confidence, then, is an indicator of the "spread" of the probability distribution around the probability. The higher the confidence, the smaller the confidence interval. Confidence can be measured in terms of a probability ("I am 95 percent sure that the probability of outcome x is 0.75") or in qualitative terms ("I am 'very sure' that the probability of outcome x is 0.75").

Ambiguity in this research is measured by asking survey respondents how *sure* they are about their estimate of the probability of an adverse health outcome. A Likert scale (1 = very sure, 2 = somewhat sure, 3 = somewhat unsure, 4 = very unsure) was used to measure confidence in risk estimates. This measure is used as a proxy for the spread, or variance, of the second-order probability distribution.

Questions were also developed to determine the sources of ambiguity. We hypothesized that ambiguity stemmed from two sources: (1) uncertainty about current residue levels in food and (2) uncertainty about the relationship between residues and their associated health effects. Ambiguity about residue levels should be high if respondents feel that current federal standards were not being adequately enforced. Ambiguity about the relationship between residue levels and health effects should be high if respondents feel that scientists did not understand the true health effects of pesticides or if respondents believed that scientists were not honest with the public about the true health effects. Questions about these hypotheses were incorporated into the survey.

All questions that were added to or revised in the van Ravenswaay and Hoehn (1991) questionnaire were pretested using personal interviews. The entire questionnaire was pretested in telephone interviews conducted by trained interviewers. This allowed us to develop detailed instructions on how interviewers should handle unusual or difficult situations, thus improving the reliability of data collection.

Some Survey Results

The target population for this study was Michigan households that purchase food. The sample consisted of the telephone numbers of 1,730 randomly selected households in Michigan purchased from Survey Sampling Incorporated (SSI). The sample purchased from SSI was drawn using Random Digit Dialing (RDD). The surveys were conducted with adults over the age of 18 who did most of the food shopping for their household. They were conducted by telephone during June and July 1992. Sixty-seven percent (1,003 households) of the eligible households contacted completed the survey, 33 percent (484 households) of those contacted refused to be surveyed. The telephone interviews were conducted by the Institute for Public Policy and Social Research (IPPSR) at Michigan State University.

The perceived risk level from pesticide residues in food based on survey responses is presented in Table 14.1. The average perceived risk is between 1 in 10,000 and 1 in 1,000. This is the same mean perceived risk found by van Ravenswaay and Hoehn (1991), although the wording of the questions differs between the two surveys. However, many fewer households in our study perceived no chance or a chance of 1 in a million. This result was expected because the earlier survey did not control for the possibility that consumers may have been taking different types and amounts of actions to reduce or avoid pesticide residues in food.

The results shown in Table 14.1 indicate that people have very divergent subjective estimates of the risk from pesticide residues in food. Consequently, surveys that assume that risk perceptions among all consumers are the same would lead to incorrect estimates of willingness to pay for risk reduction.

In addition to the questions about the mean perceived health risk, Michigan respondents were also asked to indicate their level of ambiguity about risk. Despite the difficult nature of quantitatively assessing risks, Table 14.2 shows that 23 percent of respondents were very sure about their risk estimates, 45 percent were somewhat sure, 20 percent were somewhat unsure, and only 5 percent were very unsure. The results of this question demonstrate that people have different levels of confidence in their risk estimates (i.e., the spread of the SOP varies by individual). The contingent valuation survey method used here allows us to gauge this sureness and then use it as a product attribute that affects willingness to pay for residue reduction.

The risk levels presented in Table 14.1 are the perceived risks associated with the consumption of conventionally produced foods. If foods are labeled for different levels of pesticide residues, many people will perceive that those risks change. Table 14.3 shows the risk reduction, in percentage terms, people felt they would be getting if foods were labeled as indicated.[3] As expected, respondents felt they got more risk reduction when foods are "produced without pesticides" than when foods "meet federal standards." However, the difference in risk reduction between the two labels is not large, indicating that consumers may perceive current federal standards as substantially reducing risks.

Figure 14.1 shows the types of heath effects people associate with pesticide residues in food. The question asked was, "Suppose someone from a household like yours had a health problem someday that resulted from the current levels of pesticide residues in food. In your opinion, what would the health problem most likely be?" (open-ended). The results indicate that while there are a variety of health problems associated with pesticide residues in food, more than 50 percent of respondents believe cancer is the most likely illness.

TABLE 14.1 Perceived Chance of a Health Problem

Response (Prompted)	Percent Respondents
Question: "Suppose there were a million people from households like yours who did nothing to reduce or avoid pesticide residues in food. What do you think the chances are that a person from one of these households would have a health problem someday because of pesticide residues in food?"	
No chance	2.4
1 in a million	4.1
1 in 100,000	14.1
1 in 10,000	23.0
1 in 1,000	22.8
1 in 100	10.8
1 in 10	8.4
Certain to happen	8.2
Don't know/no opinion/refused to answer	6.3

Note: N = 1,003. Figures may not add to 100 percent due to rounding.

TABLE 14.2 Sureness About Health Risk

Response (Prompted)	Percent Respondents
Question: "How sure are you that the chance of a health problem is ____?" (Blank filled in with respondent's estimate.)	
Very sure	23.4
Somewhat sure	44.7
Somewhat unsure	19.9
Very unsure	5.3
Don't know/no opinion	6.7

Note: N = 1,003. Figures may not add to 100 percent due to rounding.

Table 14.4 shows respondents' attitudes towards both the government and the scientific community. Respondents were asked to what extent they agreed with the statements given. This table attempts to capture the source of ambiguity

TABLE 14.3 Perceived Reduction in the Risks from Pesticide Residues When Foods Meet Federal Standards for Pesticide Residues or Are Produced Without Pesticides

	Label: "Meets Federal Standards" N = 434	Label: "Produced Without Pesticides" N = 418
Percent Reduction	**Percent Respondents**	
Question: "Now suppose that all foods met the federal standard for pesticide residues (split sample received: Now suppose that pesticides were not used in producing foods). What percent do you think that would reduce the chances of a health problem happening someday to people who currently do nothing to reduce or avoid pesticide residues?" (open-ended)		
0	0.9	1.7
0 to 20	10.6	13.4
20 to 40	14.3	7.2
40 to 60	28.1	29.9
60 to 80	21.9	19.4
80 to 99	9.4	13.2
100	4.1	15.3
Refused/no answer	10.6	0.0

Note: N = 852. Respondents who answered "there was no chance of a health problem," or who answered "don't know/no opinion/refused" to the question in Table 14.1 were not asked this question. Figures may not add to 100 percent due to rounding.

in people's risk estimates. It appears that ambiguity does not stem overwhelmingly from one source, although it does seem that ambiguity derives less from scientific uncertainty about risks than from the trustworthiness of scientists and government regulators.

Finally, Table 14.5 shows respondents' purchase intentions for labeled and unlabeled apples at different prices. The table gives the percentage of respondents indicating they would buy that type of apple if both labeled and unlabeled apples were available. The data do *not* indicate the quantities purchased. There was not a large difference in purchase intentions between the subsample that evaluated the "meets federal standards" label and the subsample that evaluated the "produced without pesticides" label. This is evidence that there may be substantial value in reducing ambiguity about whether foods meet current federal standards for pesticide residues.

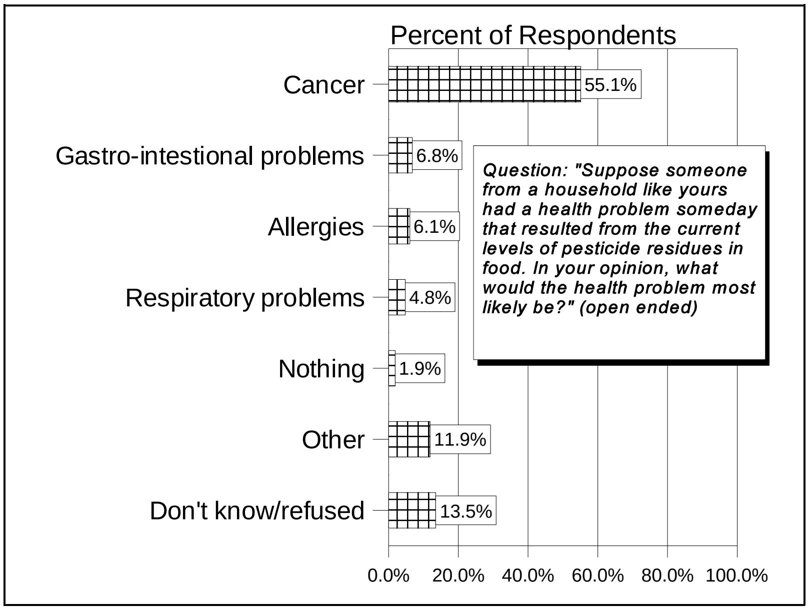

FIGURE 14.1 Health Effects Perceived to Be Associated with Pesticide Residues in Food

It is apparent from Table 14.5, that the difference in price between labeled and unlabeled apples is an important factor in respondents' decisions to purchase labeled apples. Respondents were interested in labeled apples only if the price was low enough relative to unlabeled apples. Specification of substitution possibilities is clearly important.

A Critique of Survey Methods

The results from contingent valuation surveys are often criticized because of the large divergence between what people *say* they will do, and what they *actually* do. Carson (1991) has developed a series of criteria for designing constructed markets to increase the reliability of the results. His criteria focus on the theoretical accuracy and policy relevance of the scenario offered in the survey, as well as on the extent to which the scenario is understandable, plausible, and meaningful to respondents. We use these criteria to evaluate the strengths and weaknesses of the contingent valuation survey design used in this study.

TABLE 14.4 Attitudes Toward the Government and the Scientific Community

Statement	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't Know/ No Opinion/ Refused
	Percent Respondents				
I trust the federal government to set the same standards that I would set in limiting the amount of pesticide residues allowed in food.	14.2	37.9	25.7	22.0	0.2
I trust that once the federal standards are set, all the food I buy will meet those standards.	13.6	38.0	27.8	20.0	0.6
The scientific community can be trusted to be truthful about what they know about health risks from pesticide residues.	12.5	39.7	25.4	21.1	1.3
The health risks associated with current levels of pesticide residues in food are well known and understood by the scientific community.	22.0	39.6	23.2	12.8	2.4

Note: N = 1,003. Figures may not add to 100 percent due to rounding.

TABLE 14.5 Willingness to Buy Labeled and Unlabeled Apples

Type of Apple	Percent Respondents Indicating Willingness to Buy Type of Apple			
	Label: No Pesticide Residues Above Federal Standards		Label: Produced Without Pesticides	
	Price Difference: $0.20 or less	Price Difference: $0.30 or more	Price Difference: $0.20 or less	Price Difference: $0.30 or more
Regular apples	16.8	30.4	16.1	26.7
Certified apples	71.1	48.5	68.3	50.3
Some of both	8.4	15.2	9.1	14.1
None at all	3.2	4.4	4.8	8.4
Don't know/refused	0.5	1.5	1.6	0.5

Note: N = 1,003. Figures may not add to 100 percent due to rounding. Numbers in table are percentages selecting type of apple at given prices, *not* how much would be purchased.

To guarantee theoretical accuracy, the researcher must ensure that features of the created scenario are compatible with economic theory. For example, property rights must be clearly specified, the respondent's budget constraint must be binding, substitution possibilities must be clearly indicated, and the payment mechanism for the good in question should result in accurate statements of value.

The theoretical framework outlined above warrants the use of a private-goods market. We use weak complementarity to justify the use of demand analysis as an approach to measuring willingness to pay for risk reduction. Weak complementarity requires that the benefit of risk reduction accrue only if the good is consumed (people do not benefit from reduced risk to others). The private market for apples is thus an appropriate setting for measuring willingness to pay for risk reduction.

The budget constraint of the respondent is likely to be binding since respondents were given the prices of goods in a market setting. It is doubtful that respondents would strategically exaggerate the number of apples they would buy at these prices. It is also unlikely that people would have difficulties making decisions about products. Most people buy apples; it is easy for them to accurately predict their purchasing behavior.

It is important in survey design to incorporate substitutes for the good in question. Otherwise, people are responding to questions out of the context in which they would actually be required to make payments. Our constructed market consisted of both labeled and unlabeled apples, with the prices for both indicated. Since labeled apples are considered the closest substitute for regular apples, this approach guarantees that people are considering a realistic buying scenario.

Respondents are given the choice to buy some of either type of apple, some of both, or none at all. Respondents do not then have incentives to over- or understate their purchase intentions. Since it is doubtful that market goods would succeed if demand for the product does not materialize, respondents are also unlikely to think that their responses to a survey will make a difference in the ultimate provision of the good. Respondents probably do not misrepresent their purchase intentions in the hopes of influencing a policy outcome.

Since our investigation is based on a goods-characteristics model, we designed the questionnaire such that the results indicate the value of only the food safety attribute in question. To ensure this, we structured the scenario such that respondents would assume that other product attributes did not vary. This was accomplished by asking respondents to consider the variety of apples they normally bought and to assume that the quality of all apples was the same as they normally observed.

It is important that the results of the survey be relevant to policy makers. Our survey considered not only how consumers value changes in the risks from pesticide residues but also the effect of food labeling on consumer choice.

These are both issues of interest to decision makers in the area of food safety policy. The methods we developed to elicit perceptions about risks from pesticide residues and ambiguity about those risks can be used in any application that requires an understanding of consumers' perceptions of risk.

One could question the policy relevance of a scenario that considers a market where apples are the only product tested and certified for residue levels. If policy makers were to require apples to be tested and certified, they would probably also require that other produce be tested and certified. However, we believe that respondents are unable to accurately predict and describe their behavior in the more general scenario where *all* foods are described as being tested for pesticide residues. This scenario would require changing the prices of all substitutes for apples; creating an easily understandable scenario then becomes infeasible.

As the name implies, the results of contingent valuation studies are contingent upon the scenario presented to respondents. The highly specific scenario given to respondents in this survey makes it difficult to generalize the results. However, the specific scenario offers the advantage of yielding more valid results from the point of view of economic theory and respondent comprehension.

Respondents will be more able and motivated to accurately predict their behavior if the scenario presented to them is understandable, plausible, and meaningful. Although contingent valuation surveys commonly ask respondents to directly state their willingness to pay for specific goods or services, this research did not use this approach. Instead, we ask respondents how many apples they would likely buy under different scenarios. We then use the information to estimate willingness to pay for risk reduction. Since consumers are more likely to have to make market choices than to be asked to pay directly for reduced risks, the market scenario is more understandable, plausible, and meaningful to respondents. We studied respondents' buying patterns of apples because most households purchase apples, apples have been associated with pesticide residues in the media, and using apples allows people to predict their behavior under very familiar and likely circumstances.

One of the goals of this research was to develop reliable methods of soliciting risk perceptions. Extensive pretesting of the survey instrument was therefore conducted to ensure that questions were thoroughly understood. Cross-tabulations between qualitative and quantitative responses to risk questions suggest that respondents did, in fact, understand the nature of the quantitative risk assessments they were asked to make. Careful consideration was also given to the order of questions. The survey was designed to first get respondents thinking about their current apple purchasing behavior before asking them to make hypothetical purchasing decisions.

Many studies involving decisions under risk present respondents with scientific or objective risks and then assume that respondents use those estimates in their decision calculus. In some cases, this approach may be useful, but the presentation of the objective risks should be coupled with questions that examine how such information alters risk perceptions. We cannot assume that respondents accept objective estimates of risk without consideration of their own experience and other information. In this research, we ask respondents to make their own assessment of the risks involved in pesticide residue consumption. This is a more realistic scenario since consumers are generally forced to make their own risk assessments before making purchase decisions. Furthermore, scientific or objective risk assessments are not generally available to consumers. To ensure that respondents understood the questions, risk perception questions were worded to allow respondents to think in terms of numbers of people affected rather than just in probabilities.

Our survey also allows examination of ambiguity about risk. Questions were asked about how "sure" respondents felt about their risk estimates. Because there is a lot of uncertainty about the risks from pesticide residues, ambiguity may be an important factor in explaining consumers' willingness to pay for risk reduction. We also believe that allowing respondents to express their uncertainty about the health risks from pesticide residues improves the validity of the risk perception measures. When respondents are given the opportunity to express their reservations, they feel less pressure to be right, and are then more likely to give their best estimate of the risk instead of giving worst- or best-case estimates. We are interested in respondents' judgements of the most likely estimate of risk.

We believe that additional research is needed to improve the validity of the methods of eliciting both risk and ambiguity perceptions. The methods described here should be tested against other possible approaches. We also need to further explore the possibility that food safety and nutrition involve risks that are ambiguous to consumers. The better we understand how consumers manage risks, the better we may be able to bridge the gap between scientists' understanding of the risks from pesticide residues and respondents' perceptions of those risks. We could then design policies that protect consumer health *and* ease consumers' anxiety about the risks they face.

Notes

1. Focus groups with consumers conducted by van Ravenswaay and Hoehn (1991) found that organic labels were not interpreted in a consistent fashion by consumers. Furthermore, organic products may be treated with organic pesticides and are not necessarily pesticide-free. Consumers also buy organic products for reasons other than pesticides. For example, some consumers believe organic foods have higher nutrient content and are more tasty.

2. See Camerer and Weber (1992) for a review of models of decision making that incorporate ambiguity.

3. The perceived risk levels associated with the labels can be calculated by applying the perceived risk reduction with the labels to the risk levels in Table 14.1.

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Appendix 14.A

TELEPHONE SURVEY INSTRUMENT

[Please note: all skip patterns and split-sample variations have been removed for better readability of survey. The full survey instrument is available from the authors upon request.]

Hello, is this ____________ (confirm phone number)?

My name is ______________ and I am calling from the Center for Survey Research at Michigan State University.

We are conducting a study on behalf of the Department of Agricultural Economics at Michigan State University regarding pesticide residues in food.

According to our sampling design, I need to speak to the person in the household, who is at least 18 years of age, who does the most grocery shopping. Would that be you?

Before we begin, let me tell you that any information you give me will be kept strictly confidential. Let me also tell you that this interview is completely voluntary. Should we come to any question that you don't want to answer, just let me know and we'll go on to the next question.

Throughout the study, we will be asking for your opinions in terms of the food you buy for your household. Your household includes yourself, your dependents, and persons with whom you share income and household living expenses. We will also be talking about pesticide residues in food. Pesticides are used to control insects, diseases, and other pests that spoil food. To protect consumers' health, the federal government sets standards that limit the amount of pesticide residues that may be in food sold in the U.S.

Q1 In terms of pesticide residues, how confident are you that the food your household eats is safe?

Would you say you are completely confident, mostly confident, somewhat confident, or not confident at all?
<1> COMPLETELY CONFIDENT
<2> MOSTLY CONFIDENT
<3> SOMEWHAT CONFIDENT
<4> NOT CONFIDENT AT ALL
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q2 Suppose someone from a household like yours did nothing at all to reduce or avoid pesticide residues in food. What do you think the chances would be that someone from that household will have a health problem someday because of pesticide residues in their food?

Would you say there is no chance, it is very unlikely, somewhat unlikely, somewhat likely, very likely, or certain to happen?
<1> NO CHANCE
<2> VERY UNLIKELY
<3> SOMEWHAT UNLIKELY
<4> SOMEWHAT LIKELY
<5> VERY LIKELY
<6> CERTAIN TO HAPPEN
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

3a How sure are you that there is ______ of a health problem because of pesticide residues in food? (blank is filled with respondent's answer from Q2)

Would you say you are very sure, somewhat sure, somewhat unsure, or very unsure?
<1> VERY SURE
<2> SOMEWHAT SURE
<3> SOMEWHAT UNSURE
<4> VERY UNSURE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q4 Now I would like to get a better idea about what you mean by _____ (blank is filled with respondent's answer from Q2). Suppose there were a million people from households like yours who did nothing to reduce or avoid pesticide residues in food. What do you think the chances are that a person from one of these households would have a health problem someday because of pesticide residues in food?

Would you say 1 person in a million, 1 in 100,000, 1 in 10,000, 1 in 1,000, 1 in 100, or 1 in 10?
<1> 1 PERSON IN A MILLION
<2> 1 IN 100,000
<3> 1 IN 10,000
<4> 1 IN 1,000
<5> 1 IN 100
<6> 1 IN 10
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q5 How sure are you that the chances are ________ (blank is filled with respondent's answer from Q4).

Would you say you are very sure, somewhat sure, somewhat unsure, or very unsure?
<1> VERY SURE
<2> SOMEWHAT SURE
<3> SOMEWHAT UNSURE
<4> VERY UNSURE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q6 Is there anything you usually do to reduce or avoid pesticide residues in your food? (open-ended, field coded)
<1> YES: specify
<5> NO
<98> DON'T KNOW
<99> REFUSED

Q7 Suppose someone did the same things you usually do to reduce or avoid pesticide residues in food.

What percent do you think that would reduce the chances of a health problem happening some day?
<0-100> ENTER EXACT PERCENT
<998> DON'T KNOW/NO OPINION
<999> REFUSED/NO ANSWER

Q8 Next, I am going to read you two statements, please tell me to what extent you agree or disagree with each of them.

I trust the federal government to set the same standards that I would set in limiting the amount of pesticide residues allowed in food.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q9 I trust that once the federal standards are set, all the food I buy will meet those standards.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q10 Now suppose that all foods met the federal standard for pesticide residues. What percent do you think that would reduce the chances of a health problem happening someday to people who currently do nothing to reduce or avoid pesticide residues in food?
<0-100> ENTER EXACT PERCENT
<998> DON'T KNOW/NO OPINION
<999> REFUSED/NO ANSWER

Q11 Suppose foods were tested and certified to meet federal standards for pesticide residues. Which of the following organizations do you feel would be the most effective in conducting the tests and issuing certificates?

Would you say the federal government, the state government, a well known consumer's group, or some other organization?
<1> FEDERAL GOVERNMENT
<2> STATE GOVERNMENT
<3> A WELL KNOWN CONSUMER'S GROUP
<4> SOME OTHER ORGANIZATION: SPECIFY
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q12 Suppose the federal government did the testing and certifying. How effective do you think such a program would be in ensuring that foods had no pesticide residues above federal standards?

Would you say very effective, somewhat effective, somewhat ineffective, or totally ineffective?
<1> VERY EFFECTIVE
<2> SOMEWHAT EFFECTIVE
<3> SOMEWHAT INEFFECTIVE
<4> TOTALLY INEFFECTIVE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

[Note: Half the sample received questions 10, 11, and 12 with "foods were produced without pesticides" replacing "foods met federal standards."]

Q13 Suppose someone from a household like yours had a health problem someday that resulted from the current levels of pesticide residues in food. In your opinion, what would the health problem most likely be? (open-ended, field coded)

Q14a Next I would like to ask a few questions about where you get your information about the health risks of pesticide residues.

In the past 6 months have you gotten information about the health risks of pesticide residues from a television program?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q14b In the past 6 months have you gotten information about the health risks of pesticide residues from your doctor or health specialist?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q14c In the past 6 months have you gotten information about the health risks of pesticide residues from an article in a magazine?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q14d In the past 6 months have you gotten information about the health risks of pesticide residues from a newspaper?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q14e In the past 6 months have you gotten information about the health risks of pesticide residues from a health newsletter?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q14f In the past 6 months have you gotten information about the health risks of pesticide residues from a radio program?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q14g In the past 6 months have you gotten information about the health risks of pesticide residues from family, relatives, or friends?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q14h In the past 6 months have you gotten information about the health risks of pesticide residues from any other sources? (open-ended, field coded)
<1> YES: SPECIFY

Q15 Next, I am going to read you several statements. In these statements, the term 'plants and animals' refers to plants and animals produced for food. Please tell me to what extent you agree or disagree with each of them.

If plants and animals were not protected in any way from insects, diseases, or other pests, the supply of food available to me would decrease.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q16 If plants and animals were not protected in any way from insects, diseases, or other pests, the food available to me would not look as good as it does now.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q17 If plants and animals were not protected in any way from insects, diseases, or other pests, the price of food available to me would increase.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q18 There are many equally effective ways other than using pesticides to protect plants and animals from insects, diseases, or other pests.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q19 It is more expensive to use other ways of protecting plants and animals from pests than it is to use pesticides.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q20 The scientific community can be trusted to be truthful about what they know about health risks from pesticide residues.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?

<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q21 The health risks associated with current levels of pesticide residues in food are well known and understood by the scientific community.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q21a Food labeled as organic means the food is grown without pesticides.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?)
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q21b All food that is labeled as organic has been certified by a reputable laboratory to have been organically grown.

Would you say you strongly agree, somewhat agree, somewhat disagree, or strongly disagree?
<1> STRONGLY AGREE
<2> SOMEWHAT AGREE
<3> SOMEWHAT DISAGREE
<4> STRONGLY DISAGREE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q22 The next few questions are about your food shopping routine.

How often is the grocery shopping done in your household? (open-ended, field coded)

Q23 In the past year, has your household bought any fresh apples?
<1> YES
<5> NO
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q23a When you buy fresh apples, do you usually buy them individually, by the pound, by the bag, by the peck, or by the bushel? (open-ended, field coded)
<1> INDIVIDUAL
<2> POUNDS
<3> BAGS
<4> PECK
<5> BUSHEL
<0> OTHER (SPECIFY)
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q23b How many individual apples or pounds are usually in a bag?
<1-997>
<998> DON'T KNOW/NO OPINION
<999> REFUSED/NO ANSWER

Q24 About how often does your household buy fresh apples in the fall? (open-ended, field coded)

Q24a When you buy fresh apples in the fall, on average, how many apples do you buy each time?
<0-997>
<998> DON'T KNOW/NO OPINION
<999> REFUSED/NO ANSWER

[Note: Q24 and Q24a were asked with "winter," "spring," and "summer" replacing fall.]

Q28 Now, suppose it is next fall and you are planning to buy some fresh apples. The quality of all fresh apples is what you normally expect. Apples sold loose and prepackaged are all the same price per pound. The prices of all fresh fruits other than apples are what you normally expect.

How many apples of your usual variety would you buy if all fresh apples were ________ (blank filled with one of several prices) per pound?

Q29 Now suppose you could also buy apples of your usual variety that have been tested and certified by the federal government to have no pesticide residues above federal standards. Fresh fruits other than apples are not certified. The certified apples are ______ per pound compared to _________ (blanks filled with one of several price combinations) per pound for the regular apples.

Would you buy certified apples, regular apples, some of both, or none at all?
<1> REGULAR APPLES
<2> CERTIFIED APPLES
<3> SOME OF BOTH
<4> NONE AT ALL
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q29a How many of the certified apples would you buy _____ (blank filled with one of many prices) per pound?
<0-997>
<998> DON'T KNOW/NO OPINION
<999> REFUSED/NO

Q29c How many of the regular apples would you buy ____ (blank filled with one of several prices) a pound?

[Note: Split sample variation of Q29, Q29a, and Q29c: "Tested and certified to have been produced without pesticides."]

Q31 The last few questions are for statistical purposes only. We need the information to compare your opinions with the other households we are interviewing across Michigan.

How many people in your household are under 5 years of age?
<0-97>
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q31a How many people in your household are between 5 and 18 years of age?

<0-97>
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q31b (Including yourself), how many people in your household are between 19 and 64 years of age?
<0-97>
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q31c (Including yourself), how many people in your household are over 64 years of age?
<0-97>
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q32 Respondent's gender:
<1> MALE
<5> FEMALE
<8> DON'T KNOW/NO OPINION
<9> REFUSED/NO ANSWER

Q33 What is your age?
<18-100>
<998> DON'T KNOW/NO OPINION
<999> REFUSED/NO ANSWER

Q34 What is the highest grade of school you have completed?
<0> GRADE SCHOOL ONLY
<1> DID NOT FINISH HIGH SCHOOL
<2> HIGH SCHOOL OR GED
<3> VOCATIONAL OR TECHNICAL SCHOOL
<4> SOME COLLEGE
<5> COLLEGE GRADUATE (BA, BS)
<6> SOME GRADUATE OR PROFESSIONAL SCHOOL
<7> GRADUATE DEGREE (PHD, MD, MA, MBA)
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q35 To get a picture of people's financial situations, we need to know the general range of incomes of all respondents we interview. Now, thinking about your household's total annual income before taxes from all sources (including your job) in 1991, did your household receive $45,000 or more in 1991?

<0-7>
<3> NO
<4> YES
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q35a Was it $30,000 or more?
<3> YES
<2> NO
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q35b Was it $20,000 or more?
<2> YES
<1> NO
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q35c Was it $10,000 or more?
<1> YES
<0> NO
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q35d Was it $50,000 or more?
<5> YES
<4> NO
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q35e Was it $60,000 or more?
<6> YES
<5> NO
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER

Q35f Was it $70,000 or more?
<7> YES
<6> NO
<98> DON'T KNOW/NO OPINION
<99> REFUSED/NO ANSWER