

AN ABSTRACT OF THE THESIS OF

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Consumers' risk perceptions are examined to explain the underlying reasons for consumer concern associated with milk from dairy herds treated with recombinant bovine growth hormone (rbGH). A focus group study was employed as an initial step in exploring the primary influences of consumer apprehension toward rbGH's use. The information obtained through the focus group sessions was invaluable in strengthening empirical measures of the factors affecting risk perception, and in formulating concise survey questions for a national study. Data from a nationwide survey of 1,910 primary household food purchasers were used in understanding the influence of risk characteristics on consumers' risk perceptions toward rbGH treated herd milk, as well as investigating consumer risk perception profiles. One conclusion is evident from the data, consumers remain concerned about the rbGH product despite FDA approval for commercial use. Results suggest that particular characteristics of the rbGH product hypothesized as being more risky and less tolerable elicit consumer outrage perceptions. Results also showed systematic differences between consumers, producing a range of risk perception profiles.

Overall, the results support the idea that consumers' risk perceptions are multi-dimensional and differ in emphasis compared to the risk assessments by scientific experts. Consumers' risk perceptions warrant recognition as playing a vital role in product acceptance. A recommendation proposed for those involved in risk assessment is to integrate consumer beliefs and perceptions into assessments of risk, perhaps increasing consumer trust and reducing product apprehension. Additionally, the range of risk perceptions among consumers imply that one public policy strategy is unlikely to satisfy all consumers. Risk communicators can design more effective risk communication strategies by understanding the ways consumers differ in their behavioral response to a particular perceived concern.

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Consumers' Perceptions of Risk: The Case of the
Food-Related Biotechnology, Recombinant Bovine Growth Hormone (rbGH)

by

Deana Lynn Grobe

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Mom and Dad

My Family

Ultimate Frisbee Gang

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CONSUMERS' PERCEPTIONS OF RISK: THE CASE OF THE FOOD-RELATED BIOTECHNOLOGY, RECOMBINANT BOVINE GROWTH HORMONE (rbGH)

CHAPTER 1: INTRODUCTION

Problem Statement

Biotechnology applications in food production, processing, and distribution are spreading rapidly into the daily lives of consumers. Recombinant bovine growth hormone (rbGH) is one such food-related biotechnology application used to increase milk production. With the advent of rDNA technology in 1973, the possibility arose to produce large amounts of rbGH for commercial use. rbGH is a synthetic version of the naturally occurring bovine growth hormone (bGH). Through gene splicing, the DNA for bGH is extracted from the pituitary gland of cows and inserted into *E. coli* bacteria, where it reproduces and replicates the gene. A similar technology is used to produce human insulin for diabetics. When administered subcutaneously, rbGH markedly improves the productive efficiency in lactating cows (Douthitt, 1991). Lactating efficiency is increased by coordinating the metabolism of body tissues, enhancing nutrients used for milk synthesis.

The use of rbGH in the dairy industry is supported by the industry's goals of greater efficiency. Injecting rbGH into dairy cows is estimated to increase milk production by 10-25 percent. Approval for commercial use of rbGH was granted in 1994 by the Food and Drug Administration (FDA) after scientific evidence was presented showing it was safe for human consumption, and had no adverse impact on cattle (Centner & Lathrop,

1996). Because the FDA ruled there was no difference in the milk from treated versus untreated cows they did not require any special labeling of meat or dairy products from cows treated with rbGH (Ropp, 1994).

With the use of new technologies in food production and increased knowledge of the link between diet and health, consumers are asking more questions about food quality and safety (Huang, 1991). Specifically, a significant percentage of consumers expressed concern about the safety of new biotechnology-derived products (OTA, 1992).

Approximately half of the consumers surveyed in a recent Food Marketing Institute (1996) survey felt "food produced by biotechnology" was "somewhat of" or "a serious health risk."

Being the first animal-specific biotechnology to have been approved for the marketplace, rbGH is considered a test case shaping the public's acceptance of innovative biotech food products. Before FDA approval of rbGH, studies of consumer acceptance found apprehension (for synopsis of studies see Smith & Warland, 1992). Comparably, results from an economic model on risk perceptions supported the notion of an overestimation of risks by consumers toward the use of rbGH (Grobe & Douthitt, 1995). These risk perceptions were inconsistent with industry studies reviewed and approved by the FDA, documenting the safety of food products from animals treated with rbGH (Juskevich & Guyer, 1990). As a result, scientific experts have become frustrated because they feel consumer concerns are unwarranted (Groth, 1990). They have failed to recognize that consumers place emphasis on the subjective dimensions of risk, whereas scientific

experts base risk assessment on the objective or actual statistical probability of harm from an event (Lowrance, 1976).

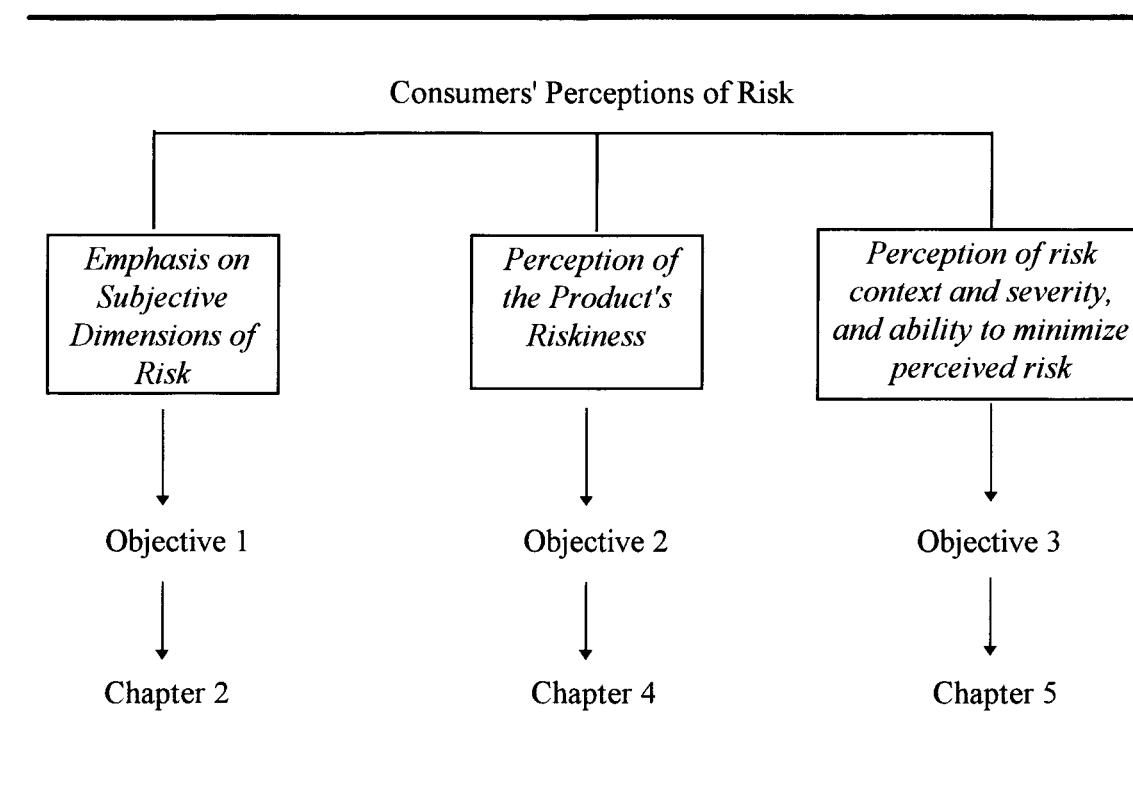
Consequently, industry's failure to account for consumers' concerns and attitudes, such as those toward the use of rbGH, could result in industry choices that are at odds with the preferences and choices of consumers. Bridging this gap requires understanding consumers' risk perceptions toward this product.

Theoretically, risks perceived by consumers have been speculated to (a) be a function of the consumer's perception of the product's riskiness, perceiving characteristics of the product as being less risky/more risky or more tolerable/less tolerable (Hadden, 1989; Sandman, 1989); and (b) vary depending on consumers' perceptions of the risk context and severity, and their ability to minimize risk (OTA, 1992; van Ravenswaay, 1995). Although researchers have explored these aspects of risk perception in various contexts, there is a lack of reliable research on food-related risks, and a need for more detailed research into specific risk issues (Sparks & Shepherd, 1994). In particular, the literature on risk perceptions toward biotechnology produced products is sparse, consisting of descriptive opinion studies and anecdotal evidence in support of theoretical speculation (Douthitt, 1995).

In summary, theory posits that emphasis should be placed on (a) the subjective dimensions of risk, (b) consumers' perceptions of the product's riskiness, and (c) consumers' perceptions of risk context and severity of harm, and their ability to minimize risk when attempting to understand consumers' risk perceptions. Figure 1.1 illustrates how

these theoretical perspectives of risk perception are linked with this study's objectives and framework.

Figure 1.1. Diagram linking theoretical perspectives of risk perception with this study's objectives and framework.



Purpose of the Study

The purpose of this study was to understand consumers' perceived risk from consuming milk produced with rbGH now that it is commercially available. The objectives of this research were as follows:

Objective 1:

Explore underlying influences of consumer apprehension associated with the use of rbGH from a qualitative perspective. The insights gained will be used in combination with past research findings to design a survey instrument for an empirical survey. Findings from the focus group study are discussed in Chapter 2.

Objective 2:

Understand the influence of risk characteristics on consumers' risk perceptions toward rbGH treated herd milk. Identification of consumers' perceived risk is an essential input into the analysis of current and future food demand. Chapter 4 contains an article focusing on modeling and estimating the influence of risk characteristics, described as outrage factors by Hadden (1989), on consumers' risk perceptions toward milk produced with rbGH.

Objective 3:

Investigate the classification of consumers as to how they respond to their risk perceptions toward the use of rbGH. The results of this investigation are intended to motivate more effective risk communication strategies. An article on consumer risk perception profiles can be found in Chapter 5.

CHAPTER 2

Risk Perceptions Expressed by Consumers Toward Milk Produced With rbGH

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In recent decades, new technologies have emerged in the food industry modifying traditional foods such as sweeteners and fat substitutes. New technologies have also been developed to reduce food-borne illnesses and extend the shelf-life of foods (Blumenthal, 1990). Recombinant bovine growth hormone (rbGH) is the first animal-specific biotechnology used to increase milk production. It is a synthetic version of the naturally occurring bovine growth hormone (bGH) found in cows. bGH is produced in the cows pituitary gland and stimulates milk production (Ropp, 1994). Large scale production of rbGH is accomplished by extracting and inserting the DNA for bGH into bacteria, which reproduce, replicating the gene. Increasing the cows' level of this hormone stimulates milk production and increases feed efficiency. The cow's overall efficiency improves by spreading the cow's body maintenance over a larger milk production, boosting their production of marketable milk by approximately 20%. In November, 1993, the Food and Drug Administration (FDA) approved rbGH use based on scientific evidence showing it was safe for human consumption, and had no adverse impact on cattle (Centner & Lathrop, 1996). After a 90 day moratorium, rbGH was available for commercial use. Nonetheless, the future of this rbGH technology ultimately depends upon consumer acceptance.

Consumers' desire for natural food encompasses using traditional methods of production, thus they are wary of the need for and safety of new technologies (Busch, 1991). Introduction of new food technologies such as irradiation and biotechnology have met with consumer resistance. Consumers believe they are faced with technologies imposing risk, that are increasing in complexity and unfamiliarity, and that offer few

consumer benefits (Centner & Lathrop, 1996; Senauer, Asp, & Kinsey, 1991). Prior to FDA approval of rbGH, studies reported consumer apprehension about consuming milk from rbGH treated cows (Douthitt, 1991; Fine, Travis, & Associates, Inc., 1986; Kaiser, Scherer, & Barbano, 1992; McGuirk, Preston, & Jones, 1992; Slusher, 1990). A consumer focus group study was one of the first studies exploring the marketability of rbGH by investigating consumer acceptance and consumption patterns (Fine, et al., 1986). Participants expressed skepticism regarding the presence of synthetic hormones in the milk they otherwise viewed as being pure and natural. Some participants indicated sufficient concern that they reduced their milk consumption (Fine, et al., 1986). Survey research explored this issue, finding comparable results. When prompted about the nature of their apprehensions, consumers indicated concern about human safety issues, loss of confidence in the government's ability to protect the safety of the milk supply, questionable economic benefits for consumers, economic concerns for small farmers, and concern for animal welfare (Douthitt, 1991; Kaiser, et al., 1992; McGuirk, et al., 1992; Slusher, 1990).

However, few of these studies explain the underlying reasons for consumer concern. For example, what has led consumers to distrust government assurances of risk? In addition, now that rbGH is FDA approved and available commercially, research on consumer attitudes is sparse. Although dramatic shifts in consumer acceptance may not be observed in light of this new information, studying risk averting strategies is relevant.

The purpose of this article was to provide a more comprehensive understanding of the factors affecting consumers' risk perceptions toward milk produced with rbGH. A focus group study was conducted exploring the participants' perceptions of the FDA

approved biotechnology, rbGH. The first objective of this article was to use participants' insights to identify risk perception factors, validating results from previous, mostly quantitative research. In addition to probing risk perceptions, a second objective of this article was to evaluate how those perceptions were linked with personal characteristics, in particular, understanding the relationships of gender and income associated with rbGH. Researchers have found female food purchasers perceive greater risks than males, and have found inconsistencies in the effect of income on consumers' risk perceptions toward rbGH treated herd milk (Grobe & Douthitt, 1995; McGuirk, et al., 1992). Therefore, three different focus groups were chosen to compare differences by gender and income. A third objective of this article was to use the information obtained through these focus groups to develop empirical measures of the factors affecting risk perceptions, and formulate concise survey questions for a national study.

Methods

Three focus groups, varying between seven to nine participants per group, were conducted in an Oregon county in the Fall of 1994. The groups represent differences in gender and income. One sample was composed of low-income women; the second sample was composed of middle- to high-income women; and the third sample was composed of middle- to high-income men. A low income men's group was not included given time constraints and financial limitations. Convenience sampling techniques were used to identify samples for the middle- to high-income men and women. Convenience samples

were considered adequate for this research as the authors were interested in exploring relevant and possible relationships of risk perception influences, and were not empirically testing relationships or generalizing to a larger population (Krueger, 1988). Local community groups and businesses provided assistance (e.g., announcements at meetings and in newsletters) in an effort to solicit participants. The sample of low-income women was acquired by seeking individuals who received Women, Infants, and Children (WIC) assistance. WIC's confidential policies prohibited release of recipient identification. Thus, a poster was placed in the WIC waiting room asking for volunteers to participate in a group discussion on food-related biotechnologies. The biotechnologies were described as being (a) a biotechnology product given to cows to increase their milk production, and (b) a biotechnology product given to hogs to increase their growth rate, resulting in leaner pork. All the potential participants were required to be the primary food shopper in the household, and did not necessarily need to be aware of, or have knowledge about either of the two biotechnologies. The authors were interested in the viewpoints of individuals with and without awareness or knowledge of the biotechnologies. The participants were also informed that they would be given a cash reimbursement of \$20 for their time. Those interested contacted the lead researcher who verified the participant's qualifications, and obtained addresses to send further information.

As suggested by Krueger (1988), each participant was sent a letter of invitation two weeks before the focus group session. The participants were asked to attend and participate in a hour and a half long group discussion on two food product biotechnologies. The participants were reassured that they did not need to be aware of, or

have knowledge about either of these biotechnologies, as information would be provided at the group discussion. The letter provided the time, date, place, and the general format of the group discussion. Participants were reminded of the cash reimbursement they would receive at the conclusion of the session.

The facility used for the middle- to high-income focus groups was the Family Study Center at a northwest university, and the low-income focus group was held at a county building. Upon arrival, participants were asked to read and sign an informed consent agreement to participate in the group discussion, as well as to be taped during the session. They were informed that the primary reason for using the tape recorder was to confirm the information they provided. They were assured the transcribed information would not contain any names or imply information about any particular individual, although direct quotes might be used. All participants signed the informed consent.

An experienced moderator and an assistant moderator were present during all three sessions. Although not considered an expert on biotechnology, the moderator was familiarized by the lead researcher about the topic. The moderator's primary role was to facilitate the discussion. During the session, the moderator took notes on large pads of paper at the front of the room. The notes were later used to summarize issues raised by the participants. The moderator interrupted only to clarify a word or phrase contributed by a participant, and would reiterate the question of interest during silent periods. The moderator refrained from answering the participants' questions besides those asking for clarity of the information provided. Instead, the participants were allowed time to answer or pose the question to the group for another participant to answer, or the question

remained unanswered until the end of the session. Given the interest in the risk perceptions of the participants, the moderator had a low level of involvement in the discussion. The assistant moderator handled logistics and tape recording, and noted nonverbal communication between the participants.

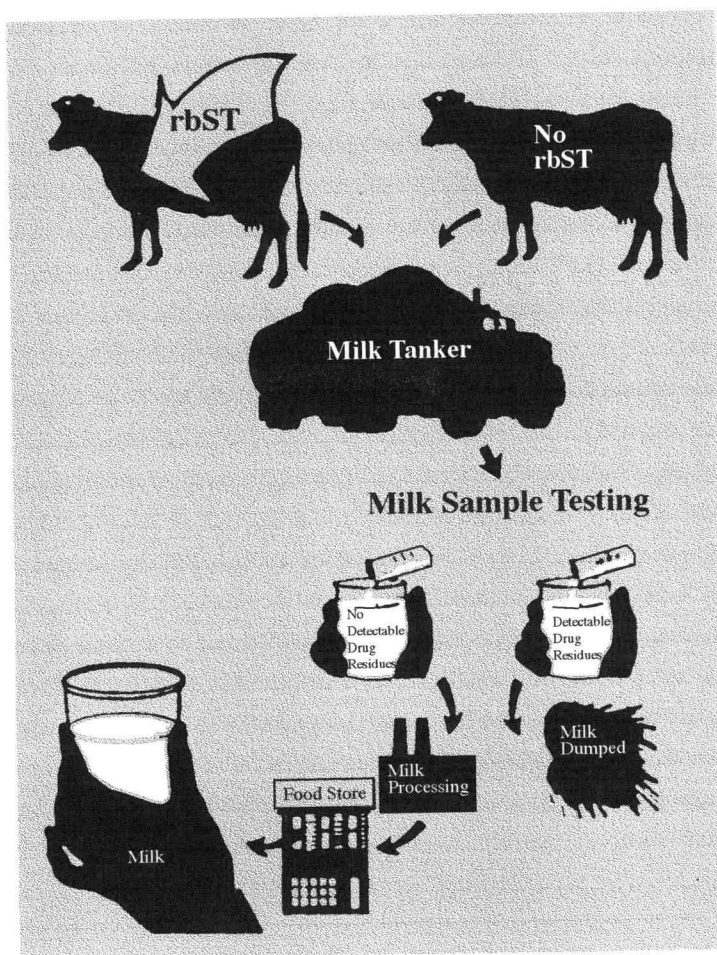
The moderator began with an introduction to the project and provided neutral introductory information on both food product biotechnologies (rbGH and rpGH). The information on rbGH included a diagram (Figure 2.1) visually describing the processing of milk for both rbGH treated and nontreated cows (Ropp, 1994). Additionally, the rbGH information provided by the moderator to the participants included: (a) rbGH is a growth hormone that is produced by technology, and can increase a cow's milk production, (b) approval of rbGH was granted by the FDA in light of scientific evidence showing that humans were at no risk consuming milk or meat from treated cows, (c) the FDA is not requiring any mandatory labeling, (d) potential economic benefits, (e) economic effects on farmers, and (f) animal health effects (Ropp, 1994) (see Table 2.1 for details). Similar information known about rpGH was provided to the participants by the moderator.

After a cursory question and answering session to clarify the information provided, the moderator asked the participants about their milk beliefs, "What are the first things that come to mind when you think of milk?" After a five to ten minute discussion, a similar question was asked about their thoughts toward rbGH. The unstructured discussion on rbGH generally lasted approximately one hour, with a five to ten minute recap, before turning the focus to rpGH.

Figure 2.1. Diagram used to illustrate the processing of milk from rbGH treated and untreated cows.

Processing of Milk Treated with rbST

Milk from rbST-treated and untreated cows is collected in the same manner. Milk from each farm is tested for antibiotic drug residues. If there are unsafe drug residues, the entire tanker of milk is dumped. If no residues are found the tanker delivers the milk to the processor who readies it for market. Antibiotics are used to treat mastitis, an inflammation of the cow's udder, which is more common in rbST-treated cows.



(Source: FDA Consumer, May 1994, p. 26)

Table 2.1. Information Provided to Participants Regarding Recombinant Bovine Growth Hormone

-
- rbGH is a growth hormone, similar to the bGH that is naturally produced by the cow but is now produced by technology, and can increase a cow's milk production.
 - rbGH is sold to farmers by industry.
 - After years of research, scientists conclude that there are no human health risks from consuming milk from cows treated with rbGH.
 - rbGH was approved by the government's Food and Drug Administration in November, 1993 and rbGH was available for sale in February, 1994.
 - The FDA is not requiring labeling of milk that comes from rbGH treated cows.
 - Scientists are not able to find a nutritional difference between milk from treated cows and milk from cows that are not treated with rbGH.
 - The reason for developing rbGH was to produce more milk from fewer cows.
 - One possible benefit of using rbGH may be a decrease in milk prices.
 - Some organizations believe that if there is more milk given the use of rbGH, small farmers may not be able to compete and may go out of business.
 - Researchers are still studying the health effects on cows (mastitis was given as an example) even though the FDA concluded rbGH had no adverse impact on cattle.
-

Data analysis followed the procedures described by Krueger (1988). At the conclusion of each session, the moderator and assistant moderator conducted a debriefing discussion. The purpose of this discussion was to arrive at a short summary of the main risk perception factors expressed in that session. This was accomplished through the discussion by the participants, recalling descriptive phrases or words used by the participants, and noting core issues articulated and summarized by the participants. With participant consent, all three sessions were tape recorded. These tape recordings were transcribed by the assistant moderator. The first reading focused on identifying factors across the groups, whereas the second reading was a verbatim transcription. From these

transcriptions, the assistant moderator produced a descriptive report that was proofread by the moderator, facilitating a three-fold interpretation of the findings.

Sample 1: Low-Income Women

One sample consisted of eight women who were receiving assistance through the Women, Infant, and Children (WIC) program. Therefore, each participant was either expecting a child or had at least a young child in their household. Individuals who have incomes up to 185 percent above the federal poverty level are able to receive Oregon WIC benefits, and thus were considered the low-income group in this study.

Sample 2: Middle- to High-Income Women

Another sample consisted of nine women from middle- to high-income groups (income greater than \$25,000). The middle- to high-income women who participated were affiliated with a northwest university either through charity work or through their husbands' employment, but were not employed themselves at the university. Eight had older children, while one participant had a nine-year-old child.

Sample 3: Middle- to High-Income Men

The final sample consisted of seven men from middle- to high-income groups (income greater than \$25,000). Three worked at a northwest university, and four worked

with local companies. One respondent was known to have younger children, and two were not married. All the participants in each sample were living in a county in Oregon.

The focus of this article was with the rbGH product, thus the findings relate only to this biotechnology. The findings comprise the factors participants identified as important to their risk perceptions toward the rbGH product. Results from prior research are also incorporated where appropriate. The value of these findings was in validating consistent factors and identifying otherwise missed factors influencing risk perceptions associated with consuming milk from rbGH treated herds.

Findings

Before interpreting the nature of concerns expressed by the participants, it is useful to put into context the participants' image of milk and awareness of rbGH's use. Overall, the participants had favorable beliefs (opinions) and images (mental pictures or representations) of milk. They discussed milk as a good, natural product. Women expressed the value of milk as nutritional for children, while men associated images of motherhood and babies with milk. The participants in all three groups expressed either no awareness or limited awareness of the use of rbGH. None of the women from the low-income group were aware of rbGH. Only a few of the middle- to high-income men and women were aware of this biotechnology. The participants' limited awareness prompted many questions initially, but after a brief period of time they became more comfortable in expressing their opinions, especially when the discussion triggered personal experiences

and knowledge. Although one man was very knowledgeable about farm management practices, none of the participants had sufficient knowledge about the rbGH product to dominate or influence the discussion.

Current Human Health Risks

Concerns regarding the current effect of rbGH on human health was found to be a primary concern in prior research, a result verified by participants. The focus group participants offered explanations for this concern. First, there were concerns that the commercial availability of rbGH would effect milk processing. Second, participants were concerned about the safety effects of rbGH because it is a hormone. For example, although the low-income women readily acknowledged their lack of understanding of hormones, these women questioned whether rbGH would affect the immune system, increase their chances of developing cancer, accelerate puberty in their children, or act like a steroid. Third, the participants were concerned that the testing accuracy and milk processing standards were not stringent enough to ensure milk's safety. All these responses originated from the information provided on the rbGH product (see Figure 2.1 and Table 2.1).

The crux of these risk perceptions seemed to be unfamiliarity. The public expects the safety and abundancy of our current food supply without understanding how it has been achieved (Harlander, 1991). This lack of understanding may increase consumer uncertainty toward new innovations derived from biotechnology.

In addition, the health effects on children were a great concern to both the women's groups. The low-income women appeared more concerned, possibly because their children were still living at home. One low-income woman was, "...curious if, just like in human beings, growth hormone had different effects on ages of life, and I would be curious if there is any chance that it could act like a hormone in young children." Another woman from the lower-income group pointed out that children have a lower body weight so they could have a higher concentration and a higher risk. These sentiments were shared by many of the participants. Given milk's central role as an essential nutritional product for children, households with children may perceive greater risk exposure, and be more adverse to milk from rbGH treated herds.

Future Human Health Risks

In every group, the concern about possible delayed health effects was mentioned and associated, in part with a lack of confidence in the FDA's ability to give explicit risk assurances. They were concerned that in five to ten years, the government would discover adverse health effects from consuming products produced with rbGH (Centner & Lathrop, 1996). The participants cited specific products they remembered being recalled "ten years" after introduction into the marketplace.

The biggest thing in my mind I think of, it may be fine in testing and you may not see anything right now, but how can we know? We can't, like the thalidomide thing--it couldn't of been predicted. Here we are dealing with another complex compound. It [rbGH] is a hormone, which often have unpredictable results when it gets in other settings (Remarks from a middle- to high-income man after a participant's comment about FDA approval of DDT).

The testing period for new substances also elicited future health concerns. The participants thought the FDA had not adequately tested the product before approval. One middle- to high-income woman noted "I think that is what I was referring to before when I said the length of time to research and everything... You cannot really travel the road of something until you get at least a generation or so." These underlying reasons for perceived future risks--long-term health consequences, sufficient testing period, competency of scientists and governmental agencies--were similarly cited in an earlier consumer focus group study (Fine, et al., 1986).

Distrust in the Government, Industry, Farmers, and the Media

Trustworthiness in various information sources has been suggested as a factor in consumers' risk perceptions (van Ravenswaay, 1995). McGuirk et al. (1992) found confidence in the government's ability to protect the milk supply to be a significant factor in consumers' decisions to decrease or stop their fluid milk consumption following the introduction of rbGH. For these participants, the notion of distrust was not limited to the government, particularly the FDA, but extended to industry, farmers, and the media. The participants elaborated on why these information sources were seen as untrustworthy. One of the greatest concerns with the FDA was the potential for reversing their decisions in ten to twenty years. "I must say that FDA approval in my mind is not always a sealed agreement, not assured that there are no risk involved for now or in the future" (middle-

to high-income man). Participants felt this way as a result of previous products being recalled.

Additionally, the participants distrusted the motives of the company producing rbGH. "We may have already said this when talking about why are they doing this in the first place, a lot of these things imply a general distrust of drug companies. What are their motives?... I guess we aren't convinced that the drug company is doing this for our benefit, the consumers" (stated by a middle- to high-income woman when summarizing key issues of concern).

Farmers' trustworthiness was questioned by both women's groups. They wondered about the farmer's honesty in informing their dairy cooperative of their rbGH use. Whereas, the two middle- to high-income groups expressed distrust in the media. They questioned their objectivity and felt the press presents biased information.

When presented with new, unfamiliar substances, risk perceptions of consumers may be alleviated if those who deliver the risk assurances are seen as trustworthy sources of information. Consumers may perceive greater trust in information sources from groups or individuals concerned with their interests, providing documentation of long-term testing, and believed to be independent and unbiased.

Economic Factors

All of the participants were concerned with the economic aspects of rbGH. They questioned the benefits of potentially lower milk prices and wondered about the necessity

of the product. The participants did not believe the benefits of lower prices would ever be seen by the consumer, because of existing milk surpluses and price supports. "I thought there were dairy supports. They can't really say prices would go down. I feel like in the price-support deal, consumers never get the lower price, general prices don't go down" (low-income woman). Following a discussion on FDA risk assurances and unintended consequences of the use of rbGH, a middle- to high-income man responded, "The real question is do we need it in the first place? We already have a surplus of milk. Why are we investing researchers time and energy into developing something that will create a greater surplus of milk and at the same time hurt people who are earning their livelihood?"

This last quote refers briefly to another concern for the participants, the economic viability of small dairy farmers after commercial availability of rbGH. Although the participants did not independently suggest this concern, connections were made between producing milk using rbGH and potential economic consequences.

One of the things that also just jumped at me when you ran through your list [reference to Table 2.1] is your economic indications there. At this point this country produces a surplus of milk and prices are already very depressed for small economies. The way this trend is going would push more small farmers out of business in favor of the large factory type production. Which doesn't seem like a good thing to me (middle- to high-income man).

Prior research has documented that price reductions of milk by ten percent were not great enough to counterbalance risk (Grobe & Douthitt, 1995), and consumers consider the economic effect on dairy farmers a factor increasing their concern toward rbGH treated herd milk (Douthitt, 1991; McGuirk, et al., 1992; Slusher, 1990). Thus, tangible consumer

benefits and economic equity may play an important role in the public's acceptance of new technology products.

Cows' Health

Participants indicated that the well-being of cows was also a concern. Information provided on rbGH initiated this discussion in all three groups (Table 2.1). They were concerned that the cow health issues would be secondary to the human health issues. In particular, participants expressed concern about possible increases in the incidence of mastitis (inflammation of the cow's udder), and alterations to the cow's own natural growth hormone. The participants linked a potential increase in the occurrence of mastitis to an increased use of antibiotics, forcing cows out of production, ultimately affecting farmers profitability. In addition to health issues, the men discussed ethical issues concerning animal rights. One man was particularly concerned about the fate of the animals, "What underlies this is the question, are we in implicit agreement that we don't care about cows, they are just things, not anything but things, objects and that's it? I don't agree with that stance." Those who have beliefs compatible with animal right groups may be more likely to express skepticism toward rbGH's use, because of its perceived cruelty to cows.

Labeling, Information, and Self-Protection

Another factor considered important to the participants perception's of risk was their sense of control. There were participants who were interested in more information, who wanted labeling, and who recommended proactive risk-averting behavior. Participants remembered some information from the time when rbGH first appeared on the market, but commented that rbGH was no longer considered newsworthy, and the issue had seemed to disappear from the media. They wanted information to help answer their questions. The participants were in agreement that it was difficult to ascertain the safety of this product given their knowledge base. Although various studies have advocated educating consumers as a way of increasing acceptance of the rbGH product (Kaiser, et al., 1992; McGuirk, et al., 1992), the solution appears more complex since beliefs appear to play a powerful role in nonacceptance of rbGH (Grobe & Douthitt, 1995).

All the groups also discussed the lack of rbGH labeling available to them as consumers. They expressed frustration with the FDA's policy not to mandate labeling. "Well, what do you do about it, if it isn't marked one way or the other, do you go without drinking milk" (middle- to high-income woman). A low-income woman felt it would be worthless to boycott all milk, while another disagreed, "I just don't want to throw up my hands and say, oh well, they have done it so I would just accept it. I would like to see some labeling." The men's group expressed unanimous agreement that "untreated with rbGH label" would be "good." These findings are consistent with previous research where

respondents also preferred choice through labeled products (Douthitt, 1991; Slusher, 1990). Consumers' fears may diminish if choices were available for consumers to make their own decisions (OTA, 1992).

Only the women's groups expressed interest in proactive measures, actions to avert risk. The two women's groups discussed self-protective behaviors like substituting other products (for example, soy milk) for cow's milk, seeking information, reducing milk consumption, supporting proactive policy action, and purchasing untreated herd milk from a reliable source. One low-income woman requested the FDA's address so that she could write and encourage them to label milk from rbGH and non rbGH treated cows. "Seem to be coming back to the fact that with some effort we are still able to buy...milk without it coming from treated cows" (middle- to high-income woman). To sum up these concerns, consumers who perceive less control over their choices may be more likely to engage in self-protective behaviors to minimize perceived personal health risks.

Discussion and Conclusions

One objective of this research was to understand the relationships between rbGH and gender and income. Previous research indicated that female food purchasers were more likely than males to perceive rbGH as risky (Fine, et al, 1986; Florkowski, Halbrendt, Huang, & Sterling, 1994; Grobe & Douthitt, 1995; McGuirk, et al., 1992). There are several explanations for these differences in risk perceptions by gender. First, women are believed to be "...more concerned than men with nurturing and maintaining life

and less concerned than men with jobs and economic growth" (Greenberg & Schneider, 1995, p. 503). Second, women are hypothesized to perceive greater personal risk exposure than men (Savage, 1993). Third, women are assumed to be less familiar with complex technologies, explaining their resistance in product acceptance. Lastly, researchers posit that the systems imposing risks are mostly controlled by men (Flynn, Slovic, & Mertz, 1994). Although the findings from this research do not reflect one particular gender group as being more concerned, differences were evident in the factors stressed by the different gender groups. The men talked in greater detail about market implications, economic consequences, and the health effects of rbGH on cows. Conversely, the women were concerned with human health risks, the effects of rbGH on children, environmental issues, and milk processing and testing. The women participants also spoke of self-protection, or behavior to avert their perceived risk susceptibility. These findings indicate a different risk perception emphasis by gender, and reinforce some of the explanations above. Nonetheless, further investigation is warranted. It is particularly important to understand the role women play in risk decision making, because women generally have the greatest impact on household food purchases.

Second, there are inconsistencies in the literature regarding the relationship between income level and risk concerns (Florkowski, et al., 1994; Grobe & Douthitt, 1995; McGuirk, et al., 1992). McGuirk et al. (1992) found that individuals with incomes in the \$20,000-50,000 range were the most worried about the safety of milk from cows treated with rbGH, and the most skeptical of the government's ability to evaluate or regulate biotechnology. These results are similar to Florkowski et al. (1994) who found

high income respondents to be more concerned about the use of bioengineered food products than were respondents from households with less than \$35,000 annual income. Conversely, Grobe and Douthitt (1995) found low-income respondents were more apprehensive of milk from rbGH treated cows than respondents in higher income brackets. These focus group findings showed a difference in the degree of concern and sense of immediacy between the low-income women and the two middle- to high-income groups. The low-income women were more adamant about their apprehensions toward rbGH, than the middle- to high-income groups. They spoke of proactive measures to avert their risk perceptions, and were concerned with their children's welfare. Nevertheless, these findings do not reflect one particular income group as being more concerned, but do indicate a different risk perception emphasis by income level toward this biotechnology. It may be that the relationship between low-income individuals and concern for risk is the perceived personal exposure to the risk (Savage, 1993).

Another objective of this research was to obtain information through these focus groups to strengthen empirical measures of the factors affecting risk perception, and formulate concise survey questions for a national study. Through discussions about the rbGH biotechnology, the participants identified important risk perception factors to include in a survey instrument. One factor was milk beliefs. Participants indicated favorable beliefs about milk from cows not treated with rbGH. Thus, measuring milk beliefs may highlight those consumers sensitized to the characteristics of rbGH perceived as being unnatural. Words used by the participants to characterize their beliefs about milk included "most complete natural product," "good for you," and "nutritional." A second

factor was trustworthiness of food-related information sources. Sources participants voiced distrust in were the government, industry, farmers, and the media--those who are directly involved in rbGH regulation, production, use, or information dissemination. A third factor was concern about immediate and delayed human health risks associated with milk from rbGH treated cows. Although it is difficult to decipher from these findings the extent to which concerns about health risks differed between short versus long run, they were primary factors of concern, thus both would be essential to include in a survey instrument. A fourth factor was economic concerns. The participants were skeptical of receiving any economic benefits with the use of rbGH. Variables focusing on the feasibility of consumer benefits and concern for the economic viability of small dairy farmers may capture concerns about who benefits from rbGH which could influence risk perceptions toward it. A final factor to include in a survey instrument is proactive measures. The women participants spoke of self-protection, or behavior to avert their perceived risk. Among other protective measures, they discussed milk substitutes, reducing milk consumption, not drinking milk at all, and purchasing milk from dairy cooperatives with a policy of processing milk from cows not treated with rbGH.

Although locus of control and group affiliation were not explicitly discussed by the participants, they were implicitly addressed. Even though some of the low-income women indicated self-protection actions, a couple expressed feelings of helplessness in reducing their risk perception toward rbGH. One indicated that she felt as if it would not do any good to worry about rbGH, because there are so many things to worry about, and besides one would have to wait many years to find out if anything was wrong. Another felt it

would be worthless to boycott because milk is in so many products. Therefore, these findings suggest a sense of helplessness or feelings of pessimism and a locus of control question may capture this. Another underlying theme implied from participants' responses was a sense of affiliation with particular groups. These may be categorized as religious, environmental, and animal rights. Measuring group affiliation may highlight personal values, influencing risk perception.

When encountering new uses of technology in the food supply, focus group participants seemed to rely on their past experiences and knowledge of, beliefs in, and trust in regulators, manufacturers, and farmers to determine the riskiness of a product. The participants had multiple concerns, contributing to an overall sense of uncertainty about the food-related biotechnology rbGH. All three groups questioned whether the rbGH product was necessary. They were not convinced that the benefits of biotechnology outweighed the perceived costs. In general, participants were concerned about the rbGH product, despite FDA assurance to the contrary. One option that may increase personal choice and diminish fears of the rbGH product would be a labeling policy of dairy products. Labeling was supported by the participants who desired notification of this new technology. In particular, the men's group supported a rbGH untreated label. They felt those wanting non rbGH labeling would be willing to pay more for their milk.

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CHAPTER 3: METHODOLOGY

Research Design

This study constituted a major part of a research study for a USDA National Research Initiatives (NRI) grant entitled "Measuring Consumer Knowledge and Risk Perceptions of Food-Related Biotechnologies." Thus, the methodologies are similar, except the scope of this study is limited specifically to consumers' risk perceptions of recombinant bovine growth hormone (rbGH).

The primary goal of this study was to better understand what factors influence consumers' risk perceptions toward the use of rbGH. A national survey of household food shoppers was implemented to measure consumer knowledge and risk perceptions of rbGH, one year after the FDA approved rbGH for commercial use. Risk perception measures were developed to determine which factors influence consumers' risk perceptions and suggest what role regulators have in influencing those perceptions.

Survey Research Methodology

Focus group sessions were first conducted to explore qualitative insights regarding the factors affecting consumers' risk perceptions of rbGH treated herd milk. Three convenience samples of individuals who lived in or near a county in Oregon, were selected, and focus groups were conducted on November 17, 28 and 29, 1994. The groups represent differences in gender and income. One sample was composed of low-

income women (n=8), the second sample was composed of middle- to high-income women (n=9), and the third sample was composed of middle- to high-income men (n=7). The focus group results (Chapter 2) were used to help clarify empirical measures of risk perception antecedents, as well as to assist in formulating more concise questions for the survey instrument (Appendix A).

Survey questions were designed according to theories of risk perception (Eom, 1993; Grobe & Douthitt, 1995; Hadden, 1989) and the results of the focus group sessions. Variables defining risk perception were incorporated into the question design. Surveys from other studies evaluating rbGH and food safety were used as references for particular question wording (McGuirk, Preston, & Jones, 1992; Research Alliance, 1990; Slusher, 1990; Smith & Warland, 1992; Sterngold, Warland, & Herrmann, 1994). The survey instrument was designed to analyze whether there were certain factors or experiences (personal, health-related, beliefs, attitudes) influencing consumers to feel there was a risk associated with the rbGH product. The survey instrument design also incorporated the impact of the commercial use of rbGH one year after its approval by the FDA. Thus, the survey instrument included items to evaluate: personal circumstances and health risk factors that might influence consumers' risk perceptions, factors of risk perception specific to the biotechnologies (rbGH and rpGH), the effects of commercial adoption of rbGH on consumer demand for fluid milk, consumer self-protection or risk-averting responses, and support for and availability of product labeling.

Three different survey techniques were used allowing for validity testing of responses for a particular question order or word usage. For four of the questions, a randomization of responses was used.¹ For example, when asking about milk beliefs, four belief statements were randomized for each respondent. The second survey technique alternated the use of the terms "administering" and "injecting" rbGH for two questions.² The third technique alternated the block of questions for rbGH and the block of questions for rpGH,³ thus allowing testing for possible influence of the rbGH discussion on the discussion of rpGH and vice versa.

Survey Interview

A nationwide survey of primary household food purchasers' attitudes toward the use of rbGH and rpGH was conducted by the Letters and Science Survey Center (LSSC) from March 1 through June 27, 1995, approximately one year after the FDA approved the commercial use of rbGH. (The LSSC is a unit of the College of Letters and Science at the University of Wisconsin-Madison). A total of 1,910 interviews averaging 16 minutes in length were completed. The adjusted response rate for the entire sample frame was 56.1 percent (Table 3.1).

Thirty-eight survey interviewers were briefed on the background and goals of the study, the funding source, and trained on the survey instrument. A pretest consisting of 19

¹ See Survey Instrument variables in Appendix A: M1a-d; P1a-d; B1Na-f; FCTa-c, g-h

² See Survey Instrument variables in Appendix A: IBGH, DRES

³ See Survey Instrument variables in Appendix A: rbGH block of questions ABGH through SCON; rpGH block of questions APGH through PPRK

Table 3.1. Response Rate Calculations

Sample	Response Rate ^a
<u>Entire Sample: National, WI, VT, Poor</u>	
1910	1910
1910+1038+145+156+5+(.602*248)	3403
	56.1%
<u>National Sample</u>	
969	969
969+585+80+77+1+(.576*131)	1787
	54.2%
<u>Wisconsin Sample</u>	
187	187
187+77+6+8+(.584*14)	286
	65.3%
<u>Vermont Sample</u>	
186	186
186+73+5+15+(.513*29)	294
	63.3%
<u>Poor Sample: 20th Percentile</u>	
394	394
394+209+37+22+(.702*47)	695
	56.7%
<u>Poor Sample: 10th Percentile</u>	
174	174
174+94+17+34+4+(.693*29)	343
	50.7%

^a The response rate was calculated with the adjustment as follows:
 completed/(completed + refused +away for duration +R not available + other + (adjusted)(no answer)) = .

completed interviews was performed in mid-February 1995, and the survey instrument was revised based on interviewers' and pretest respondents' input. The interview was conducted using a Computer Assisted Telephone Interview (CATI) system. The text of each question appeared on the screen for the interviewer to read. The routing through the interview was computer-determined, based on programmed skip patterns. Question wording could be adapted according to answers previously given in the interview. The computer allowed only valid responses; when an invalid response was entered, the computer asked the interviewer to reenter the response.

Telephone calls were conducted at all reasonable times of day and night, including weekends. However, most interviews were completed in the evening and on weekends. When each telephone number was called, the interviewer would determine whether or not a working residential number had been reached. Each residential number was then screened to verify that it was associated with a household. Residential households located in the continental United States were then further screened to determine whether there was at least one household resident who was 18 years or older. Finally, the person selected as the interview respondent was the person identified as a household resident "who is age 18 or older and primarily responsible for the household's food purchasing decisions." Only that person could be interviewed; no substitutions were allowed.

Sample Composition

The 1,910 completed interviews consisted of 969 completions from a National sample frame, 187 completions from a Wisconsin sample frame, 186 completions from a Vermont sample frame, and 568 completions from a Poor sample frame. The states of Wisconsin and Vermont were oversampled because of their food labeling regulations on rbGH. Wisconsin has established voluntary labeling regulations of products from untreated herds, and Vermont has established mandatory labeling of products from both treated and untreated herd milk. However, on August 8, 1996 the 2nd U.S. Circuit Court of Appeals in New York ruled Vermont's labeling law was a violation of the U.S. Constitution, possibly breaching the food corporations First Amendment rights. Results from Grobe and Douthitt (1995) showed that low income respondents were more apprehensive toward rbGH treated herd milk; therefore, poor households were also oversampled to ensure sufficient degrees of freedom for multivariate analysis of their behavior.

National Sample

Nine hundred sixty-nine completed interviews were obtained from a National sample frame of telephone numbers purchased by LSSC from Nielsen Media Research. The adjusted response rate for the National sample was 54.2% (Table 3.1). The sample is representative of currently working residential telephone numbers in the continental United States, including both listed and non-listed numbers. Nielsen updates the sample

three times a year. It is estimated that approximately 5 to 7 percent of U.S. households do not have telephones, and would therefore not be represented in the sample.

Nielsen Media Research begins with a file of all residential telephone numbers that are listed in published telephone directories. This file is, in effect, sorted by exchange and number within exchange. Next, within each exchange, ten thousand potential telephone numbers (XXX-0000 through XXX-9999) are generated and divided into one hundred blocks of one hundred consecutive numbers. If any of these blocks do not contain listed residential numbers, the block is eliminated. A sample is then drawn from the remaining numbers. Thus, the sample includes telephone numbers that are listed in the published directories, those that are unlisted, and numbers within those blocks that have been assigned since the most recent issue of the telephone directory. Use of this sampling scheme is more efficient than a simple random digit-dialing procedure. The time and expense of making calls to blocks that do not have currently assigned numbers, or to blocks with nonexistent or nonresidential exchanges, is avoided.

Wisconsin Sample

One hundred and eighty-seven completions were acquired from the Wisconsin sample frame. LSSC purchased this sample frame of telephone numbers from Nielsen Media Research. The adjusted response rate for the Wisconsin sample was 65.3% (Table 3.1). The same sampling strategy described above for the National sample frame was utilized by Nielsen Media Research to select the state of Wisconsin sample frame. The

sample frame is representative of currently working listed and nonlisted residential telephone numbers in the state of Wisconsin.

Vermont Sample

One hundred and eighty-six completions were acquired from the Vermont sample frame. This sample frame was also purchased by LSSC from Nielsen Media Research. The adjusted response rate for the Vermont sample was 63.3% (Table 3.1). Again, the same sampling strategy described in the section above for the National sample frame was utilized to select the state of Vermont sample frame. The sample frame is representative of currently working listed and nonlisted residential telephone numbers in the state of Vermont.

Poor Sample

Five hundred sixty-eight completions were acquired from the Poor sample frame. Two sample frames of telephone numbers were purchased by LSSC from Survey Sampling, Inc. (SSI). The samples targeted geographic areas in the continental United States where average household incomes fall below a specific level. One sample frame was drawn from exchanges within areas where the average household income was within the lowest 20% of U.S. household incomes, and the other was from exchanges where the average household income was within the lowest 10% of household incomes. The

response rates were 56.7% for the 20th percentile and 50.7% for the 10th percentile (Table 3.1). In the low-income area sample frames, interviews were attempted with all sample cases. Cases were not screened for meeting poverty guidelines before the interviews. The USDA poverty guidelines⁴ were used post-interview to determine the respondents' level of poverty.

To select a random digit "Targeted Income Sample," SSI computes an average of the income predictor score at the household level for each telephone exchange. Survey sampling uses a sophisticated income predictor to select samples that target households within a specified income range. The income predictor is derived from a multiple regression analysis of both individual household data and Census data at the block group level. The individual household data included information such as automobile ownership, length of residency, and type of dwelling unit; while the Census data are based on over 200 variables related to income from the U.S. Census. Then the exchanges are ranked by predicted income. Once a geographic definition has been determined (for this project it was defined as the continental U.S.), a particular income level is specified. The sample was selected only from those exchanges where the average of the income predictor scores was calculated to be at that level or lower.

SSI used the following selection process for random digit telephone samples: (1) identified all working telephone exchanges and working blocks (the first two digits after the exchange); (2) assigned each exchange to a single county; (3) stratified the sampling

⁴ Annual update of the Department of Health and Human Services Poverty Guidelines. Federal Register, Vo. 60, No. 27, Thursday, February 9, 1995, pp: 7772-7774.

frame by exchange, and within exchange by working block; and (4) systematically selected the sample for the geographic area specified.

Response Rates

A total sample frame of 5,815 telephone numbers were used in the study. This resulted in:

1,910 Completed Interviews

2,313 Non-sample (including not eligible, not working numbers, business numbers, etc.)

1,592 Non-response

1,038 Refusals

145 Away for Duration of Study

156 Contact Respondent Not Available

5 Other non-response

248 No answer

The response rate was adjusted⁵ to compensate for the never answered numbers. The never-answered numbers consist of residential numbers that were never answered in any of the twenty calls that were made. It was assumed that the ratio of working residential numbers to other numbers in this subset is the same as for numbers that were answered (see Table 3.1 for specific calculations).

⁵ Response rate adjustment = (completed + total non-response) / (completed + total non-response + total non-sample)

Calculation of Weights

The sample contained five separate samples that were combined by appropriate weighting: (1) a National random sample, (2) a Wisconsin random sample, (3) a Vermont random sample, (4) a sample drawn from low income areas (i.e., 20th percentile), and (5) a second sample drawn from low income areas, where average income is lower than in the first (i.e., 10th percentile). Because the National and Poor samples were independent (that is, they were not mutually exclusive and exhaustive subsets of the total population), we assume that the low-income households in each of the three samples (National, 20th percentile, 10th percentile) represent low-income persons in general.

To combine the Poor samples with the random National sample, a weight was computed such that the income distribution of the random National sample was maintained (that is, depending on the reported income, Poor area cases were added to deflate or inflate the weight of all cases). Household income was divided into 13 categories and weights were computed.

To add the two state samples (i.e., Wisconsin and Vermont) to the National and Poor samples, weights were computed that made the Vermont over sample represent .0023 of the total sample and the Wisconsin cases (from both the state and the national samples) represent .0197 of the total sample.⁶ According to recent Census Bureau state

⁶ There were, by chance, no Vermont cases in the national sample, although, there were Wisconsin cases in the National sample.

population estimates, Wisconsin includes 1.9% of U.S. households; Vermont includes 0.23%. The sum of the weights is then adjusted to 1,910, the total number of sample cases.

Demographic Characteristics

The sample and U.S. Census household demographic characteristics were compared to assess whether the sample was representative of U.S. households. Given the respondent selected was the primary household food purchaser, household comparisons were not appropriate for particular individual demographic characteristics (gender, education, age). These demographic characteristics are shown in Table 3.2 for the sample only. Almost 72% of the respondents were women, reflecting the screening question for primary household food purchaser. The typical food purchaser's education was less than a bachelors degree, with an average age of 45.6 years. For the other demographic characteristics in Table 3.2, a comparison is made between the U.S. households and the sample. Household data were taken from the 1990 Census Population, General Population Characteristics of the United States. Close to 60% of the respondents were married, with an average household size of 2.87; for U.S. households, the respective figures are 54.9% and 2.63. Median income was higher for the sample than the U.S. households figure. Eighty percent of the respondents were Caucasian, consistent with U.S. households, with approximate representation of other ethnic groups. This sample had a median income approximately \$8,000 higher than the U.S. household median income, and a higher

Table 3.2. Comparison of U.S. Household Demographics and Sample Demographics

	U.S. Households	Sample (N=1910)
<u>Gender</u>		
Female		71.8%
Male		28.2%
<u>Education</u>		
Less than High school graduate		10.2%
High school graduate		21.2%
1-3 years of college		23.5%
Associate		15.2%
Bachelors		18.9%
Masters		7.9%
Ph.D./Professional		3.1%
<u>Age</u>		
Mean age of adult householder		45.6 (range: 18-95)
<u>Marital Status</u>		
	(1991)	
Married	54.9%	62.9%
Widowed	12.4%	8.5%
Divorced	13.2%	9.6%
Living with a partner	-	4.0%
Separated	4.0%	1.3%
Never married	15.3%	13.2%
<u>Household Size</u>		
	(1990)	
Average per household	2.63	2.87
<u>Income</u>		
	(1993)	
Median Income	\$31,241	\$40,000
<u>Ethnic</u>		
	(1990)	
Caucasian	80.0%	81.2%
African American	10.8%	10.4%
Native American	0.6%	1.0%
Asian	2.1%	1.5%
Hispanic ^a	6.5%	3.6%
other	-	2.5%

^a For U.S. households, all races were asked whether they were of Hispanic origin, while for this study's sample only those who indicated they were Caucasian were also asked if they were of Hispanic origin such as Mexican-American, Latin American, Puerto Rican, or Cuban.

percentage of married couples represented in the sample than for U.S. households. These differences may reflect the use of a telephone survey, excluding those without phones and those not willing or able to complete the survey.

Limitations of the Data

Note should be made of several limitations of these data. First, there is no direct measure of risk perception. Data were collected on consumers' level of concern about human safety (current and future)⁷ associated with consuming milk produced with rbGH, but an overall measure of risk perception was not obtained. Second, there are issues relating to the respondent's awareness of rbGH's use. Only respondents indicating a lack of awareness were provided a brief description of rbGH as a basis for answering the remaining survey questions about the biotechnology. In addition, for those respondents who stated they were aware, the level of their awareness is absent from these data. Third, Vermont's food labeling regulations were not in effect during data collection. Fourth, funding restrictions limited survey questions. In an ideal situation, further data would have been collected on the trustworthiness of additional information sources, perceived opinion of family and friends regarding the rbGH product, whether or not the respondent lived in a stressed neighborhood, as well as a more comprehensive measure of locus of control (person's perceived sense of control over life events).

⁷ See Survey Instrument variables in Appendix A: LRKB, LCON, RSKB, SCON.

CHAPTER 4

A Model of Consumers' Risk Perceptions Toward Recombinant Bovine Growth Hormone (rbGH): The Impact of Risk Characteristics

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One of the first animal-specific applications to be approved for the marketplace, recombinant bovine growth hormone (rbGH), is considered a controversial test case shaping the public's acceptance of other biotechnology applications. Approval of rbGH was granted February, 1994 by the Food and Drug Administration (FDA) after scientific evidence suggested humans were not at risk consuming milk or meat from cows treated with rbGH, and the use of rbGH had no adverse impact on cattle (Centner & Lathrop, 1996).

Prior to FDA approval, numerous researchers explored the marketability of rbGH, reporting consumer apprehension (for synopses see Smith & Warland, 1992). Now that rbGH is available in the market, few researchers have followed up on consumer attitudes. In light of new information regarding risks (i.e., learning about FDA approval, commercial availability) consumers may be revising their perceptions of the rbGH product. Thus, the question remains whether consumer concern persists now that rbGH is FDA approved and commercially available.

Researchers focusing on understanding the causes of consumer concern have primarily concentrated on factors influencing consumers' risk perceptions. Consumers' perceptions of risk have been stated to be based on more than the probability of occurrence and outcome of an event. One factor believed to influence risk perceptions, or various kinds of attitudes and judgments about risk, is the characterization of risk (Slovic, 1992). Slovic's work has suggested two primary dimensions of characterizing risk: the degree to which the risk is unknown or unobservable to the consumer, and the degree to which the risk creates apprehension or a feeling of dread (Peters & Slovic, 1995).

Oglethorpe and Monroe's (1994) comprehensive study of consumers' perceptions toward health and safety risks led them to concur that understanding risk perception requires more than the simple model of probability of occurrence and severity of the outcome. Although they are important determining factors, the inclusion of risk characteristics into the model yielded increased predictability and unbiasedness compared to the simple model of probability of occurrence and severity of the outcome. Furthermore, each of the eight products tested generated different best⁸ models. They concluded that subtle differences in risk perceptions depend on the nature of the product (Oglethorpe & Monroe, 1994).

Hadden (1989) and Sandman (1989) posit that risk is multifaceted, containing perhaps twenty different characteristics. Hadden (1989), in particular, views risk perceived by consumers as a function of the riskiness of the product. These risky elements have been coined, outrage factors. Outrage factors reflect the "relevant [aspects] about a risk except how likely it is to be harmful" (Sandman, 1989, p. 45). The risk characteristics labeled as outrage factors by Hadden include the following paired dichotomies: voluntary or involuntary, familiar or unfamiliar, immediate or delayed effects, natural or artificial, controlled by the individual or by someone else, and visible benefits or no visible benefits (1989, p. 141). The first characteristic in each pair is associated with less risk than the second.

⁸ The models performed well in explaining variability and predicted with minimal bias, variance, and collinearity.

Although researchers have noted the potential influence of outrage factors in understanding consumers' risk perceptions, there is a lack of published, empirical work. The purpose of this study is to estimate the effect these risk characteristics, described as outrage factors by Hadden (1989), have on consumers' risk perceptions toward the use of rbGH. The outrage factors applicable to milk from rbGH treated herds include:

- (a) involuntary risk exposure, (b) unfamiliarity with the products production process, (c) unnatural product characteristics, (d) lack of trust in regulator's ability to protect consumers in the marketplace, and (e) consumers' inability to distinguish milk from rbGH treated herds compared to milk from untreated herds.

Theoretical Background

When consumers weigh the benefits and risks of a consumption good, they are making decisions under uncertainty. One theory examining the economic behavior of households under uncertainty is the von Neumann-Morgenstern expected utility theory (Machina, 1987). In the framework of an expected utility function $E(U)$, a household member can make choices between a risky good x , and a riskless composite good y . The assumption is that the uncertainty in the expected utility function stems from possible health problems linked to the quantity of risky food consumed. The possible occurrence of an adverse health effect is one of the assumed outcomes a household faces. The alternative is no adverse health effect.

If there is no adverse health effect (NH), the household's state-dependent utility function is denoted by $U_{NH}(x,y)$ and by $U_H(x,y)$ if there is an occurrence of the health effect (H), where $U_{NH}(x,y) > U_H(x,y)$ (Machina, 1987). It is assumed that a household faces only these two outcomes with probability of occurrence as $1-\pi$ and π , respectively. Therefore, the expected utility function is

$$E(U) = (1-\pi) U_{NH}(x,y) + \pi U_H(x,y). \quad (1)$$

In the framework of the expected utility function, π , the probability of occurrence, is assumed to be known to the individual and understood as the risk assessment estimated by scientific experts. The underlying view of the expected utility theory is that a person's preferences conform to the axioms of a well-defined, transitive preference ordering by individuals, completeness of a system of individual preferences, and independence (Machina, 1987).

Viscusi (1990) utilizes the expected utility theory to model the discrete cigarette smoking decision: smoking or not smoking. The two possible outcomes in Viscusi's (1990) model are life or death. When alive, utility received is $U(\text{smoke})$ if the individual smokes, and $U(\text{don't})$ when the individual does not smoke. The outcome of death applies only to those who smoke and offers a payoff V , representing the utility foregone from living, or the negative amount of utility one would have if they continued living. Associated with each outcome is the probability of occurrence. If one smokes, the probability of living is denoted as $(1 - s)$, while the probability of death is s . For those who

choose the alternative of not smoking, the probability of living is also denoted as $(1-s)$, while the probability of death related to smoking risk, s , is zero (Viscusi, 1990). Viscusi (1990) posits that an individual will smoke if

$$(1 - s) U(\text{smoke}) + sV > U(\text{don't})$$

or $[U(\text{smoke}) - U(\text{don't})] + s[V - U(\text{don't})] > 0$ (2)

meaning, an individual will smoke if the net gain from cigarette smoking is greater than the expected utility loss from death, or the foregone life expectancy.

Theoretical Model

This study applies Viscusi's (1990) decision model to identify whether or not Hadden's outrage factors are determinants of consumers perceiving risk from consuming rbGH treated herd milk. In this study, the alternatives are perceiving no risk (NRP_{rbGH}) or perceiving risk (RP_{rbGH}) from the use of rbGH. Perceived risk is defined as consumers' attitude or judgment that the rbGH product is not currently safe for humans, or adverse health effects may later be discovered, or both. The uncertainty in this model is assumed to derive from possible ill health effects from consuming the rbGH product. Thus, the outcomes are no adverse health effect or occurrence of an adverse health effect. When there are no adverse health effects, the individual will receive utility $U(NRP_{\text{rbGH}})$ if they perceived no risk, and $U(RP_{\text{rbGH}})$ if the individual perceives risk associated with consuming

milk produced with rbGH. While Viscusi's (1990) model equated V to the payoff offered by the outcome death, this study defines it as the perceived cost, \hat{C} , of an adverse health effect occurring. Only those who perceive a risk would incur this perceived cost. As in Viscusi's (1990) model, probabilities are assigned to each outcome. If one perceives no risk from the rbGH product, the probability of no health effects occurring is expressed as $(1 - \pi)$, whereas the probability of an adverse health effect occurring, π is zero. Those who perceive risk are assumed to engage in self-protective behavior if the cost of averting risk is less than the perceived cost, \hat{C} , of an adverse health effect occurring. If one perceives risk, the probability of no health effect occurring is expressed as $(1-\pi)$, assuming they have adopted a self-protective behavior, whereas the probability of an adverse health effect occurring is π . Equation (2) is modified to represent the choice alternatives associated with rbGH treated herd milk, and probabilities associated with occurrence of each outcome,

$$(1 - \pi) U(RP_{rbGH}) + \pi \hat{C} > U(NRP_{rbGH}). \quad (3)$$

For the case of rbGH, "no scientific evidence exists to suggest that humans are at risk in consuming milk from cows given BST [rbGH]" (CAST, 1993). Therefore, π , the probability of an adverse health effect occurring in equation (3) would be equal to zero and we would have a normal utility function. Slovic (1992) maintains that experts define risk in a narrow, quantitative way, while the public has a wider view, incorporating

legitimate value-laden considerations. Therefore, an assumption of this model is that consumers use their own personal beliefs or subjective probabilities of the outcome occurring and their subjective values (or utilities) attached to the outcomes when deciding whether or not to perceive risk toward the use of rbGH. Thus, π in equation (3) is modified to consumers' subjective probability of an adverse health effect occurring, $\hat{\pi}$, while $(1 - \hat{\pi})$ is the subjective probability of no adverse health effect occurring. This study posits that an individual will perceive risk toward rbGH if

$$(1 - \hat{\pi}) U(\text{RP}_{\text{rbGH}}) + \hat{\pi} \hat{C} > U(\text{NRP}_{\text{rbGH}})$$

or
$$[U(\text{RP}_{\text{rbGH}}) - U(\text{NRP}_{\text{rbGH}})] + \hat{\pi} [\hat{C} - U(\text{RP}_{\text{rbGH}})] > 0 \quad (4)$$

meaning, a consumer will perceive risk toward rbGH if the net utility from perceiving risk toward rbGH's use outweigh the subjective expected utility loss or perceived health costs from consuming milk from rbGH treated herds.

The vector of variables reflecting the net utility from perceiving risk, shown by the first term in equation (4), are attitudinal (behavior representing a strong belief) and demographic characteristics. It is reasonable to assume that consumer response to risk is affected by their attitudinal--personal experience, social and cultural influences--and demographic characteristics (Hadden, 1989; Slovic, 1992). These attitudinal and demographic characteristics shape our unique experiences and may differ notably between consumers.

The vector of variables reflecting perceived health costs, second term in equation (4), are the outrage factors germane to rbGH. Theoretically, these outrage factors are characterized as risky elements influencing consumer beliefs, which contribute to an increased probability of perceiving risk from milk produced with rbGH. First, in the absence of mandatory labeling by the FDA, an involuntary risk is imposed. This involuntary risk is imposed on those consumers who remain concerned about health effects associated with consuming milk from this recombinant technology, despite FDA assurance to the contrary. Slovic (1990) suggests that the ability consumers have to influence some safety risks in their lives (e.g., wearing seat belts, changing diets), has sensitized them to want to control other risks. Thus, imposed risks evoke frustration and outrage. The more involuntary the risk exposure appears to be, the greater the likelihood of perceiving risk toward the use of rbGH.

Second, lack of familiarity with the production process or use of this technology may increase consumer uncertainty. Because many consumers are not familiar with how food is grown and processed, new techniques such as biotechnology are misunderstood (Harlander, 1991). This lack of understanding may increase consumer apprehension toward milk produced with rbGH.

Third, rbGH is considered an unnatural or artificial product by some consumers. Studies have found that people are willing to accept greater "natural" product risks than risk associated with synthetic products (Busch, 1991). Milk is perceived as one of the few unadulterated, naturally produced products on the market today (Busch, 1991). These product characteristic perceptions have been instilled and reinforced successfully by milk

marketing campaigns. The stronger these positive beliefs about milk's natural production, the greater the risk perceptions of the non-natural rbGH technology.

Fourth, consumers must feel they can trust regulators, provided the alternatives for this product are not determined by individuals but by a regulatory agency. A study of past technology introduction reveals a pattern of ineffective communication and lack of trust on the part of consumers toward regulatory enforcement agencies ability to set or enforce food safety standards (Hermann, 1982; van Ravenswaay, 1995). The less trust consumers have in regulators' ability to ensure food safety, the stronger the perceived risk associated with consuming milk from rbGH treated herds.

Finally, scientists are unable to detect any nutritional or physical appearance differences in the milk from treated versus untreated herds (Ropp, 1994). Thus, there are no tangible benefits in the consumer interest. Although rbGH's use may provide a benefit of lower market prices resulting from an increase in milk production efficiency, this benefit may not be great enough to offset risk perceptions toward this product.

Data

To elicit responses concerning perceptions and attitudes toward milk produced using rbGH technology, data were collected through a national telephone survey of food shoppers approximately one year after the FDA approved the commercial use of rbGH. The survey was administered from March 1 through June 27, 1995 by the Letters and Science Survey Center, University of Wisconsin-Madison. The data consisted of 1,910

completed surveys from a national survey sample. In addition to a random national sample (969 completions), oversamples from Wisconsin (187 completions), Vermont (186 completions) and poor SMSA's around the U.S. (568 completions) were collected. The states of Wisconsin and Vermont had passed food labeling regulations on rbGH and thus were oversampled. Poor households were oversampled because previous research (Grobe & Douthitt, 1995) showed that low-income respondents were more apprehensive toward rbGH treated herd milk. Sample weights were used to ensure findings were representative of the U.S. population (for further details see Douthitt, Zepeda, & Grobe, 1996). The adjusted response rate for the entire sample frame was 56.1%.

Interviews averaging sixteen minutes in length were conducted with the person identified as a household resident "who is age 18 or older and primarily responsible for the household's food purchasing decision." All respondents were asked personal circumstances and health risk factors that might influence risk perceptions and factors of risk perception specific to this food-related biotechnology. Those who were not aware of the rbGH technology (35.7% of entire sample) were provided a brief description² of rbGH as a basis for answering the remaining survey questions about the biotechnology. For this analysis, the subsample consists of those respondents who (a) expressed an opinion on their level of concern or no concern for the current safety of consuming milk from rbGH treated herds (89 cases lost), (b) expressed an opinion on their level of concern or no

² Interviewers read the following statement verbatim to respondents, "Bovine somatotropin (rbGH) is a growth hormone, which when administered/injected in fully grown, lactating cows, increases their milk production, thereby improving dairy farm profits. The milk from cows given rbGH has the same product characteristics as the milk from untreated cows."

concern for the future discovery of ill health effects associated with milk produced with rbGH (17 additional cases lost), and (c) reported complete data for all other variables used (665 cases lost). The final subsample size was 1,139.

Three quarters of the weighted subsample respondents were female, reflecting the screening question for primary household food purchaser. Eighty-five percent of this subsample were Caucasian. The typical respondent was 44 years of age, and had a median income of approximately \$40,000. Seventy-five percent of the subsample respondents were married, with an average household size of 3.24.

Empirical Model

By parametrizing equation (4), a regression relation is specified (Viscusi, 1990),

$$B_1 Y_1 + B_2 \hat{\pi} Y_2 + u_2 > 0$$

or
$$\Pr (RP_{rbGH}) = [\Pr (B_1 Y_1 + B_2 \hat{\pi} Y_2) > -u_2] \quad (5)$$

where B_i ($i=1,2$) represents the parameter vectors, Y_1 is a vector of attitudinal and demographic characteristics, Y_2 a vector of outrage factors, and a random error term, u_2 .

Perceived risk (RP_{rbGH}), was operationalized through consumers' current concerns for the safety of milk produced with rbGH (CURRENTCON), and concern for the future discovery of human ill health effects (FUTURECON) toward rbGH's use. The subsample data shows that over 80% of respondents' expressed some level of current concern about

human ill health effects associated with rbGH, while 89% expressed some level of concern over future ill health effects. These variables were measured by a level of concern scale that is discrete and ordinal (Table 4.1). Hence, ordered probit analysis will be used to estimate (a) the effect of Hadden's (1989) outrage factors on consumer concern toward the rbGH product, and (b) the risk perception model of whether or not attitudinal and demographic characteristics, or outrage factors may be related to health concerns toward rbGH's use.

Table 4.1. Weighted Summary Statistics for the Dependent Variables (n=1139)

Variable	Measurement	Freq.	Percent	Mean	St.Dev
CURRENTCON ^a	Current concern about human safety:			1.926	1.130
	0= no concern	224	19.7		
	1= concerned a little	100	8.8		
	2= moderately concerned	351	30.8		
	3= very concerned	464	40.7		
FUTURECON ^a	Concern about future discovery of human ill health effects:			2.201	0.969
	0= no concern	115	10.1		
	1= concerned a little	98	8.6		
	2= moderately concerned	369	32.4		
	3= very concerned	557	48.9		

^a Sample selection analysis of the "don't know" responses were not significantly different from the other four categories, and thus were omitted from the analysis.

Outrage Model

Empirically, we begin with a partial form of equation (5) based solely on the vector of outrage factors, expressed as two empirical models for current and for future health concerns (6). The two empirical models to be estimated include the following outrage factor variables:

$$Y_i = [\text{VOLUNTARY}, \text{INVOLUNTARY}, \text{AWARE}, \text{MILK BELIEF}, \text{NO TRUST}, \\ \text{NO CONSUMER BENEFIT}, \text{CONSUMER BENEFIT}] \quad (6)$$

where $i=1$ is current concern and $i=2$ is future concern.

The outrage factor of involuntary risk exposure was specified as dummy variables VOLUNTARY and INVOLUNTARY, based on whether or not the respondent had the ability to purchase milk from untreated herds (Table 4.2). The "don't know" responses for this question were reflected in the omitted category for these binary variables. One would expect those not having a choice of purchasing milk from untreated herds would less likely perceive control in their choice decision, increasing health concerns toward the use of rbGH. Thus, INVOLUNTARY was predicted to be positively related, and VOLUNTARY negatively related to health concerns, compared to those responding "don't know."

Table 4.2. Weighted Summary Statistics for the Independent Variables (n=1139)

Variable	Measurement	Mean	St.Dev
Outrage Factors			
VOLUNTARY	1= food stores where you can purchase milk from untreated cows; 0= don't know	0.354	0.478
INVOLUNTARY	1= no food stores where you can purchase milk from untreated cows; 0= don't know	0.241	0.428
AWARE	1= aware of rbGH; 0 = not aware	0.727	0.446
MILK BELIEF	1= agreed strongly that milk is natural; 0= disagreed, neutral, or somewhat agreed that milk is natural	0.333	0.471
NO TRUST	1= felt FDA was not very or not at all trustworthy; 0= felt FDA was trustworthy	0.098	0.298
NO CONSUMER BENEFIT	1= disagreed somewhat or strongly that use of rbGH has benefited consumers; 0= don't know	0.542	0.499
CONSUMER BENEFIT	1= agreed strongly, agreed somewhat, or neutral that use of rbGH has benefited consumers; 0= don't know	0.342	0.475
Attitudinal and Demographic Factors			
LACTOSE	1= respondent or household member are lactose intolerant; 0= lactose tolerant	0.181	0.385
HEREDITY	1= respondent or household member have family history of cancer or heart disease; 0= no history of hereditary disease	0.564	0.496
PERSONAL CONCERN	1= changed food habits given concern about future personal and family health risk; 0= no change in food habits	0.874	0.333
POOR	1= poor (qualified as poor under the February 9, 1995, USDA poverty guidelines); 0= nonpoor	0.076	0.264
GENDER	1= female; 0= male	0.771	0.421
RACE	1= African American, Asian, Native American, or of Hispanic origin; 0= Caucasian	0.147	0.354
AGE	Age in years	43.51	13.76
CHILD<=6	Presence of child(ren) age 6 or less; 0= childless	0.250	0.433
CHILD7-17	Presence of child(ren) age 7-17; 0= childless	0.378	0.485

Table 4.2 (Continued). Weighted Summary Statistics for the Independent Variables (n=1139)

Variable	Measurement	Mean	St.Dev
ENVIRONMENT	1= strongly identified with environmentalists; 0= not at all, or somewhat identify with environmentalists	0.368	0.482
ANIMAL RIGHTS	1= strongly identified with animal rights groups; 0= not at all, or somewhat identify with animal rights groups	0.265	0.442
LOCUS OF CONTROL	1= index created when respondent strongly agreed with: "I worry about the future that today's children are facing;" and "More and more, I feel helpless in the face of what's happening in the world today;" 0= not at all, or somewhat agreed with either of the above two statements	0.442	0.497

The outrage factor of an unfamiliar product was measured by the respondents awareness of rbGH (AWARE) (Table 4.2). Respondents were asked "do you recall having heard or read anything about the use of a synthetic bovine growth hormone, commonly called bGH or bst, that is used by farmers to increase cows' milk production?" Given that scientific evidence suggests no risks from consuming milk from treated herds, consumers who were aware about rbGH's use were hypothesized to negatively influence health concerns associated with the rbGH product than those unaware.

The outrage factor of unnatural product characteristics was measured by MILK BELIEF, based on agreement to the statement "milk is natural" (Table 4.2). It was hypothesized that if one holds strong, positive beliefs toward milk produced naturally, they

would more likely be skeptical of a man-made production technology, positively influencing safety concerns toward rbGH's use.

The outrage factor of lack of trust in regulator's ability to protect consumers in the marketplace was measured by the trustworthiness of the FDA as a food-related information source (NO TRUST) (Table 4.2). A lack of trust in the FDA (NO TRUST) was hypothesized to positively influence health concerns.

The outrage factor of no tangible consumer benefits from rbGH treated herd milk was measured by the dummy variables NO CONSUMER BENEFIT and CONSUMER BENEFIT. These binary variables were based on the respondents' disagreement (NO CONSUMER BENEFIT) or agreement (CONSUMER BENEFIT) with the statement "increasing milk production by farmers using rbGH has benefited consumers," as the intercept captures the "don't know" responses. One would expect that those who believe the use of rbGH yields no benefits for consumers will more likely increase their health concerns toward the rbGH product than those responding "don't know."

Risk Perception Model

Equation (7) represents two empirical risk perception models, allowing testing of whether or not the attitudinal and demographic characteristics, or outrage factors may be related to concern over health effects toward rbGH's use,

$$Y_i = [\text{LACTOSE, HEREDITY, PERSONAL CONCERN, POOR, GENDER, RACE, AGE, AGE-SQUARED, CHILD}\leq 6, \text{CHILD7-17, ENVIRONMENT, ANIMAL RIGHTS, LOCUS OF CONTROL, VOLUNTARY, INVOLUNTARY, AWARE, MILK BELIEF, NO TRUST, NO CONSUMER BENEFIT, CONSUMER BENEFIT}] \quad (7)$$

where $i=1$ is current concern and $i=2$ is future concern.

LACTOSE, HEREDITY, and PERSONAL CONCERN represent variables measuring personal experience (Table 4.2). LACTOSE measures the occurrence of lactose intolerance in the household and also controls for differences in lactose intolerance among ethnic groups; HEREDITY measures family hereditary disease characteristics; and PERSONAL CONCERN was based on response to changing food habits because of a concern about future personal and family health risks. It was hypothesized that concern about personal health characteristics and risk positively influence safety concerns associated with the rbGH product.

Factors reflecting economic situation and demographic characteristics were POOR, GENDER, RACE, AGE, AGE-SQUARED, CHILD ≤ 6 , and CHILD7-17 (Table 4.2). All but age were binary variables. It was posited that because those in poverty are more likely to direct their energy to their present situation, they will be more concerned about current rather than the future discovery of ill health effects regarding rbGH's use. Women were assumed to be more concerned than men about perceived adverse health effects from consuming milk from rbGH treated herds. This hypothesis is based on results

from empirical studies (Grobe & Douthitt, 1995; McGuirk, Preston, & Jones, 1992). Race, a proxy for neighborhood effect, and age were hypothesized to positively and negatively influence health concerns, respectively. Savage (1993) found both African Americans and younger people to have more perceived fear of risks than Caucasians and older individuals. Presence of children in the household was hypothesized to positively influence safety concerns, given milk's role in meeting children's nutritional needs.

Variables reflecting social and cultural background were group affiliation and locus of control. Group affiliation measures the respondent's level of identification with environmentalists (ENVIRONMENT) and level of identification with animal rights groups (ANIMAL RIGHTS) (Table 4.2). A person's perceived sense of control over life events was measured by the index variable LOCUS OF CONTROL (Table 4.2). The group affiliation and locus of control variables were hypothesized to positively influence health concerns. For example, environmentalists or animal rights groups may boycott milk if they believe the use of rbGH is harmful to the environment or cruel to cows, respectively, while those who perceive a lack of personal control may feel their effort is ineffective at changing the risks they feel they face.

Empirical Results

Outrage Factor Influence on Consumers' Risk Perceptions

The overall ordered probit outrage models were significant at the .001 level, implying the models do a good job of explaining much of the health concern toward rbGH's use. The current concern model predicted 47% of the observed outcomes correctly, as the future concern model predicted 51% (Table 4.3). For both models the majority of correctly predicted outcomes occurred in the highest level of concern--very concerned--approximately 80% for both models. For the other levels of current concern, 37% of outcomes were predicted correctly for those with "no concern," 0% for those who were "concerned a little," and 24% for those "moderately concerned" (Table 4.3). Outcomes predicted correctly for the other levels of future concern were 0% for the first two levels, and 39% for those who responded "moderately concerned." Results of equation (6) are presented in Table 4.3. The LIMDEP software package was used for the ordered probit analysis (Greene, 1995).

Hadden's (1989) outrage factors were found to be influential determinants of current and future health concerns toward milk produced with rbGH. The outrage factor of involuntary control, measured by INVOLUNTARY was found to have a significant and positive effect on current concern. For those who were not able to purchase milk from untreated herds (INVOLUNTARY), the probability of expressing "very concerned" about

Table 4.3. Ordered Probit Estimation Results for Outrage Factor Influence on Consumers' Risk Perceptions

Variable	Coefficient	z-ratio	Marginal Effect on Very Concerned ^a
Outrage Model: CURRENT CONCERN (n=1139)			
CONSTANT	0.993 ^c	9.798	
VOLUNTARY	0.117	1.541	0.045
INVOLUNTARY	0.155 ^b	2.167	0.059
AWARE	-0.162 ^b	-2.371	-0.062
MILK BELIEF	-0.249 ^c	-3.921	-0.095
NO TRUST	0.635 ^c	6.317	0.242
NO CONSUMER BENEFIT	0.282 ^c	3.003	0.108
CONSUMER BENEFIT	-0.497 ^c	-5.182	-0.189
μ_1^d	0.309	11.732	
μ_2^e	1.212	28.156	

Log-Likelihood -1358.44 Chi-Squared 157.93^c

Predicted Correctly: 47% (Level of Concern: 0=37%, 1=0%, 2=21%, 3=81%)

Outrage Model: FUTURE CONCERN (n=1139)

CONSTANT	1.343 ^c	11.555	
VOLUNTARY	0.057	0.740	0.023
INVOLUNTARY	0.105	1.462	0.042
AWARE	-0.120	-1.751	-0.048
MILK BELIEF	-0.172 ^c	-2.636	-0.069
NO TRUST	0.541 ^c	5.324	0.215
NO CONSUMER BENEFIT	0.335 ^c	3.241	0.133
CONSUMER BENEFIT	-0.379 ^c	-3.660	-0.151
μ_1^d	0.433	12.227	
μ_2^e	1.417	28.440	

Log-Likelihood -1277.74 Chi-Squared 81.37^c

Predicted Correctly: 51% (Level of Concern: 0=0%, 1=0%, 2=39%, 3=80%)

^a Marginal effects on the response categories other than very concerned are not shown. For the categories other than very concerned, the direction of influence is consistently opposite. The marginal effects were computed at the sample means for all variables.

^b Significant at the .05 level.

^c Significant at the .01 level.

^d Change in the constant for level of concern=1.

^e Change in the constant for level of concern=2.

current health effects increased compared to those who responded "don't know." AWARE was found to have a significant and negative effect on being very concerned about current health effects from consuming milk produced with rbGH. Respondents who were aware of the use of rbGH (AWARE), appeared less likely to be very concerned about current health effects than those who lacked awareness.

For both measures of concern, if the respondent agreed that "milk is natural" (MILK BELIEF), the less likely they were to be very concerned about health effects than those who believe milk not to be natural. This result was counter to what was expected. Consumers who have strong, positive beliefs that milk is natural seem to hold on to these beliefs, while those who believe milk not to be natural were more concerned about adverse health effects. The variable measuring FDA trustworthiness (NO TRUST) was significant and positive with health concerns. Expressing "very concerned" about current and future health effects was significantly more likely for respondents indicating less trust in the FDA than those finding the FDA to be trustworthy.

Finally, for those who felt there were no consumer benefits from farmers' use of rbGH (NO CONSUMER BENEFIT), the probability of expressing "very concerned" about current and future health effects significantly increased compared to those who responded "don't know." In contrast, if the respondent agreed that farmers' use of rbGH benefited consumers (CONSUMER BENEFIT), the less likely they were to be very concerned about current and future health effects than those responding "don't know."

Attitudinal, Demographic, and Outrage Factor Influence on Consumers' Risk Perceptions

The overall ordered probit risk perception models were also significant at the .001 level. Similar to the outrage models, the current concern risk perception model predicted 48% of the observed outcomes correctly, with the future concern model predicting 54% (Table 4.4 and Table 4.5). "Very concerned," the highest level of concern, had the majority of correctly predicted outcomes (73% for current concern, 81% for future concern). Results of equation (7) and the correctly predicted outcomes for the other levels of current and future concern can be found in Table 4.4 and Table 4.5, respectively.

Although the risk perception models do not add much in terms of overall prediction, they do allow exploration of the linkages between attitudinal and demographic characteristics and outrage factor influences on consumers' risk perceptions. A test was conducted determining whether or not the outrage factors had a significant impact on consumers' risk perceptions after controlling for attitudinal and demographic characteristics. The Likelihood Ratio test statistic for each risk perception model was statistically significant, rejecting the hypothesis that the outrage factors had no significant impact on the probability of having health concerns toward the rbGH product (Table 4.4 and Table 4.5).

As hypothesized, the attitudinal and demographic characteristics of being female (GENDER), being African American, Asian, Native American, or of Hispanic Origin (RACE), presence of children age six or younger (CHILD \leq 6), identifying with

Table 4.4. Ordered Probit Estimation Results for Current Risk Perception Regression

Variable	Parameter Estimate	z-ratio	Marginal Effect for Very Concerned ^a
Risk Perception Model: CURRENT CONCERN (n=1139)			
<u>Attitudinal and Demographic Factors</u>			
CONSTANT	-0.268	-0.788	
LACTOSE	0.243 ^c	2.897	0.092
HEREDITARY	0.050	0.789	0.019
PERSONAL CONCERN	0.093	0.986	0.035
POOR	0.153	1.080	0.058
GENDER	0.259 ^c	3.710	0.098
RACE	0.193 ^b	2.185	0.073
AGE	0.026	1.819	0.009
AGE-SQUARED	-0.001	-1.843	-0.001
CHILD≤6	0.169 ^b	2.175	0.064
CHILD7-17	-0.020	-0.289	-0.008
ENVIRONMENT	0.268 ^c	3.934	0.101
ANIMAL RIGHTS	0.185 ^b	2.381	0.070
LOCUS OF CONTROL	0.402 ^c	6.123	0.152
<u>Outrage Factors</u>			
VOLUNTARY	0.131	1.682	0.050
INVOLUNTARY	0.146 ^b	1.944	0.055
AWARE	-0.071	-0.985	-0.027
MILK BELIEF	-0.190 ^c	-2.838	-0.072
NO TRUST	0.485 ^c	4.446	0.184
NO CONSUMER BENEFIT	0.207 ^b	2.149	0.078
CONSUMER BENEFIT	-0.551 ^c	-5.640	-0.210
μ_1^d	0.329	11.596	
μ_2^e	1.286	27.947	

Log-Likelihood -1303.87 Chi-Squared 267.07^c

Predicted Correctly: 48% (Level of Concern: 0=42%, 1=0%, 2=33%, 3=73%)

Likelihood Ratio Test Statistic: 140.586^c

^a Marginal effects on the response categories other than very concerned are not shown. For the categories other than very concerned, the direction of influence is consistently opposite. The marginal effects were computed at the sample means for all variables.

^b Significant at the .05 level

^c Significant at the .01 level.

^d Change in the constant for level of concern=1.

^e Change in the constant for level of concern=2.

Table 4.5. Ordinal Probit Estimation Results for Future Risk Perception Regression

Variable	Parameter Estimate	z-ratio	Marginal Effect for Very Concerned ^a
Risk Perception Model: FUTURE CONCERN (n=1139)			
<u>Attitudinal and Demographic Factors</u>			
CONSTANT	-0.307	-0.866	
LACTOSE	0.054	0.657	0.022
HEREDITARY	0.097	1.488	0.038
PERSONAL CONCERN	0.116	1.186	0.046
POOR	0.004	0.034	0.002
GENDER	0.325 ^c	4.353	0.129
RACE	0.194 ^b	2.201	0.077
AGE	0.048 ^c	3.308	0.019
AGE-SQUARED	-0.001 ^c	-3.570	-0.001
CHILD<=6	0.192 ^b	2.417	0.077
CHILD7-17	-0.110	-1.576	-0.044
ENVIRONMENT	0.280 ^c	4.028	0.111
ANIMAL RIGHTS	0.105	1.300	0.042
LOCUS OF CONTROL	0.353 ^c	5.243	0.140
<u>Outrage Factors</u>			
VOLUNTARY	0.568	0.713	0.023
INVOLUNTARY	0.091	1.200	0.036
AWARE	-0.038	-0.523	-0.015
MILK BELIEF	-0.097	-1.385	-0.039
NO TRUST	0.423 ^c	3.736	0.168
NO CONSUMER BENEFIT	0.286 ^c	2.700	0.114
CONSUMER BENEFIT	-0.414 ^c	-3.908	-0.165
μ_1^d	0.457	12.160	
μ_2^e	1.500	28.366	

Log-Likelihood -1227.325 Chi-Squared 182.21^c

Predicted Correctly: 54% (0=10%, 1=0%, 2=42%, 3=81%)

Likelihood Ratio Test Statistic: 107.108^c

^a Marginal effects on the response categories other than very concerned are not shown. For the categories other than very concerned, the direction of influence is consistently opposite. The marginal effects were computed at the sample means for all variables.

^b Significant at the .05 level

^c Significant at the .01 level.

^d Change in the constant for level of concern=1.

^e Change in the constant for level of concern=2.

environmentalists (ENVIRONMENT), and perceiving a lack of control over life events (LOCUS OF CONTROL), were significant and positive influences for both health concerns toward the use of rbGH. For those respondents who are or have household members that are lactose intolerant (LACTOSE), and those who strongly identify with animal rights groups (ANIMAL RIGHTS), the probability of expressing "very concerned" about current safety increased, compared to lactose tolerant individuals and those who do not strongly identify with animal rights groups. Contrary to hypothesized, older food purchasers were significantly more likely to express "very concerned" about the future discovery of ill health effects than younger consumers. However, the significant and negative AGE-SQUARED variable implies that concern over future health does not rise monotonically with age. The other attitudinal and demographic variables, HEREDITY, PERSONAL CONCERN, POOR, and CHILD7-17 were insignificant.

The outrage factors of NO TRUST, NO CONSUMER BENEFIT, and CONSUMER BENEFIT were significant influences of health concerns. For both measures of concern, if the respondent lacked trustworthiness in the FDA (NO TRUST), the more likely they were to be very concerned about health effects than those who trust the FDA (Table 4.4 and 4.5). The variable measuring disagreement that there were any consumer benefits from farmers using rbGH (NO CONSUMER BENEFIT) was significant and positive with health concerns, while those who agreed rbGH's use yielded consumer benefits (CONSUMER BENEFIT) had a significant and negative influence on health concerns compared to those responding "don't know" (Table 4.4 and 4.5).

The outrage factors of INVOLUNTARY and MILK BELIEF were significant influences on being very concerned about current health effects (Table 4.4). Those who were not able to purchase untreated herd milk (INVOLUNTARY) had a significant and positive influence on current safety concerns compared to those responding "don't know," while those strongly agreeing that milk is natural (MILK BELIEF), were less likely to have current safety concerns than those who believe milk not to be natural.

Discussion and Conclusions

One conclusion seems evident from the data, consumers remain concerned about milk from cows treated with rbGH despite FDA approval. Typically, when there is concern about new food technology it diminishes over time (OTA, 1992). With rbGH this has not been the case (Fine, Travis, & Associates, Inc., 1986; Grobe & Douthitt, 1995; McGuirk, et al., 1992).

In attempting to explain the underlying reasons for consumer concern, this study is one of the first to empirically test Hadden's (1989) theory that outrage factors are influential determinants of consumers' risk perceptions. This study was interested in going beyond the demographic determinants of risk perception to an examination of risk characteristics. The results support that understanding consumers' perceptions of risk toward milk produced with rbGH requires more than a model of attitudinal and demographic factors, as Hadden's (1989) outrage factors are important predictors.

Further, the results suggest the risky elements, except for unfamiliarity and unnatural product characteristics, elicit consumer outrage perceptions.

The acceptability of biotechnology produced products is assumed to depend in part on the "...individual's ability to control their exposure to that product" (van Ravenswaay, 1988, p. 99). These results confirm this hypothesis as current health concern is contingent on consumers' perceived control over the product. Establishing market alternatives where consumers can purchase milk from untreated herds addresses consumer outrage, minimizing perceived personal health concerns.

While various studies have advocated risk information as a strategy for rbGH product acceptance (Kaiser, Scherer, & Barbano, 1992; McGuirk, et al., 1992), these results show an insignificant difference in risk perceptions between those who are aware and those unaware of rbGH's use. These results imply that information is only a partial solution to this complex problem.

Further, consumers who distrusted the FDA as a food-related information source were more likely to be very concerned about the current safety and the future discovery of adverse health effects from rbGH's use. This result reflects a lack of consumer trust in regulators' abilities to protect them in the market, and supports other studies reporting a loss of confidence in regulatory agencies charged with protecting food safety (Auld, Kendall, & Chipman, 1994; Dittus & Hillers, 1993; van Ravenswaay, 1995).

Contrary to theory, consumers who have strong, positive beliefs that milk is a natural product did not elicit negative feelings toward the unnatural production process of

rbGH. Rather, consumers who believe milk is not natural express concern about the non-natural rbGH technology.

Lastly, unless consumers perceive a clear benefit from a product, they will be less likely to accept any level of risk (Senauer, Asp, & Kinsey, 1991; Slovic, 1990). These results reinforce this hypothesis as consumers skeptical of receiving any tangible benefits with the use of rbGH question the safety of this product. Conversely, those who believe they will benefit from rbGH's use are less likely to have safety concerns.

Therefore, sole consideration of attitudinal and demographic factors provide a limited conception of risk, resulting in an underspecified model. Although they provide important predictors of risk perception and further explain why some consumers perceive risk toward FDA approved rbGH while others do not, the inclusion of outrage factors into the model reduces bias compared to this simpler model.

As this study's results have shown, outrage factors mediate risk perceptions. Consumers' perceived risks warrant recognition as a vital role in product acceptance. Therefore, those involved in risk assessment should place emphasis on integrating consumer beliefs and perceptions into assessments of risk. By identifying the less tolerable risk characteristics for a particular product, and incorporating these factors into risk assessments, one may find less consumer apprehension and increased trust in experts analysis of risk.

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CHAPTER 5

Consumer Risk Perception Profiles for the Biotechnology, Recombinant Bovine Growth Hormone (rbGH)

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Overtime, researchers have documented an increase in consumer concerns and feelings of vulnerability to modern food risks (OTA, 1992). Often these concerns vary in magnitude among consumers, given different perceptions of the product's riskiness. Even with similar food risk knowledge, differences emerge among consumers because of unique values and experiences (Sapp, Harrod, & Zhao, 1994). Consumers also differ in their response to risk context (van Ravenswaay, 1995). For example, some consumers may perceive a greater personal threat or susceptibility to the risk than others. In addition, consumers perceive different types and severity of harm. The extent of these perceptions may motivate a behavioral response from consumers, depending on their ability or resources to avoid the risk. Engaging in a self-protective behavior is one such response to minimize perceived personal risk. A self-protective behavior is defined as an averting behavior used by consumers to reduce the chance of an adverse outcome, or as an action taken to reduce personal or group vulnerability to a risk (Ehrlich & Becker, 1972). Self-protective behaviors to reduce food-related risks could involve changing food preparation methods, reducing consumption of the suspect food, substituting other comparable foods, or preventative health behavior (Eom, 1993).

Krimsky (1995) contends that the life cycle of a controversy can provide insights into the process of risk selection. The life cycle controversy of recombinant bovine growth hormone (rbGH), a food-related biotechnology used in milk production, was described by Krimsky (1995) as having a 13 year gestation period with peaks of intense public debates in the years 1990 and 1993, right before its approval for commercial use. While still in the development stage, the rbGH product drew skepticism from environmental and sustainable

agricultural groups (Krimsky, 1995). Although there was public apprehension toward the product, there was no dramatic incident or single health hazard such as with other food products or additives (e.g., Alar). Such dramatic events are said to heighten risk perceptions, as well as to shape risk behavior (Kasperson, 1992). The broad but less intense public concern associated with the rbGH product primarily focused on health and equity concerns, in addition to social and ethical issues of the product (Krimsky, 1995). Yet strong support from professional organizations, as well as scientific evidence showing rbGH was safe for human consumption and had no adverse impact on cattle, ultimately led to the Food and Drug Administration (FDA) approval of rbGH for commercial use in 1994 (Ropp, 1994). Because the FDA ruled there was no difference in the milk from treated versus untreated cows' milk they did not require any special labeling of meat or dairy products from cows treated with rbGH (Ropp, 1994). Despite this, some consumers remain concerned. As a result, the controversy around rbGH has turned to whether there should be mandatory labeling laws to enhance consumer choice.

In summary, public apprehension has been expressed about the rbGH product since its development (Smith & Warland, 1992). According to Krimsky (1995), how the controversy develops can impact consumers' sense of risk. The extent to which this controversy elicits a particular level of perceived risk toward milk produced with rbGH will be indicated by the consumer's selection of risk.

There is evidence that consumers' risk perceptions vary depending on the nature of the product (Oglethorpe & Monroe, 1994; Slovic, 1992). However, little is known about the magnitude of consumers' risk perceptions for a specific product. The research

presented here provides initial insights as to how consumers respond to different typologies of risk perception toward the use of rbGH. The intent of this research is to determine the characteristics of consumers for each risk perception typology. With the use of new technologies in the food supply and increased knowledge of the link between diet and health, consumers have a heightened interest in food quality and safety issues (Huang, 1991). Risk communicators could more effectively respond to this interest if they were aware of the various consumer risk perception profiles for a particular product.

This study modifies Weinstein's (1988) self-protection stage theory to classify different risk perception typologies associated with milk from cows treated with rbGH. After reviewing Weinstein's theory, the authors formulate risk perception typologies for the case of rbGH. Using nationwide consumer survey data, the characteristics of consumers for the risk perception typologies are investigated. The results are presented with a discussion of policy implications.

Weinstein's Self-Protection Process

Weinstein characterizes self-protection as a "...series of distinct stages" reflecting individual behavior differences at different points in the self-protection process (1988, p. 358). Weinstein's theory defines stages in terms of "...beliefs people hold about this risk situation" (1988, p. 359). Weinstein also suggests that "...people at different points in the precaution adoption process behave in qualitatively different ways and that the kinds of interventions and information needed to move people closer to action will vary from stage

to stage" (1988, p. 358). He proposed a stage approach to understanding the self-protection adoption process. This approach differs from other theories (Cleary, 1987), because it allows individuals to vary their behavior at each stage. The stage approach assumes that (a) advancing to the next stage requires an acceptance of the idea defining the current stage, and (b) the stages are cumulative (Weinstein, 1988).

Weinstein (1988) developed his theory for perception of an actual risk. The first of Weinstein's (1988) five stages is that a person must have learned or heard about the existence of the hazard (Table 5.1). Weinstein (1988) believes that in most cases a lack of self-protection stems from not being aware a risk actually exists. Progressing to stage two entails a belief that there is a significant likelihood for others to experience a risk. Many individuals form an erroneous belief that their own risk is less than someone else's, or what is referred to as "optimistic bias" (Weinstein, 1988). Optimistic bias can be a critical barrier to engaging in self-protective behavior. If individuals do not believe a risk exists, they will be less likely to search for information and be less attentive to risk communication. Acceptance of personal risk susceptibility characterizes Weinstein's (1988) stage three. One would have little interest in self-protective behavior unless they felt they were personally vulnerable to the risk, or that it exhibited a personal threat. This is a pivotal component in the process of adopting self-protective behavior. Stage four is the intention to take the self-protective behavior (Weinstein, 1988). Necessary conditions for deciding to act are that the person must believe the risk could happen to them and possibly cause personal negative consequences. People must also evaluate their ability and perceived effectiveness in taking the self-protective behavior. Despite the individual's

intention to act, barriers remain such as time commitment or situational circumstances which may create a gap between intention and adoption of a self-protective behavior. Taking a self-protective behavior advances one to the fifth and final stage of Weinstein's (1988) process.

Table 5.1. Weinstein's Stage Approach Theory for the Self-Protection Process

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Learn the hazard exists	Believes in significant likelihood for others	Acknowledges personal susceptibility	Intention to act	Takes self-protective behavior

Risk Perception Typologies for rbGH

Contrary to Weinstein's (1988) theory which presumes an actual risk exists, consumers' perceived risk is the focus of interest for the rbGH product. The usefulness of Weinstein's (1988) theory was in motivating insight regarding various classifications of risk perceptions. His theory assists in conceptualizing the differences among consumers along a continuum, where differences diverge depending on the personal susceptibility and severity one feels toward the perceived risk, and perceived effectiveness of reducing risk perceptions. Thus, this research modified Weinstein's self-protection stages to risk perception typologies. The purpose of this analysis was to determine the characteristics of consumers for each risk perception typology.

Survey Design

The survey design is presented to assist in clarifying the formation of the risk perception typologies. A survey was designed to analyze whether there were certain factors or experiences (personal, health-related, beliefs, attitudes) influencing consumers to feel there was a risk associated with the rbGH product. With regard to awareness, those respondents who were not aware of rbGH's use were provided a description¹⁰ as a basis for answering the remaining survey questions about the biotechnology. Regardless of whether the respondent was aware of rbGH or had received limited information on rbGH's use, all were asked about their current concern for health risks and future discovery of health risks. If the response was positive (perceived current or future concern), respondents were probed about the level of their concern. The survey instrument also incorporated questions on the effects of commercial adoption of rbGH on consumer demand for fluid milk, and consumer self-protection or risk-averting response.

Not Aware, But Provided Limited Information About rbGH

Given the complexity and unfamiliarity of biotechnology applications, perceptions of risk were assumed to differ between those aware and those not aware of rbGH's use. Further, there is evidence that new risk information can influence consumers' perceptions

¹⁰ Interviewers read the following statement verbatim to respondents, "Bovine somatotropin (rbGH) is a growth hormone, which when administered/injected in fully grown, lactating cows, increases their milk production, thereby improving dairy farm profits. The milk from cows given rbGH has the same product characteristics as the milk from untreated cows."

(OTA, 1992). Thus, various classifications were designated for those unaware, given the potential influence of information on personal perceptions associated with consuming rbGH treated herd milk (Table 5.2).

Table 5.2. Risk Perception Typologies for the rbGH Product

Risk Perception Typology					
	<i>Type 0</i>	<i>Type 1</i>	<i>Type 2</i>		
Not Aware <i>(Provided limited information about rbGH's use)</i>	Perceive no ill health risk	Perceive only future ill health risk from consuming rbGH treated herd milk	Perceive both future and immediate ill health risk from consuming rbGH treated herd milk		
				<i>Type 3</i>	<i>Type 4</i>
Aware of rbGH's use	Perceive no ill health risk	Perceive only future ill health risk from consuming rbGH treated herd milk	Perceive both future and immediate ill health risk from consuming rbGH treated herd milk, and have the ability or resources to self-protect, but elect not to self-protect	<i>Type 5</i>	<i>Type 6</i>
				Perceived personal risk elicits a self-protection response: <ul style="list-style-type: none"> • purchasing milk identified as coming from nontreated herds • changing milk consumption levels 	

Type 0. This typology represents those consumers who lack awareness and perceive no adverse health effects from consuming rbGH treated herd milk. In essence,

this typology is characterized by those who received limited information about rbGH's use, and do not perceive a risk.

Type 1. Consumers with limited information who expressed a concern level for the future discovery of ill health effects typify this typology. Consequently, even if the consumer perceived some future health risk, they may not view this risk as affecting them immediately.

Type 2. This typology represents consumers with limited information who perceive both a future and immediate health risk from consuming milk from rbGH treated herds. Although the consumers of this typology have expressed a level of perceived personal susceptibility, their lack of awareness of rbGH's use precludes them from actually engaging in self-protective behaviors.

Aware of rbGH's Use

Risk perception typologies were also formulated for those aware of the use of rbGH (Table 5.2). Those with knowledge of the product's existence were assumed to form various opinions about their perceived level of concern, differing with regard to their perceived susceptibility or severity, or personal effectiveness at reducing their perceived risk.

Type 3. This risk perception typology reflects those consumers who have heard or read something about rbGH's use and believe the safety assurances by the FDA. Thus, consumers at this typology are aware of rbGH's use and perceive no ill health risks.

Type 4. This typology is manifested by consumers who are aware and express a concern level for the future discovery of ill health effects. Yet, the perceived risk of the consumers comprising this typology was not severe enough to evoke concern about an immediate health risk.

Type 5. This typology comprises consumers who are aware and express both future and immediate health concerns, indicating a personal susceptibility from milk produced with rbGH. Further, these consumers have the ability and some have the resources to reduce their perceived risk, but have elected not to self-protect. The ability, in this case, is changing milk consumption levels, while resources are indicated by knowing of a local food store where one could purchase milk from untreated herds. Ability or resources could increase the consumer's perceived effectiveness of taking a self-protective behavior. Although these consumers have the ability or resources to self-protect, barriers remain which prevent actual adoption.

Type 6. This typology typifies aware consumers, who perceive personal susceptibility, and use their ability or resources to engage in a self-protective behavior. Self-protective behavior one may engage in for rbGH include: (a) seeking assurance that purchased milk came from a nontreated herd, or (b) changing milk consumption levels. Specifically, consumers could purchase milk identified as coming from nontreated rbGH herds. The individual may identify the milk through a store, a brand, and/or labeling policy. Consumers could change consumption by: reducing milk consumption, stopping milk consumption altogether, or substituting to other products such as soy or goat's milk.

Methodology

In the following analysis, individual differences for each risk perception typology are examined. This study compares the influences of personal characteristics across a particular risk perception typology. The value of such a comparison is apparent when considering effective risk communication for those consumers at each typology of risk perception.

Sample

A nationwide telephone survey was conducted from March 1 through June 27, 1995 by the Letters and Science Survey Center, University of Wisconsin-Madison. The respondent selected for the interview was the person identified as a household resident "who is age 18 or older and primarily responsible for the household's food purchasing decisions." The 1,910 completed interviews consisted of 969 completions from a National sample frame, 187 completions from a Wisconsin sample frame, 186 completions from a Vermont sample frame, and 568 completions from a Poor sample frame. We wanted to obtain a significant representation from the two states with food labeling regulation and low-income consumers. Thus, Wisconsin, Vermont, and poor households were oversampled. A weighting procedure was applied when projecting results to U.S. households to reduce sample bias and ensure findings were representative of the U.S. household population (for details see Douthitt, Zepeda, & Grobe, 1996).

Respondents were qualified for inclusion in the subsample if they (a) expressed an opinion on whether or not they were aware of rbGH (12 observations lost), (b) met the parameters of the typologies (398 observations lost), (c) purchased milk (37 observations lost), and (d) reported complete data for all other variables used (326 observations lost). This left 1,137 in our subsample.

Of these weighted subsample respondents 74% were women, results consistent with the screening question for primary household food purchaser. The typical respondent was 45 years of age, and had a median income of approximately \$40,000. Sixty-seven percent of this subsample respondents were married, with an average household size of 2.93. Eighty-five percent of this subsample was Caucasian.

Variable Definition

Risk-perception typologies. The dependent variable, TYPE, represents the mutually exclusive risk perception typologies, resulting in a polychotomous variable (Table 5.3). TYPE was equal to zero when the respondent was not aware of the use of rbGH in milk production and did not perceive ill health effects from consuming the rbGH product (TYPE=0). Almost five percent of the subsample respondents comprise this typology. Approximately three percent of the subsample respondents were not aware of the use of rbGH in milk production, but were concerned with the future discovery of ill health effects associated with milk from rbGH treated herds (TYPE=1). Being unaware and concerned for both the future discovery and immediate ill health effects included

Table 5.3. Variable Definition and Sample Statistics for the Dependent Variable

Dependent Variable	Definition						Mean	St. Dev.	N
TYPE							3.7931	1.7465	1137
TYPE=0	TYPE=1	TYPE=2	TYPE=3	TYPE=4	TYPE=5	TYPE=6			
A=1 B-F=0 (4.5%)	AC=1 B,DEF=0 (3.3%)	ACD=1 B,EF=0 (19.4%)	B=1 A,C-F=0 (9.6%)	BC=1 A,DEF=0 (6.2%)	BCDE=1 A,F=0 (35.8%)	BCDEF=1 A=0 (21.2%)			

A = 1 if respondent did not "recall having heard or read anything about the use of rbGH" (were provided limited information about rbGH)

B = 1 if respondent recalled "having heard or read anything about the use of rbGH"

C = 1 if respondent expressed concern levels of moderate or very concerned about the future discovery of ill health effects associated with consuming milk from rbGH treated herds; 0 otherwise

D = 1 if respondent expressed moderate or very concerned about current human ill health effects from consuming milk from rbGH treated herds; 0 otherwise

E = 1 if the respondent knew there were food stores in their area where they could purchase milk from untreated cows; 0 otherwise

F = 1 if respondent indicated they (a) "usually purchase milk identified as coming from nontreated cows," or (b) reduced or stopped their milk consumption; 0 otherwise

19.4% of the subsample respondents (TYPE=2). Almost 10% of the subsample respondents were aware and perceived no health risks from consuming the rbGH product (TYPE=3). Six percent of the subsample respondents were aware and concerned only for the future discovery of ill health effects (TYPE=4). Being aware, concerned about potential and immediate health risks, able to avoid perceived risk, but deciding not to self-protect included around 35% of the subsample respondents (TYPE=5). Finally, subsample

respondents who were aware, perceived both future and immediate health risks, and either purchased milk identified as coming from cows not treated with rbGH or changed their milk consumption levels comprise this typology (TYPE=6). Twenty-one percent of the subsample respondents engaged in self-protective behavior.

Personal health influences. Personal experience is believed to impact not only the recognition of risk, but also the intention to engage in self-protective behavior (Weinstein, 1989). Family characteristics, in particular, can be associated with a heightened state of awareness about health, influencing health beliefs, attitudes, and behaviors (Cleary, 1987). Weinstein (1984) found heredity factors to be significantly associated with perceived risk. Similarly, individuals who have developed other food safety concerns may be more health motivated. Schafer, Schafer, Bultena, & Hoiberg (1993) found individuals who were more health motivated were significantly more likely to engage in self-protective food safety behavior than those who were not health motivated. These individuals may also be more open to risk communication strategies.

Variables reflecting personal health influences relevant to food purchases were HEREDITY, PERSONAL CONCERN, and LACTOSE (Table 5.4). HEREDITY and LACTOSE reflect family characteristics, as PERSONAL CONCERN represents health motivation. HEREDITY measures whether or not the respondent or anyone in the household has a family history of cancer or heart disease; PERSONAL CONCERN measures changing food habits because of a concern about future personal and family health risks; and LACTOSE measures the occurrence of lactose intolerance in the household and also controls for differences in lactose intolerance among ethnic groups.

Table 5.4. Variable Definition and Sample Statistics for the Independent Variables (n=1137)

Independent Variable	Definition	Mean	St. Dev
<u>Personal Health Influences</u>			
HEREDITY	=1 if respondent or any of the household members have a family history of cancer or heart disease; 0 no history of hereditary disease	0.570	0.495
PERSONAL CONCERN	=1 if respondent changed food habits because of concern about future personal and family health risks; 0 no change in food habits	0.878	0.328
LACTOSE	=1 if respondent or any of the household members are lactose intolerant; 0 lactose tolerant	0.177	0.382
<u>Social and Cultural Influences</u>			
GENDER	=1 female; 0 male	0.741	0.439
POOR	=1 if poor (qualified as poor under the February 9, 1995, USDA poverty guidelines); 0 nonpoor	0.063	0.242
EDUCATION	=1 if greater than a high school degree; 0 high school degree or less	0.731	0.444
AGE	Age in years	44.70	14.68
HHSIZE	Number of persons living in the household counting all adults and children.	2.934	1.406
ETHNIC	=1 for African American, Asian, Native American or of Hispanic origin; 0 for Caucasian	0.154	0.361
ENVIRONMENT	=1 if respondent strongly identified with environmentalists; 0 not at all, or somewhat identified with environmentalists	0.369	0.483
ANIMAL RIGHTS	=1 if respondent strongly identified with animal rights groups; 0 not at all, or somewhat identified with animal rights groups	0.250	0.433
<u>Perceived Locus of Control</u>			
LOCUS OF CONTROL	=1 if respondent strongly agreed with the following two statements: "I worry about the future that today's children are facing;" "More and more, I feel helpless in the face of what's happening in the world today;" 0 not at all, or somewhat agreed with either of the above two statements	0.444	0.497

Social and cultural influences. "Health behavior may reflect, in part, broad social processes" (Cleary, 1987, p. 132). Schafer et al. (1993) found females, older persons, and larger households to be significantly more likely to be concerned with food safety issues and undertake self-protective behaviors, than men, younger individuals, and smaller households. Schafer et al. (1993) posited that education attainment and income affect behavior by influencing the perception of susceptibility. That is, higher educated individuals have the knowledge, while those with higher income have the resources to ensure food safety (Schafer, et al., 1993). Although their results did not support this hypothesis, other researchers have found education to be associated with health practices, and low-income individuals to have different barriers (social isolation, access to preventative services) affecting their ability to engage in self-protective behaviors (Cleary, 1987). Researchers have found ethnicity to be a "...determinant of individuals' perception of and response to symptoms" (Cleary, 1987, p. 134), while social support networks were seen as a means of interacting with a person's beliefs and the beliefs of network members (Cleary, 1987).

Variables reflecting social and cultural influences are GENDER, POOR, EDUCATION, AGE, HHSIZE, ETHNIC, ENVIRONMENT, and ANIMAL RIGHTS (Table 5.4). All but age and household size were binary variables. GENDER was equal to one if the respondent was female, zero if male; POOR was equal to one if the respondent qualified as poor under the February 9, 1995, USDA poverty guidelines, zero if nonpoor; and EDUCATION was equal to one if the respondent had greater than a high school degree, zero if high school degree or less. Age and household size were continuous

variables where AGE indicated the respondents' age in years, and HHSIZE indicated the number of persons living in the household counting all adults and children. ETHNIC was equal to one if the respondent's were African American, Asian, Native American, or of Hispanic origin, zero if they were Caucasian. Group affiliation variables measure the respondent's level of identification with environmentalists (ENVIRONMENT), and the level of identification with animal rights groups (ANIMAL RIGHTS).

Perceived locus of control. Locus of control, or the individual's perceived control over life events is viewed as a barrier to self-protective behavior. Research suggests that feelings of external control were associated with less initiative and effectiveness in carrying out behavior to protect oneself (Cleary, 1987). This was indicated by results finding perceived control to be significantly related to behavioral intention, and ultimately influencing self-protective behavior (Cleary, 1987).

LOCUS OF CONTROL was measured by creating an index of two variables (Table 5.4). The first variable was based on agreement to the statement "I worry about the future that today's children are facing," while the second variable was based on agreement to the statement "More and more, I feel helpless in the face of what's happening in the world today" (Seeman, 1991). LOCUS OF CONTROL is equal to one if the respondent strongly agreed with the two statements, zero if not at all, or somewhat agree with either of the above two statements.

Results

The purpose of this study was to understand individual differences for the various risk perception typologies. Thus, we estimated a multinomial logit model of the typologies, using personal characteristics as explanatory variables. Table 5.5 presents the marginal effects for each personal characteristic at each risk perception typology. The marginal effects reflect the predicted probability, evaluated at the weighted subsample means for all variables, of being in a particular typology for a change in the independent variable. For example, the probability of being in TYPE=0 increased by one percent for those with a family history of cancer or heart disease. The overall multinomial logit model for the typologies variable had a significant overall chi-square value at the 0.001 level (Table 5.5). The LIMDEP econometric software was used for the multinomial logit procedure (Greene, 1995).

Not Aware and Perceive No Risk (TYPE=0)

The marginal effects indicate that those with a high school education or less (EDUCATION) were more likely to be unaware of rbGH and perceive no ill health risks, than those with greater than a high school education. This result can be compared with McGuirk, Preston, & McCormick (1990) who found higher educated individuals to be more aware of food safety concerns and also more likely to act on those concerns. Less

educated consumers may be more unaware, considering the complexity and availability of information on biotechnology produced products.

Table 5.5. Marginal Effects, the Probability of Being in One Typology for a Change in the Independent Variable

Independent Variables	NOT AWARE			AWARE			
	TYPE=0	TYPE=1	TYPE=2	TYPE=3	TYPE=4	TYPE=5	TYPE=6
Constant	-	-	-	-	-	-	-
HEREDITY	0.012	-0.026 ^b	-0.005	-0.036 ^a	0.005	0.020	0.030
PERSONAL CONCERN	-0.013	0.016	-0.032	0.010	-0.021	0.083	-0.044
LACTOSE	-0.010	-0.048 ^a	-0.014	-0.027	-0.019	0.100 ^b	0.018
GENDER	0.004	0.002	0.047	-0.067 ^b	-0.026	0.044	-0.005
POOR	0.026	-0.024	0.044	0.041	-0.001	-0.106	0.021
EDUC.	-0.031 ^a	-0.005	-0.113 ^b	0.041	0.019	0.046	0.043
AGE	-0.001	-0.001	-0.002	0.001	-0.001	0.003 ^a	-0.001
HHSIZE	-0.004	-0.001	-0.003	-0.001	0.001	-0.008	0.014
ETHNIC	0.003	0.001	0.082 ^b	-0.036	-0.033	0.006	-0.010
ENVIRON.	-0.017	-0.025 ^a	0.005	-0.015	-0.013	-0.011	0.077 ^b
ANIMAL RIGHTS	-0.006	-0.007	0.053	-0.047 ^a	-0.016	0.042	-0.018
LOCUS OF CONTROL	-0.026	0.015	0.060 ^a	-0.087 ^b	-0.038 ^b	0.073 ^a	0.003

Log-Likelihood -1779.234 Chi-Squared 220.4129^b

^aSignificant at the .05 level; ^bSignificant at the .01 level

Not Aware, Future Health Concerns, But No Immediate Concerns (TYPE=1)

The personal characteristics of HEREDITY, LACTOSE, and ENVIRONMENT were significant covariates for those respondents with limited awareness and who

expressed a concern for future health risks. Respondents who do not have a family history of cancer or heart disease (HEREDITY), those who are lactose tolerant (LACTOSE), and those who do not, or only somewhat, identify with environmentalists (ENVIRONMENT), were more likely to be in this typology than those with a history of hereditary diseases, lactose intolerant individuals, or those who strongly identify with environmentalists. It may be that those without personal health factors, or who do not identify with environmentalists tend to feel risk information has less personal salience.

Not Aware, Concerned about Future and Immediate Health Effects (TYPE=2)

There is significant evidence that those with a high school education or less (EDUCATION), respondents whose ethnicity is African American, Asian, Native American, or of Hispanic origin (ETHNIC), and those who feel a lack of control over life events (LOCUS OF CONTROL), were more likely to have limited awareness and be concerned for both future and immediate health risks compared to those with greater than a high school education, Caucasians, and those who perceive control. These results are consistent with Savage (1993) who found those with lower levels of education and African Americans to have greater fear of risk than higher educated individuals and non African Americans. Savage (1993) believes these particular consumers' perceive more personal exposure to the risk. A similar conclusion is suggested for those who perceive a lack of control over life events.

Aware of rbGH's Use and Feel the Product is Safe (TYPE=3)

The personal characteristics of HEREDITY, GENDER, ANIMAL RIGHTS, and LOCUS OF CONTROL were significant influences on being aware of rbGH and perceiving no ill health risks. The marginal effects imply that respondents who do not have a family history of cancer or heart disease (HEREDITY), males (GENDER), those who do not, or only somewhat identify with animal rights groups (ANIMAL RIGHTS), and those who perceive control over life events (LOCUS OF CONTROL), were more likely to be in this typology than those with a history of hereditary disease, females, those identifying with animal rights groups, and those who perceive a lack of control. These results are comparable to Weinstein (1984) who found hereditary factors to be significantly associated with perceived risk, Savage (1993) who found women to perceive greater risks than men, and Douglas and Wildavsky (1982) who believe that those who are involved in certain social groups tend to emphasize certain risks as a way of maintaining the group. Moreover, the results show that feeling in control over life events increases one's confidence in the safety of the rbGH product.

Aware of rbGH, Future Health Concerns, But No Immediate Concerns (TYPE=4)

Respondents who perceive control over life events (LOCUS OF CONTROL) are more likely to be in this typology than those who perceive a lack of control. Thus, the probability of being aware and concerned about future health risk increased for consumers

with a greater sense of control. This result indicates that those who perceive control over life events and feel less assurance about future health risks, are possibly seeking further information.

Aware, Future and Immediate Health Concerns, But Elect Not to Self-Protect (TYPE=5)

LACTOSE, AGE, and LOCUS OF CONTROL were significant determinants influencing being aware, perceiving personal susceptibility toward the use of rbGH, and having the ability or resources to avoid perceived risk, but deciding not to self-protect. For the consumers of this typology, not engaging in self-protection actions may originate from barriers such as time commitments, or personal circumstances.

Those with household members who are lactose intolerant (LACTOSE) were more likely to be in this typology compared to those lactose tolerant. The results suggest that those with a heightened health awareness, resulting from their own personal health, are more likely to feel susceptible to perceived personal risk.

Additionally, there is evidence that the probability of being in this typology increases with the primary household food purchasers age (AGE). This was consistent with findings of older individuals having greater concern with food safety, compared to younger individuals who have a greater optimistic bias about perceived susceptibility (Schafer, et al., 1993; Weinstein 1984).

Further, those who perceive a lack of control over life events (LOCUS OF CONTROL) were more likely to be in this typology compared to those perceiving control.

The results show that consumers who feel their personal effort is futile are less likely to adopt self-protective behavior and perceive more personal vulnerability than those who perceive control over life events. As found by Schafer et al. (1993), those who engaged in food safety behaviors had a greater perceived control than those who perceived a lack of control.

Engage in Self-Protective Behavior (TYPE=6)

ENVIRONMENT showed to have a significant influence on the adoption of self-protective behavior. The marginal effects indicate that those who strongly identify with environmentalists (ENVIRONMENT) were more likely to be aware, perceive personal susceptibility, have the ability or resources to self-protect, and actually engage in self-protective behavior, than those who do not, or only somewhat identify with environmentalists. That is, these consumers responded to their perceived health risk by eliciting strategies to obtain a particular level of risk acceptability.

Conclusions

Groups of consumers with the same information have variable beliefs and attitudes relating to their own personal preferences. Given these preferences, consumers are expected to exhibit differences in their evaluation of the outcome of decisions (Hadden 1989). It is important to understand the role consumers play in risk decision making because they evaluate risks in ways that differ from others (e.g., scientific risk

assessments). This study is an initial attempt at classifying consumers in how they respond to their perceived risks toward the use of rbGH. The results show that one cannot characterize consumers' risk perception in a single way. There are systematic differences between consumers producing a range of risk perception profiles toward milk produced with rbGH.

This study's results strengthen the idea that consumers with similar information display varying perceptions of risk. For example, those consumers who were unaware of rbGH's use but were provided the same brief description of rbGH (TYPE=0-2), exhibited different risk perception responses, from believing the product was safe to perceiving personal susceptibility. For these consumers, perceiving both immediate and future health risks seem to be contingent on the individual's perceived personal exposure, or fear of risks in general. The results also imply that consumer characteristics such as personal health factors, being older, or perceiving a lack of control appear to influence being aware and perceiving some risk associated with the use of rbGH. The most likely explanation for those consumers who have immediate concerns but do not self-protect is that personal barriers, or lack of perceived effectiveness of action prevents self-protective behavior. Results from this study also showed that those who engaged in self-protective behavior were more likely to strongly identify with environmentalists. Overall this result supports the notion that environmental concerns of this rbGH product may be as important as food safety concerns. In addition, Krinsky (1995) was previously noted to posit that how a controversy develops can impact a consumer's sense of risk. This statement is reinforced by these findings as environmental groups were skeptical early in rbGH's development,

impacting their beliefs and attitudes toward perceived risk and their decision to self-protect.

The implication of these results is that one public policy strategy will unlikely satisfy all consumers (van Ravenswaay, 1995). By understanding the way consumers differ in their behavioral response to perceived concern, risk communicators could design more effective risk communication strategies. For example, those consumers who were aware and concerned about potential health risks indicate a profile of information seekers who would be more attentive to risk information.

This preliminary research has been useful in stimulating thinking about typologies of risk perception. Although an investigation accounting for the linkages in typologies was beyond the scope of this study, it is an area for future research. Risk communicators could further gain from understanding the processes involved in risk perception behavior. In addition, research should proceed by implementing a predictive model, determining who would fall into a particular typology of risk perception.

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CHAPTER 6: SUMMARY

The research problem for this study was characterized as a noted discrepancy between consumers' risk perceptions and scientific experts' assessment of risk, requiring an investigation of the underlying reasons for consumers' risk perceptions. There is also a lack of commonly accepted methodologies and theoretical frameworks for empirically studying risk perceptions toward food-related products. Thus, this researcher sought to understand consumers' perceived risk from consuming milk produced with rbGH through a three part study. First, a focus group study was utilized, exploring the primary factors of consumer apprehension toward rbGH's use. This also proved invaluable for designing a survey instrument for a national study. The second part used national survey data to empirically test the theoretical speculation that outrage factors influence risk perceptions, while the last part investigated consumer risk perception profiles. The results suggest the following: (a) consumers' risk perceptions are multi-dimensional and differ in emphasis compared to the risk assessments by scientific experts, (b) to a certain extent one can identify consumers' concerns by recognizing outrage, and (c) there are systematic differences between consumers' risk perceptions and their behavior associated with these perceptions. This research provides new opportunities for dialog and study by offering a consumer perspective toward using rbGH technology in milk production. Government regulators, the food industry, risk communicators, and consumer researchers can all benefit from this perspective.

Government Regulators

Implications

- Establishing choices in product selection addresses consumer outrage from an imposed risk, minimizing perceived personal risk.
- Consumers' risk perceptions warrant recognition as playing a vital role in product acceptance.
- Consumers lack confidence in the government's ability to protect the safety of the food supply.

Recommendations

- Providing market alternatives by labeling would be an effective approach to increasing personal choice. Recommendations exist for regulated voluntary labeling of biotechnology-derived food products (Douthitt, 1995; OTA, 1992; Thompson, 1996). This approach could lead to a more accurate consumer demand response (Viscusi, 1993), and improve perceptions of the safety of our food supply (Harris, Padberg, & Capps, 1991).
- Those involved in risk assessment should place emphasis on integrating consumer beliefs and perceptions into assessments of risk.

- Government regulators need to incorporate consumers early in the approval process regarding complex risk situations, potentially building trust in assuring food safety and reducing consumer apprehension. This approach was similarly recommended in the past year by a committee of the National Research Council and the Commission on Risk Assessment and Risk Management ("Facing Our Fears," 1996).

Food Industry

Implications

- Exclusive concentration on the market's supply-side does not provide a comprehensive view of final product acceptance.

Recommendations

- When developing unfamiliar and complex innovative food products, the food industry is advised to base product acceptance response on both the demand and supply aspects of the market.

Risk Communicators

Implications

- Consumers will be more inclined to believe food information sources perceived to:

(a) be concerned with the interests of consumers, (b) provide assurances of long term testing, and (c) be independent and unbiased.

- Consumers' risk perceptions are multi-dimensional.
- One risk communication strategy will unlikely satisfy all consumers' risk perceptions.

Recommendations

- Risk communicators should identify and collaborate with food-related information sources deemed trustworthy by consumers.
- Risk communicators need to recognize the value issues, as well as the factual issues involved in food-related risk. Thus, focus should be directed toward enhancing trust, reducing outrage, and transmitting facts to communicate effectively about food safety issues (Groth, 1990).
- More effective risk communication strategies could be designed by understanding the ways consumers differ in their perceptions of risk for a particular food-related product.

Consumer Researchers

Implications

- Qualitative research is invaluable in strengthening empirical measures and in formulating concise survey questions.
- Outrage factors mediate risk perceptions.

- There are systematic biases in the way people evaluate perceptions of health risk from a new food-related biotechnology.

Recommendations

- Consideration should be given to qualitative research as a precursor to survey instrument design and development.
- Further empirical estimation of the influence of outrage factors on the perceived risks of other food-related technologies is warranted.
- Research needs to further investigate and clarify the differences among consumers' perceptions of risk for specific food products.

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APPENDIX

APPENDIX: Survey Instrument

May I speak to the person in your household who is 18 years or older and is primarily responsible for household meal planning?

We are calling to discuss your attitudes about different foods, your family's health, and new food technologies.

GEND [equiv RN7 position 2]

(INTERVIEWER: ENTER R'S GENDER)

<1> MALE

<2> FEMALE

==>

DIET

Over the past few years have you made any concerted efforts to improve your personal or family diet?

<1> YES

<2> NO [goto CANC]

<8> DON'T KNOW [goto CANC]

<9> REFUSED [goto CANC]

==>

CNG1

Have you made any of the following changes? First, have you or your family...
reduced the number of calories you eat ?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

CNG2

Have you made any of the following changes? Have you or your family...)
reduced your fat intake ?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

CNG3

Have you made any of the following changes? Have you or your family...
reduced your salt intake?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

CNG4

Have you made any of the following changes? Have you or your family...
eaten more fruits and vegetables ?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

CNG5

Have you made any of the following changes? Have you or your family...
eaten less red meat?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

CNG6

Have you made any of the following changes? Have you or your family...
eaten more chicken or fish ?

- <1> YES
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ====>

CNG7

Have you made any of the following changes? Have you or your family...
eaten more breads and grains ?

- <1> YES
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ====>

CNG8

Over the past few years have you made any OTHER concerted efforts to improve
 your personal or family diet?

- <1> YES
- <2> NO [goto WHY1]
- <8> DON'T KNOW [goto WHY1]
- <9> REFUSED [goto WHY1]
- ====>

CNG9 [allow 2]

What did you do ?
 ====> [specify]

WHY1

Why did you make these changes? Did you make the changes...**because a doctor recommended it?**

- <1> YES
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ====>

WHY2

Why did you make these changes? Did you make the changes...**because of a response to a current personal or family health problem?**

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

WHY3

Why did you make these changes? Did you make the changes...**because of a concern about future personal or family health risks?**

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

WHY4

Why did you make these changes? Did you make the changes...**because of a concern about food safety?**

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

WHY5

Why did you make these changes? Did you make the changes...**because of media attention given to health issues?**

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

WHY6

Are there any OTHER reasons you have made efforts to improve your personal or family diet?

- <1> YES
- <2> NO [goto CANC]
- <8> DON'T KNOW [goto CANC]
- <9> REFUSED [goto CANC]
- ====>

WHY7 [allow 2]

What are those reasons ?

====> [specify]

CANC

Now we have a question about your and other household members' health. Do you or anyone in your household have a family history of cancer or heart disease?

- <1> YES
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ====>

FDA

Are you familiar with the U.S. Food and Drug Administration, the FDA ?

- <1> YES
- <2> NO [goto TRS1]
- <8> DON'T KNOW [goto TRS1]
- <9> REFUSED [goto TRS1]
- ====>

JOB

How good a job do you think the FDA is doing to ensure the safety of new products introduced into the market? Do you feel they are doing a poor job, a fair job, a good job, or an excellent job?

- <1> POOR JOB
- <2> FAIR JOB
- <3> GOOD JOB
- <4> EXCELLENT JOB
- <8> DON'T KNOW
- <9> REFUSED
- ===>

TRS1

There are many ways that consumers educate themselves about food safety. Further, some people consider certain information sources as being more trustworthy than others. How about you? How trustworthy are the following food safety information sources to you? Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?

First, the Food and Drug Administration (FDA)?

Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ===>

TRS2

(How trustworthy are the following food safety information sources to you?)

Next, farmer organizations?

(Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?)

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ===>

TRS3

(How trustworthy are the following food safety information sources to you?)

Next, physicians?

(Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?)

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ==>

TRS4

(How trustworthy are the following food safety information sources to you?)

Advertisements?

(Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?)

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ==>

TRS5

(How trustworthy are the following food safety information sources to you?)

Nutrition information labels?

(Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?)

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ==>

TRS6

(How trustworthy are the following food safety information sources to you?)

Journalists?

(Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?)

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ====>

TRS7

(How trustworthy are the following food safety information sources to you?)

Food and drug related businesses?

(Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?)

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ====>

TRS8

(How trustworthy are the following food safety information sources to you?)

The United States Department of Agriculture, the USDA ?

(Would you say they were very trustworthy, somewhat trustworthy, not very trustworthy, or not at all trustworthy?)

- <1> VERY TRUSTWORTHY
- <2> SOMEWHAT TRUSTWORTHY
- <3> NOT VERY TRUSTWORTHY
- <4> NOT AT ALL TRUSTWORTHY
- <8> DON'T KNOW
- <9> REFUSED
- ====>

Random assignment here: >ran1< [if RN1 eq <0> goto M1a]

[if RN1 eq <1> goto M2a]
 [if RN1 eq <2> goto M3a]
 [if RN1 eq <3> goto M4a]
 [if RN1 eq <4> goto M5a]
 [if RN1 eq <5> goto M6a]
 [if RN1 eq <6> goto M7b]
 [if RN1 eq <7> goto M8b]
 [if RN1 eq <8> goto M9b]
 [if RN1 eq <9> goto M10b]
 [if RN1 eq <10> goto M11b]
 [if RN1 eq <11> goto M12b]
 [if RN1 eq <12> goto M13c]
 [if RN1 eq <13> goto M14c]
 [if RN1 eq <14> goto M15c]
 [if RN1 eq <15> goto M16c]
 [if RN1 eq <16> goto M17c]
 [if RN1 eq <17> goto M18c]
 [if RN1 eq <18> goto M19d]
 [if RN1 eq <19> goto M20d]
 [if RN1 eq <20> goto M21d]
 [if RN1 eq <21> goto M22d]
 [if RN1 eq <22> goto M23d]
 [if RN1 eq <23> goto M24d]

Note: Only the first of 24 randomizations is provided for better readability of the survey.

M1a

Please tell me the extent to which you agree or disagree with the following statements as I read them, using the following scale: disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly.

First, children must have milk for proper growth and development. Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?

<1> DISAGREE STRONGLY
 <2> DISAGREE SOMEWHAT
 <3> NEITHER AGREE NOR DISAGREE
 <4> AGREE SOMEWHAT
 <5> AGREE STRONGLY
 <8> DON'T KNOW
 <9> REFUSED
 ==>

M1b

(Please tell me the extent to which you agree or disagree with the following statements as I read them.)

Next, milk is nutritious.

(Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?)

- <1> DISAGREE STRONGLY
 - <2> DISAGREE SOMEWHAT
 - <3> NEITHER AGREE NOR DISAGREE
 - <4> AGREE SOMEWHAT
 - <5> AGREE STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ==>

M1c

(Please tell me the extent to which you agree or disagree with the following statements as I read them.)

Milk is natural.

(Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?)

- <1> DISAGREE STRONGLY
 - <2> DISAGREE SOMEWHAT
 - <3> NEITHER AGREE NOR DISAGREE
 - <4> AGREE SOMEWHAT
 - <5> AGREE STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ==>

M1d

(Please tell me the extent to which you agree or disagree with the following statements as I read them.)

Milk is a pure product.

(Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?)

- <1> DISAGREE STRONGLY
- <2> DISAGREE SOMEWHAT
- <3> NEITHER AGREE NOR DISAGREE
- <4> AGREE SOMEWHAT
- <5> AGREE STRONGLY
- <8> DON'T KNOW
- <9> REFUSED
- ==> [goto QMIL]

QMIL

In total, about how much milk is used by your household in an average week?
(ENTER NUMBER HERE, UNIT ON NEXT SCREEN)

- <0> NONE [goto LACT]
- <1-97>
- <98> DON'T KNOW [goto LACT]
- <99> REFUSED [goto LACT]
- ==>

UNIT (ENTER UNIT HERE:)

- <1> PINT
- <2> QUART
- <3> 1/2 GALLON
- <4> GALLON
- <8> DON'T KNOW
- <9> REFUSED
- ==>

TYPE

What type of milk does your household use most, whole milk, low fat 2% milk,
1% milk, skim or non-fat milk, or what?

- <1> WHOLE MILK
- <2> LOW FAT (2%) MILK
- <3> 1% FAT MILK
- <4> SKIM (NON-FAT) MILK
- <5> OTHER
- <8> DON'T KNOW
- <9> REFUSED
- ==>

PRIM

About how much do you usually pay for milk ? (ENTER NUMBER OF CENTS
HERE, UNIT ON NEXT SCREEN)

<0> NONE [goto KDRI]
 <5-997> CENTS
 <998> DON'T KNOW [goto KDRI]
 <999> REFUSED [goto KDRI]
 ==>

UNI2 (ENTER UNIT HERE:)

<1> PINT
 <2> QUART
 <3> 1/2 GALLON
 <4> GALLON
 <8> DON'T KNOW
 <9> REFUSED
 ==>

KDRI

Do young children or teenagers drink most of the milk you buy?

<1> YES
 <2> NO
 <8> DON'T KNOW
 <9> REFUSED
 ==>

LACT

Are you or any of your household members lactose intolerant, that is, are unable to
comfortably digest dairy products?

<1> YES
 <2> NO
 <8> DON'T KNOW
 <9> REFUSED
 ==>

Randomization here >ran2< [if RN2 eq <0> goto P1a]

[if RN2 eq <1> goto P2a]
 [if RN2 eq <2> goto P3a]
 [if RN2 eq <3> goto P4a]
 [if RN2 eq <4> goto P5a]

[if RN2 eq <5> goto P6a]
 [if RN2 eq <6> goto P7b]
 [if RN2 eq <7> goto P8b]
 [if RN2 eq <8> goto P9b]
 [if RN2 eq <9> goto P10b]
 [if RN2 eq <10> goto P11b]
 [if RN2 eq <11> goto P12b]
 [if RN2 eq <12> goto P13c]
 [if RN2 eq <13> goto P14c]
 [if RN2 eq <14> goto P15c]
 [if RN2 eq <15> goto P16c]
 [if RN2 eq <16> goto P17c]
 [if RN2 eq <17> goto P18c]
 [if RN2 eq <18> goto P19d]
 [if RN2 eq <19> goto P20d]
 [if RN2 eq <20> goto P21d]
 [if RN2 eq <21> goto P22d]
 [if RN2 eq <22> goto P23d]
 [if RN2 eq <23> goto P24d]

Note: Only the first of 24 randomizations is provided for better readability of the survey.

P1a

Please tell me the extent to which you agree or disagree with the following statements as I read them, using the following scale: disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly.

First, children must have pork for proper growth and development. Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?

<1> DISAGREE STRONGLY
 <2> DISAGREE SOMEWHAT
 <3> NEITHER AGREE NOR DISAGREE
 <4> AGREE SOMEWHAT
 <5> AGREE STRONGLY
 <8> DON'T KNOW
 <9> REFUSED
 ==>

P1b

(Please tell me the extent to which you agree or disagree with the following statements as I read them.)

Next, pork is nutritious.

(Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?)

- <1> DISAGREE STRONGLY
 - <2> DISAGREE SOMEWHAT
 - <3> NEITHER AGREE NOR DISAGREE
 - <4> AGREE SOMEWHAT
 - <5> AGREE STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ====>

P1c

(Please tell me the extent to which you agree or disagree with the following statements as I read them.)

Pork is natural.

(Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?)

- <1> DISAGREE STRONGLY
 - <2> DISAGREE SOMEWHAT
 - <3> NEITHER AGREE NOR DISAGREE
 - <4> AGREE SOMEWHAT
 - <5> AGREE STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ====>

P1d

(Please tell me the extent to which you agree or disagree with the following statements as I read them.)

Pork is a pure product.

(Do you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat, or agree strongly?)

- <1> DISAGREE STRONGLY
- <2> DISAGREE SOMEWHAT
- <3> NEITHER AGREE NOR DISAGREE
- <4> AGREE SOMEWHAT
- <5> AGREE STRONGLY
- <8> DON'T KNOW
- <9> REFUSED
- ====> [goto ABIO]

ABIO

Now we would like to ask specifically about your attitudes regarding biotechnology and related agricultural applications.

As you may know, biotechnology refers to the use of technology to create new plant or animal species, or to create chemicals. In agriculture, biotechnology has been used to create new disease-resistant plants and to economically produce chemicals to increase farm production.

Have you heard or read anything about agricultural use of biotechnology?

- <1> YES [goto OBIO]
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ====> [goto PORB]

OBIO

Overall, do you or do you not approve of agricultural uses of biotechnology?

- <1> APPROVE
- <2> DISAPPROVE
- <8> DON'T KNOW
- <9> REFUSED
- ====>

[ALTERNATE BEGINNING WITH RPGH (BLOCK=APGH-PPRK) AND RBGH (BLOCK=ABGH-OVLB)]

APGH

Have you heard or read anything about the use of rpGH, a synthetic pork hormone used to stimulate the growth of hogs to produce leaner pork?

<1> YES [goto SPGH]

<2> NO

<8> DON'T KNOW

<9> REFUSED

==> [goto IPGH]

IPGH

Porcine somatotropin (SO-MAT-O-TROP-IN), or rpGH, is a growth hormone, which when injected stimulates the growth rate of hogs. Its use causes reduced fat deposit and hence, leaner pork.

<1> PRESS 1 TO CONTINUE

==>

SPGH

Although scientists have not discovered any ill health effects for humans from eating pork treated with rpGH, some consumers believe that the meat from treated pigs is not safe. How about you, do you share such concerns, or not?

<1> YES, SHARE SUCH CONCERNS [goto LCRN]

<2> NO

<8> DON'T KNOW

<9> REFUSED

==> [goto EATP]

LCRN

Would you say you are concerned only a little, moderately concerned, or very concerned?

<1> CONCERNED ONLY A LITTLE

<2> MODERATELY CONCERNED

<3> VERY CONCERNED

<8> DON'T KNOW

<9> REFUSED

==>

EATP

Do you or members of your household eat pork products?

- <1> YES [goto PPRK]
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ==> [goto RTS1]

PPRK

Do you think you would purchase rpGH treated pork for you or your family if its use was approved by the FDA?

- <1> YES
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ==>

ABGH

Do you recall having heard or read anything about the use of a synthetic bovine growth hormone, commonly called bGH or bST, that is used by farmers to increase cows' milk production?

- <1> YES [goto BINF]
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ==>

ALTERNATE BETWEEN ADMINISTERED AND INJECTED**IBGH**

Bovine somatotropin (SO-MAT-O-TROP-IN) (rbGH) is a growth hormone, which when ADMINISTERED/INJECTED in fully grown, lactating cows increases their milk production, thereby improving dairy farm profits. The milk from cows given rbGH has the same product characteristics as the milk from untreated cows.

- <1> PRESS 1 TO CONTINUE
- ==>

BINf

Now I want to read some statements about milk from cows treated with rbGH. As far as you know, I'd like you to tell me the extent to which you agree or disagree with the statements as I read them using the following scale: disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat or agree strongly.

<1> PRESS 1 TO CONTINUE

==>

RANDOMIZE THE ORDER OF THE FOLLOWING ITEMS (BINa - BINf)

BINa

Milk from cows treated with rbGH is just like milk from untreated cows.
(Would you say you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat or agree strongly with that statement?)

- <1> DISAGREE STRONGLY
- <2> DISAGREE SOMEWHAT
- <3> NEITHER AGREE NOR DISAGREE
- <4> AGREE SOMEWHAT
- <5> AGREE STRONGLY
- <8> DON'T KNOW
- <9> REFUSED

==>

BINb

The long-run health implications of rbGH are not known.
(Would you say you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat or agree strongly with that statement?)

- <1> DISAGREE STRONGLY
- <2> DISAGREE SOMEWHAT
- <3> NEITHER AGREE NOR DISAGREE
- <4> AGREE SOMEWHAT
- <5> AGREE STRONGLY
- <8> DON'T KNOW
- <9> REFUSED

==>

BINc

Increasing milk production by farmers using rbGH has benefitted consumers.
(Would you say you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat or agree strongly with that statement?)

- <1> DISAGREE STRONGLY
 - <2> DISAGREE SOMEWHAT
 - <3> NEITHER AGREE NOR DISAGREE
 - <4> AGREE SOMEWHAT
 - <5> AGREE STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ==>

BINd

bGH is naturally found in milk.
(Would you say you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat or agree strongly with that statement?)

- <1> DISAGREE STRONGLY
 - <2> DISAGREE SOMEWHAT
 - <3> NEITHER AGREE NOR DISAGREE
 - <4> AGREE SOMEWHAT
 - <5> AGREE STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ==>

BINe

Treating cows with rbGH is not harmful to them.
(Would you say you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat or agree strongly with that statement?)

- <1> DISAGREE STRONGLY
 - <2> DISAGREE SOMEWHAT
 - <3> NEITHER AGREE NOR DISAGREE
 - <4> AGREE SOMEWHAT
 - <5> AGREE STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ==>

BINf

rbGH use has had negative economic effects on small dairy farms.
 (Would you say you disagree strongly, disagree somewhat, neither agree nor disagree, agree somewhat or agree strongly with that statement?)

- <1> DISAGREE STRONGLY
- <2> DISAGREE SOMEWHAT
- <3> NEITHER AGREE NOR DISAGREE
- <4> AGREE SOMEWHAT
- <5> AGREE STRONGLY
- <8> DON'T KNOW
- <9> REFUSED
- ==>

OBGH

Overall, what is your opinion about treating cows with rbGH to increase their milk production. Would you say it was a poor idea, fair idea, good idea or an excellent idea?

- <1> POOR IDEA
- <2> FAIR IDEA
- <3> GOOD IDEA
- <4> EXCELLENT IDEA
- <8> DON'T KNOW
- <9> REFUSED
- ==>

LRKB

Some consumers are further concerned that although there are currently no known human ill health effects associated with consuming milk from rbGH treated cows, that ill health effects may **LATER** be discovered. How about you, do you share such concerns, or not?

- <1> YES, SHARE SUCH CONCERNS
- <2> NO [goto RSKB]
- <8> DON'T KNOW
- <9> REFUSED
- ==>

LCON

Would you say you are concerned only a little, moderately concerned, or very concerned?

<1> CONCERNED ONLY A LITTLE

<2> MODERATELY CONCERNED

<3> VERY CONCERNED

<8> DON'T KNOW

<9> REFUSED

====>

RSKB

Although the U.S. Food and Drug Administration has stated that there are no ill health effects for humans associated with consuming dairy products made of milk from rbGH treated cows, some consumers believe that rbGH treated cows' milk is not safe. How about you, do you share such concerns, or not?

<1> YES, SHARE SUCH CONCERNS

<2> NO [goto DRES]

<8> DON'T KNOW

<9> REFUSED

====>

SCON

Would you say you are concerned only a little, moderately concerned, or very concerned?

<1> CONCERNED ONLY A LITTLE

<2> MODERATELY CONCERNED

<3> VERY CONCERNED

<8> DON'T KNOW

<9> REFUSED

====>

**RANDOMLY USE ADMINISTERING/INJECTING FOR DRES QUESTION
ADD FLAG VARIABLE=1 IF QUESTION WORDED USING "INJECTING"**

DRES

Since February of 1994, it has been legal for farmers to increase their cows' milk production by ADMINISTERING/INJECTING them with rbGH. How, if at all, has the approval of rbGH's use influenced the amount of milk you buy?

- <1> INCREASE THE AMOUNT OF MILK YOU BUY FOR YOUR HOUSEHOLD [goto OVLB]
 - <2> NO CHANGE IN YOUR MILK PURCHASE [goto OVLB]
 - <3> DECREASE THE AMOUNT OF MILK YOU BUY FOR YOUR HOUSEHOLD [goto SUBS]
 - <4> STOP BUYING MILK ALTOGETHER [goto SUBS]
 - <8> DON'T KNOW [goto OVLB]
 - <9> REFUSED [goto OVLB]
- ===>

SUBS

Have you substituted other products for milk?

- <1> YES
 - <2> NO
 - <8> DON'T KNOW
 - <9> REFUSED
- ===>

OVLB

Do you think milk should be labeled in such a way that you could distinguish between milk from treated and untreated cows?

- <1> YES
 - <2> NO
 - <8> DON'T KNOW
 - <9> REFUSED
- ===>

PURL

In your area are there food stores where you can purchase milk from untreated cows?

- <1> YES
 - <2> NO [goto PRF1]
 - <8> DON'T KNOW [goto PRF1]
 - <9> REFUSED [goto PRF1]
- ===>

KNOA

Among all the stores where you purchase food, what indications do you have that the milk is from untreated cows?

Is it store policy?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

KNOB

(Among all the stores where you purchase food, what indications do you have that the milk is from untreated cows?)

Is the milk from untreated cows labelled?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

KNOC

(Among all the stores where you purchase food, what indications do you have that the milk is from untreated cows?)

Is it the policy of the brand (dairy company)?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

KNOD

(Among all the stores where you purchase food, what indications do you have that the milk is from untreated cows?)

Is the milk labelled organic?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

KNOE

(Among all the stores where you purchase food, what indications do you have that the milk is from untreated cows?)

Are there any other indications that milk is from untreated cows?

<1> YES (ENTER RESPONSE FOLLOWED BY ///)[specify]

<2> NO

===>

PRDF

Is there a price difference between the milk from treated and untreated cows?

<1> YES

<2> NO [goto PRF1]

<8> DON'T KNOW [goto PRF1]

<9> REFUSED [goto PRF1]

===>

EXPV

Which is more expensive, milk from the treated or untreated cows?

<1> TREATED

<2> UNTREATED

<8> DON'T KNOW

<9> REFUSED

===>

PRF1

Do you have a preference for whether the milk you buy comes from rbGH treated cows, or not?

<1> YES

<2> NO [goto LOCU]

<8> DON'T KNOW [goto LOCU]

<9> REFUSED [goto LOCU]

===>

PRF2

Which do you prefer, milk from the treated or untreated cows?

- <1> TREATED
- <2> UNTREATED
- <3> NO PREFERENCE
- <8> DON'T KNOW
- <9> REFUSED
- ==>

```
[if PRF2 eq <1>]
    [if PURL eq <1> goto LPBB] [#prefer from treated and store in area
[endif]
[if PRF2 eq <2>]
    [if PURL eq <1> goto LPBA] [#prefer from untreated and store in area
[endif]
[#goto LOCU][goto RTS2]
```

LPBA

Do you usually purchase milk identified as coming from nontreated cows, or not?

- <1> YES
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ==> [goto FCTR]

LPBB

Do you usually purchase milk identified as coming from treated cows, or not?

- <1> YES
- <2> NO
- <8> DON'T KNOW
- <9> REFUSED
- ==> [goto LOCU]

FCTR

Please express how important the following factors are in explaining your preference for untreated cows milk.

First...

- <1> ENTER 1 TO CONTINUE
- ==>

RANDOMIZE THE ORDER OF THE FOLLOWING ITEMS (FCTa-c, g, h)

FCTa

Concern about potential ill health effects for yourself.
(Would you say this is of no importance, of little importance, moderately important or very important to you?)

- <1> OF NO IMPORTANCE
- <2> OF LITTLE IMPORTANCE
- <3> MODERATELY IMPORTANT
- <4> VERY IMPORTANT
- <8> DON'T KNOW
- <9> REFUSED
- ====>

FCTb

Concern about potential ill health effects for your children.
(Would you say this is of no importance, of little importance, moderately important or very important to you?)

- <1> OF NO IMPORTANCE
- <2> OF LITTLE IMPORTANCE
- <3> MODERATELY IMPORTANT
- <4> VERY IMPORTANT
- <8> DON'T KNOW
- <9> REFUSED
- ====>

FCTc

Concern for small farmers' economic survival.
(Would you say this is of no importance, of little importance, moderately important or very important to you?)

- <1> OF NO IMPORTANCE
- <2> OF LITTLE IMPORTANCE
- <3> MODERATELY IMPORTANT
- <4> VERY IMPORTANT
- <8> DON'T KNOW
- <9> REFUSED
- ====>

FCTg

Concern for dairy product surpluses.

(Would you say this is of no importance, of little importance, moderately important or very important to you?)

- <1> OF NO IMPORTANCE
- <2> OF LITTLE IMPORTANCE
- <3> MODERATELY IMPORTANT
- <4> VERY IMPORTANT
- <8> DON'T KNOW
- <9> REFUSED
- ====>

FCTh

Concern for the economic motivation of the manufacturers of biotechnology.

(Would you say this is of no importance, of little importance, moderately important or very important to you?)

- <1> OF NO IMPORTANCE
- <2> OF LITTLE IMPORTANCE
- <3> MODERATELY IMPORTANT
- <4> VERY IMPORTANT
- <8> DON'T KNOW
- <9> REFUSED
- ====>

LOCA

Now I'm going to read two statements regarding public issues about which some people agree and others disagree. Please give us your own opinion about these items. Would you say you strongly agree, agree, disagree, or strongly disagree?

First, I worry about the future that today's children are facing.

(Do you strongly agree, agree, disagree, or strongly disagree?)

- <1> STRONGLY AGREE
- <2> AGREE
- <3> DISAGREE
- <4> STRONGLY DISAGREE
- <8> DON'T KNOW
- <9> REFUSED
- ====>

LOCB

(Now I'm going to read two statements regarding public issues about which some people agree and others disagree. Please give us your own opinion about these items. Would you say you strongly agree, agree, disagree, or strongly disagree?)

More and more, I feel helpless in the face of what's happening in the world today.
(Do you strongly agree, agree, disagree, or strongly disagree?)

- <1> STRONGLY AGREE
- <2> AGREE
- <3> DISAGREE
- <4> STRONGLY DISAGREE
- <8> DON'T KNOW
- <9> REFUSED
- ==>

GRA1

Please express the extent to which you identify with the following groups:

First, environmentalists, those who wish to protect our natural resources.
Would you say you identify with them strongly, somewhat, or not at all?

- <1> NOT AT ALL
- <2> SOMEWHAT
- <3> STRONGLY
- <8> DON'T KNOW
- <9> REFUSED
- ==>

GRA2

(Please express the extent to which you identify with the following groups:)

Religious groups who believe in a strict interpretation of the Bible.
Would you say you identify with them strongly, somewhat, or not at all?

- <1> NOT AT ALL
- <2> SOMEWHAT
- <3> STRONGLY
- <8> DON'T KNOW
- <9> REFUSED
- ==>

GRA3

(Please express the extent to which you identify with the following groups:)

Animal rights groups, those who oppose using animals in experimental studies.
Would you say you identify with them strongly, somewhat, or not at all?

- <1> NOT AT ALL
 - <2> SOMEWHAT
 - <3> STRONGLY
 - <8> DON'T KNOW
 - <9> REFUSED
- ====>

POP

Your responses to these last few questions are important for our statistical analysis. In our report, information will be summarized for all respondents; never any one person's response.

What is the population of the community you live in? Is it less than 2,500, 2,500 to less than 10,000, 10,000 to less than 50,000, 50,000 to less than 100,000, 100,000 to less than 500,000, 500,000 to less than 1 million, or 1 million or more?

- <1> LESS THAN 2,500
 - <2> 2,500 - 9,999
 - <3> 10,000 - 49,999
 - <4> 50,000 - 99,999
 - <5> 100,000 - 499,999
 - <6> 500,000 - 999,999
 - <7> 1 MILLION OR MORE
 - <8> DON'T KNOW
 - <9> REFUSED
- ====>

EDUC

The next questions are about your education. Do you have a high school diploma ?

(INTERVIEWER : G.E.D. OR OTHER H.S. EQUIVALENCY, CODE AS YES.)

- <1> YES [## label = High School Diploma]
 - <2> NO [goto EDU5]
 - <8> DON'T KNOW [goto AGE]
 - <9> REFUSED [goto AGE]
- ====>

EDU2

Did you ever attend a college, university, vocational, or technical school ?

- <1> YES [## label = Post Secondary School]
- <2> NO [goto AGE]
- <8> DON'T KNOW [goto AGE]
- <9> REFUSED [goto AGE]
- ====>

EDU3

Do you have a degree or diploma from a college, university, vocational, or technical school?

- <1> YES [## label = Post Secondary Degree]
- <2> NO [goto AGE]
- <8> DON'T KNOW [goto AGE]
- <9> REFUSED [goto AGE]
- ====>

EDU4

What is your highest degree ?

- <1> ASSOCIATE DEGREE [## label = Highest Degree]
- <2> BACHELORS DEGREE (eg : BA, AB, BS)
- <3> MASTERS DEGREE (eg : MA, MS, MEng, MSW, MEd, MBA)
- <4> DOCTORAL DEGREE (eg : PhD, EdD)
- <5> PROFESSIONAL DEGREE (eg : MD, DDS, DVM, LLB, JD)
- <0> OTHER (SPECIFY, FOLLOWED BY /// :) [specify]
- <8> DON'T KNOW
- <9> REFUSED
- ====> [goto AGE]

EDU5

What was the highest grade of school that you completed?

- [## label = Highest Grade Completed]
- <0-11> GRADES 0 to 11 [goto AGE]
- <97> OTHER
- <98> DON'T KNOW [goto AGE]
- <99> REFUSED [goto AGE]
- ====>

E50S [allow 3]
(DESCRIBE R'S SCHOOLING HERE :)

(ENTER TEXT FOLLOWED BY ///)
[## label = Description of Schooling]
==> [specify]

AGE

In what year were you born?

<00-77> 1900 TO 1977
<98> DON'T KNOW
<99> REFUSED
==>

MARS

What is your marital status--are you **CURRENTLY** married, widowed, divorced, living with a partner, separated or never married?

<1> MARRIED
<2> WIDOWED
<3> DIVORCED
<4> LIVING WITH A PARTNER
<5> SEPARATED
<6> NEVER MARRIED
<8> DON'T KNOW
<9> REFUSED
==>

HHSZ

How many persons live in your household...**counting all adults and children and INCLUDING yourself?**

<1-15> ONE THROUGH FIFTEEN PEOPLE IN HH
<16> MORE THAN FIFTEEN PEOPLE
<98> DON'T KNOW [goto INC]
<99> REFUSED [goto INC]
==>

ONEP [if HHSZ eq <1> goto INC] [#don't need to ask about kids if Respondent is only person in household]

KIDS

Do any children under 18 years of age live in your household?

<1> YES

<2> NO [goto INC]

===>

KID7

How many, if any, children 7 to 17 years of age live in your household?

<0-15> ZERO THROUGH FIFTEEN

<98> DON'T KNOW

<99> REFUSED

===>

KID6

How many, if any, children 6 years of age or younger live in your household?

<0-15> ZERO THROUGH FIFTEEN

<98> DON'T KNOW

<99> REFUSED

===>

TMKD

If you consider, overall, the amount of time adults in your household spend caring for children who live in the household, who spends the most time? You, another household member, or is it equal?

<1> SELF

<2> OTHER

<3> EQUAL

<8> DON'T KNOW

<9> REFUSED

===>

INC

And, just roughly, what was YOUR HOUSEHOLD'S total income, from all sources, in the past 12 months, BEFORE TAXES ?

<100-9999999> \$100 to \$9,999,999 [goto ETHN]

<8> DON'T KNOW

<9> REFUSED

===>

```

T11 [if INC eq <9>]
    [store <would> in 892b]
    [else]
    [if INC eq <8>]
        [store <could> in 892b]
    [endif]
[endif]

POV1 [allow 6]
    [store <> in POV1]

POV2 [allow 6]
    [store <> in POV2]

POV3 [allow 6]
    [store <> in POV3]

INFL [if HHSZ eq <1>]
    [store <7,470> in POV1] [#base poverty level]
    [store <9,711> in POV2] [#base x 1.3]
    [store <11,952> in POV3] [#base x 1.6]
    [goto INCA]
[endif]          [#updated 2/23/95 ejw]

    [if HHSZ eq <2>]
        [store <10,030> in POV1]
        [store <13,039> in POV2]
        [store <16,048> in POV3]
        [goto INCA]
    [endif]
    [if HHSZ eq <3>]
        [store <12,590> in POV1]
        [store <16,367> in POV2]
        [store <20,144> in POV3]
        [goto INCA]
    [endif]
    [if HHSZ eq <4>]
        [store <15,150> in POV1]
        [store <19,695> in POV2]
        [store <24,240> in POV3]
        [goto INCA]
    [endif]
    [if HHSZ eq <5>]
        [store <17,710> in POV1]

```

```
        [store <23,023> in POV2]
        [store <28,336> in POV3]
        [goto INCA]
[endif]
[if HHSZ eq <6>]
    [store <20,270> in POV1]
    [store <26,351> in POV2]
    [store <32,432> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <7>]
    [store <22,830> in POV1]
    [store <29,679> in POV2]
    [store <36,528> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <8>]
    [store <25,390> in POV1]
    [store <33,007> in POV2]
    [store <40,624> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <9>]
    [store <27,950> in POV1]
    [store <36,335> in POV2]
    [store <44,720> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <10>]
    [store <30,510> in POV1]
    [store <39,663> in POV2]
    [store <48,816> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <11>]
    [store <33,070> in POV1]
    [store <42,991> in POV2]
    [store <52,912> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <12>]
    [store <35,630> in POV1]
    [store <46,319> in POV2]
    [store <57,008> in POV3]
```



```

    [goto INCA]
[endif]
[if HHSZ eq <13>]
    [store <38,190> in POV1]
    [store <49,647> in POV2]
    [store <61,104> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <14>]
    [store <40,750> in POV1]
    [store <52,975> in POV2]
    [store <65,200> in POV3]
    [goto INCA]
[endif]
[if HHSZ eq <15>]
    [store <43,310> in POV1]
    [store <56,303> in POV2]
    [store <69,296> in POV3]
    [goto INCA]
[endif]
[if HHSZ gt <15> goto INCT] [#if don't know how many people or > 15]
                                [#goto the general category question]

```

INCA

Then [fill 892b] you tell me whether YOUR HOUSEHOLD'S total income, from all sources, in the past 12 months was above or below \$[fill POV1]?

```

<1> ABOVE $[fill POV1] [goto INCB]
<2> BELOW $[fill POV1]
<3> EXACTLY $[fill POV1]
<8> DON'T KNOW
<9> REFUSED
==> [goto ETHN]

```

INCB

Was YOUR HOUSEHOLD'S total income, from all sources, in the past 12 months was above or below \$[fill POV2]?

```

<1> ABOVE $[fill POV2] [goto INCC]
<2> BELOW $[fill POV2]
<3> EXACTLY $[fill POV2]
<8> DON'T KNOW
<9> REFUSED
==> [goto ETHN]

```

INCC

Was YOUR HOUSEHOLD'S total income, from all sources, in the past 12 months was above or below \$[fill POV3]?

- <1> ABOVE \$[fill POV3]
- <2> BELOW \$[fill POV3]
- <3> EXACTLY \$[fill POV3]
- <8> DON'T KNOW
- <9> REFUSED
- ==> [goto ETHN]

INCT

Then [fill 892b] you tell me in which of the following GROUPS YOUR HOUSEHOLD'S total income, from all sources, in the past 12 months, BEFORE TAXES falls ?

Was it less than \$10,000,
\$10,000 to less than \$20,000, \$20,000 to less than \$30,000,
\$30,000 to less than \$40,000, \$40,000 to less than \$50,000,
\$50,000 to less than \$60,000, or \$60,000 or more ?

- <0> LESS THAN \$10,000
- <1> \$10,000 - \$19,999
- <2> \$20,000 - \$29,999
- <3> \$30,000 - \$39,999
- <4> \$40,000 - \$49,999
- <5> \$50,000 - \$59,999
- <6> \$60,000 OR MORE
- <8> DON'T KNOW
- <9> REFUSED
- ==>

ETHN

Is your race White, Black, Asian, American Indian, or what ?

- <1> WHITE
- <2> BLACK [goto tm2]
- <3> ASIAN [goto tm2]
- <4> AMERICAN INDIAN [goto tm2]
- <0> OTHER (SPECIFY, FOLLOWED BY ///): [specify] [goto tm2]
- <8> DON'T KNOW [goto tm2]
- <9> REFUSED [goto tm2]
- ==>

HISP

Are you of Hispanic origin such as Mexican-American, Latin American, Puerto Rican, or Cuban?

<1> YES

<2> NO

<8> DON'T KNOW

<9> REFUSED

==>

>tm2< [allow 6]

[stop timer]

[record timer in tm2]

[store idat in DATE]