

Gender differences in choice shifts:
A study of social influence on consumer attitude
toward food irradiation

by

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INTRODUCTION

Recent literature on choice shifts shows increased attention to the impact of group discussion on individual opinion change (Sheppard and Davis, 1982). Social influence in groups is considered to be of importance in producing group-induced individual opinion shifts, especially polarization. The theoretical explanations of choice shifts have been fundamentally framed within the two-process dependency model of social influence: informational influence and normative influence (Turner, Wetherell and Hogg, 1989).

Gender differences in social influence and conformity have been examined in many studies, but any direct connection between gender and choice shifts still remains a question. The present study addresses group influences on opinion change regarding a highly controversial food safety issue: social acceptance of food irradiation. A study of gender differences in choice shifts regarding food irradiation may give further understanding of choice shifts as well as some suggestions for future policy-decisions and research on food irradiation.

Gender role socialization theory suggests that gender differences in social attitudes and behaviors exist as the outcome of different socialization processes between males and females. In addition, some personality variables, such as

self-esteem, self-efficacy, and locus of control, have been shown to affect individual susceptibility to social influence and attitude change. Further, research on social influence indicates gender differences in information dependency: males are more influenced by the opinions of experts while females tend to be influenced by the opinions of their peers (Hanson, Allen and Jones, 1980).

Objectives

In light of the previous theory and research, this thesis will pursue three major objectives:

- 1) to explore gender differences in opinion shifts regarding acceptance of food irradiation.
- 2) to examine effects of personality variables on opinion shifts in relation to gender differences.
- 3) to examine differences in sources of influence between male and female subjects.

The thesis consists of five Chapters. The Chapter I reviews the theoretical and empirical literatures related to the study and proposes the theoretical assumptions. Chapter II discusses the controversy surrounding the adaptation of food irradiation. Chapter III outlines the research method used. Chapter IV presents results of the study. The summarization and discussion appear in Chapter V.

CHAPTER I: LITERATURE REVIEW

The literature review consists of five sections. The first section reviews research literature on choice shifts. Theories and research on gender differences in social attitudes and behaviors are discussed in the second section. The third section addresses research on effects of personality factors in social influence. The fourth section discusses findings regarding gender differences on influence resources. The fifth section summarizes the literature reviewed and presents the theoretical assumptions of the study.

Theories of Choice Shifts

The phenomenon of choice shifts was initially discovered in the small group studies of Stoner (1961) and Wallach et al. (1962). Both their studies indicated that the average group opinion after discussion was more likely to suggest a risky action than the averaged individual opinion before discussion. Following their discovery, there has been much research work done in the field, and many theoretical assumptions are proposed to discuss the occurrence of choice shifts.

Most explanations assume that "individual group members are induced by one means or another to change their personal choices among response alternatives" (Davis and Hinsz,

1982:6). From this view, group choice is considered as the group consensus reached by group members after they discuss the choice items, and consequently it is different from the individual pre discussion choice; that is, it is either more risky or cautious than the individual choice. It might be true that the study of choice shifts at the group level has been waning in recent years, but a related finding--group-induced polarization--has maintained research attention in social psychology (Davis and Hinsz, 1982).

Group-induced polarization describes an increased extremity in individual opinions after group discussion. This effect was first identified by Moscovici and Zavalloni (1969) in their study of French students' attitudes toward Americans. They found that individual student's pre-discussion negative attitudes became more extreme after group discussion. Later this polarization phenomenon was confirmed in laboratory experiments (Myers and Bishop, 1971; Myers and Kaplan, 1976; Lamm et al., 1976), field observations (Chickering and McCormick, 1973), and surveys (Riley and Pittigrew, 1976; Batson, 1975).

Contemporary explanations of group-induced polarization derive from three major theories:

Persuasive Argument Theory

Persuasive arguments theory (Vinokur and Burnstein, 1974) proposes that when people evaluate two alternatives, they generate ideas on the attributes of each alternative. "There is a culturally given pool of arguments speaking to each alternative, and in judging the relative merits of the alternatives, the person samples from this pool." (Vinokur and Burnstein, 1978:873). People's pre discussion opinions often reflect the favorable arguments on a particular alternative, which come to their mind when they make an evaluation. Further discussions reinforce these initial opinions, and "following discussion, the moderate members polarize their opinions in accord with the thrust of the most compelling, and relatively extreme, arguments" (Sanders and Baron, 1977:304).

A culturally given pool, for example, might contain four pro-A arguments and two pro-B arguments. If two persons all have the same arguments, their attitudes toward A would be identical and discussion would lead to no change. On the other hand, if two pro-A and one pro-B arguments come to the first person's mind, and two pro-A and one pro-B arguments come to the second person's mind. Their prior attitudes are identical, but the discussion would produce polarized attitudes toward A. Thus, polarization toward A would be predictable if the original pool of arguments contains more

favorable arguments for A and these arguments are mentioned in the discussion.

The informational basis of social influence is the focus of research within this approach. Burnstein and Vinokur conducted a series of experiments in 1970s to test persuasive-arguments explanation of choice shifts, and their research demonstrated that (a) persuasive arguments determined a person's choice prior to group discussion (Vinokur and Burnstein, 1974); (b) without open arguments, polarization would disappear (Burnstein and Vinokur, 1973, 1975); and (c) polarization depended on tacit argumentation (Burnstein and Vinokur, 1975). All of their studies strongly supported the group-induced choice shifts in view of persuasive arguments theory.

Social Comparison Theory

Social comparison theory was developed by Leon Festinger (1954) and has become one of the more influential theories in social psychology. Based on his studies of effects of social communication on opinion change in social groups, Festinger argued that there was a drive for people to make self-evaluations of their opinions or abilities. This self-evaluation occurs by comparing oneself with other persons when there are no objective standards for one to make a judgement.

According to social comparison theory, post-discussion opinion change is the result of either comparing one's opinion position to that of others in the group or one's desire to get a favorable group appraisal (Myers, 1977). During the group discussion, subjects may realize that other extreme opinions are more close to their admired positions, or find their own opinions are different from other members. Hence, moderate members are encouraged to adopt a more extreme position that reflects what they wish to be, and the members with different opinions are motivated to shift their opinions toward the admired group consensus to achieve valued positive recognition by the group. This tendency toward favorable social comparison yields post-discussion attitudes polarization.

Myers (1978) has contrasted two versions of social comparison theory: merely exposing subjects to group norms or average, which is based on the proposition that exposure to the group norm or average is sufficient to elicit a more polarized response (Levinger and Schneider, 1969), or merely exposing subjects to a group member representing their opinions in an extreme form, which derives from the explanation that polarization is the constraints release after people observe a group member who models their ideal in a relatively extreme form (Pruitt, 1971). His results indicated that comparison-induced polarization occurred in both situations. "The phenomenon appears to be reliable and

generalizable, although subtle" (Myers, 1978:561). Myers and Bishop (1970) also examined the influence of similar others on attitude polarization and found that "discussion with similarly minded other people would increase the attitude gap between the two groups" (Myers, 1982:131). Therefore, it is evident that subjects tend to compare and are influenced mostly by others who have similar attitudes and values.

Self-Categorization Theory

A more recent explanation of choice shifts is self-categorization theory, which explains social influence in groups in terms of a social identity process (Turner, 1985; Hogg, Turner and Davidson, 1990). Self-categorization theory describes group polarization as a kind of conformity phenomenon in which individuals conform to a polarized in-group norm by identifying themselves with the group. The direction of group polarization is influenced by the social comparison between an in-group and an out-group.

Self-categorization theory incorporates the major insights of persuasive arguments theory and social comparison theory. It takes the view that polarization is determined by the informational process of persuasion, a meta-comparison between intergroup and intragroup differences, and individual's self-identification with the in-group members. It "brings together the concepts of social value and

informational influence in that it explains persuasion in terms of the processes whereby explicit or implicit informational content becomes socially valued or validated" (Turner, Wetherell and Hogg, 1989:145).

Research using this approach focuses on testing the in-group and out-group informational influence in producing group polarization. Wetherell (1987) reported that subjects were more persuaded by the arguments from an ingroup than from an outgroup. Her findings indicated that polarization was influenced by opinion identification or categorization. Mackie (1986) also found that subjects polarized to a more extreme position when they believed that information was from their ingroup. Similarly, Hogg, Turner and Davidson (1990) contrasted types of referent information on three choice dilemmas: risky, neutral, and cautious. Their results supported the assumption that group polarization was a function of the salient subjective referent frame and the degree of group identification.

Gender Differences in Choice Shifts

Gender differences in social behaviors have been investigated extensively in many psychological studies. Although gender differences are not supported conclusively, previous findings indicate that gender differences do exist:

in mathematical and verbal skills (Benbow and Stanley, 1980), depression (Raven, 1983), attitudes toward environmental issues (Brody, 1984; Arcury, Scollay, and Johnson, 1987), and in sexual attitudes (S.Hendrick, C.Hendrick, Slapion-Foote, and H.Foote, 1985; Howard, 1988). Gender differences are observed also in group behaviors (Hans and Eisenberg, 1985), in parent and infant behaviors (Smith and Dalish, 1977), and in social research interviews (Grimes and Hansen, 1984). Gender differences in social influence and conformity have been noticed by many researchers in studying small group behaviors, although findings are not consistently supported (e.g., Reitan and Shaw, 1964; Nord, 1969; Sistrunk and McDavid, 1971; Maccoby and Jacklin, 1974).

Much of the literature suggests that females are consistently more compliant than males (Shaw, 1976). In his study of the relationship between gender and sex-role related stimulus items, Morelock (1980) found that gender differences in compliance and persuasiveness were intimately related to the sex-role related stimulus: male students were more compliant than females when the stimuli were female sex-role related statements, whereas female students were more influenced when the stimuli were male sex-role related statements. A similar result was also discovered by Hansson, Allen and Jones (1980) in their study of sex differences in the perceived status of the source of influence.

Gender differences in social attitudes and behaviors are most often explained from the perspective of gender role socialization, which refers to the process of forming "the attitudes and behaviors the members of a society are expected to act out" (Lindsey, 1990).

Three theoretical perspectives are reviewed here in consideration of gender differences in choice shifts:

Expectation States Theory

Expectation states theory (Berger, Rosenholtz, and Zelditch, 1980) discusses status differentiation within groups and provides a sociological view of gender differences. According to the expectation states theory, gender is considered to carry numerous expectations about behavior within group interaction. As individual behavior is likely to be evaluated in consideration of a person's external status, gender becomes a mediator to interpret and evaluate his or her behaviors. Thus, males and females are expected to do or interact in accordance with what they should be doing. A woman, for example, establishing power by eye contact "may be redefined as flirting" (Wallston, 1987).

Gender differences in attitude formation and change can be explained with expectation states theory. As culturally defined, men are believed to be more aggressive and self-assertive than females, and they are expected to be more

influential in a group (Shaw, 1976). Thus, generally, females are assumed to be more influenced than males and tend to conform to group consensus.

Gender Schema Theory

Gender schema theory is developed to explain the conceptual development of "maleness" and "femaleness" (Bem, 1981, 1982). A person's behavior is considered to be related to his or her sex-linked cognitive structure called "gender schema." Gender schema theory has three major propositions: (a) sex-typed individuals have a mutually exclusive conception of masculinity and femininity; (b) they develop a cognitive schema in association with these sex-typed conceptions; and (c) they use the schema to evaluate and organize information about themselves. Thus, "certain individuals may link a rich and varied network of culturally stereotyped associations to their construal of what being male or female should be like" (Larsen and Seidman, 1986:205). A similar concept, "self-schema about gender," is also proposed by Hazel Markus, et al. (1982). Their explanation of gender schema is different from Bem's with the emphasis on "self." In their view, self-schema is of influence only when it relates to one's own sex type, but not to gender in general.

There is much debate on these two theoretical explanations (Henley, 1985), but both of them are important in

understanding the cognitive impact of gender identity on social attitudes and behavior. Sex-typed people are found to have more sexist attitudes toward others and they are more friendly to people who conform to cultural standards of gender roles (Andersen and Bem, 1981; Motowidlo, 1982). Frable (1989) examined the impact of gendered personality on gender ideology and gender discrimination, and found that sex-typed people were more likely than the androgynous to accept gender rules designing culturally appropriate behavior for women and men. Also sex-typed persons were more likely to present sexist behaviors toward female job applicants. He concluded that gendered personality could affect a person's gender attitudes, values, preferences and behaviors.

Gender Role Strain Theory

The concept of gender role strain is used by J.H. Pleck (1981) to describe the dominant male gender role identity paradigm (Wallston, 1987). Gender roles are defined by societal norms, and the violation of them often leads to negative social and psychological consequences. In his study of family and work, Pleck pointed out that paid work and family roles provide sources of gender role strain. Sex differences are created and maintained by the family and society. Although empirical support is not strong, his

explanation indicates another insightful perspective on the social maintenance of gender stereotypes and norms.

Gender role socialization can create not only a social and psychological strain on people's behavior, but also a difference in attitudes toward social issues between women and men. Some researchers on environmental issues, for example, have used gender role socialization theory to predict gender differences in environmental attitudes. Due to the social norms of gender role, men are expected to be dominant in technoscientific aspect of society and socialized to unecological attitudes toward the environment, while women are denied access to the technoscientific realm and socialized to the more ecologically benign role of mother and nurturer (Barbour, 1980; Merchant, 1979). Thus, women and men could be different in their concerns and knowledge about environmental issues such as nuclear power, pollution control and resource conservation. The findings in this field, however, have not been consistent (Brody, 1984; McStay and Dunlap, 1983; Arcury, Scollay, Johnson, 1987).

Other Correlates of Choice Shifts

This section reviews research on the impact of personality factors, such as self-esteem, self-efficacy, and locus of control, on individual opinion formation and change.

Self-esteem

Generally, self-esteem refers to some broad self-evaluation, such as, "I think highly (or poorly) myself" (Stotland and Canon, 1972), and it is considered to be the sum of self-confidence and self-respect. Self-esteem is important to understanding a person's behavior because it affects the evaluation of performance and manner that he or she presents when in interaction with others. Self-esteem has been an important personality factor in the study of social comparison, social influence, and conformity.

In opinion and ability evaluation, self-esteem directs persons to make a favorable comparison between themselves and others. A person's self-esteem is increased, for example, when comparing himself or herself with a less competitive target (Morse and Gergen, 1970). Thus, the types of comparisons made by an individual are assumed to be influenced by his or her self-esteem and by the need of self-enhancement.

Studies on personality and persuasibility indicate that self-esteem is one of the determinants of individual responsiveness to influences from mass media and social interaction. People with low self-esteem were more persuadable than those with high self-esteem, who were more resist to persuasive influence (Janis, 1950). Cohen (1959) found that persons with low self-esteem were more likely to be

influenced by those with high self-esteem. Conformity studies bring some evidence to support a difference between persons of high self-esteem and those of low self-esteem. Worchel and McCormick (1963), for example, found that high self-esteem persons were more confident of their opinions than low self-esteem ones. The lows tended to depend on other person's judgement of reality or be more sensitive to others' opinions about them (Wicklund and Brehm, 1968; Rosenberg, 1965).

Self-efficacy

Conceptually, self-efficacy is defined as two related expectancies: an outcome expectancy, or the person's belief that a given outcome is related to a given behavior; and a self-efficacy expectancy, or the person's belief that he or she is capable or not capable of performing a behavior or sets of behaviors. Self-efficacy affects behavior because "people process, weight, and integrate diverse sources of information concerning their capability, and they regulate their choice behavior and effort expenditure accordingly" (Bandura, 1977:212).

Self-efficacy is found to be an effective psychological variable in predicting human behavior in various situations, such as task performance and learning (Bandura, 1977, 1982; Feltz, 1982; Meier, McCarthy, and Schmeck, 1984), eating

behavior (Jeffery et al., 1984), and fear arousal (Kirsch, 1985). Slater (1989) found that self-efficacy mediates effects of social influence and cognitive control on eating behavior. This finding implies that individual response to interpersonal influence and attitude change could be differentiated by self-efficacy. Theoretically, people with low self-efficacy are assumed to be more susceptible to interpersonal influence than those with high self-efficacy.

Locus of control

Another possible personality correlate of choice shifts is locus of control, which refers to a person's belief that events are controlled either by internal, personal forces of the actor or by external, situational forces of the environment. Locus of control has been found to be an effective variable to study individual's adjustment to various social situations and life changes (Hansen, 1984; Heretick, 1981; Abel and Hayslip, 1986; Bugaighis, Schumm, Bollman and Jurich, 1983).

The functions of internal-external control in human behavior have been attractive to many researchers. Previous research shows that persons with internal control are much different from those with external control in shifts of expectancy, risk taking, degree of conformity, resistance to

subtle influence and life satisfaction (Battle and Rotter, 1963; Liverant and Scodel, 1960; Crowne and Liverant, 1963; Davis and Phares, 1967; Pryer and Distefano, 1971; Runyon, 1973; Dufffy and Shifletty, 1977). The resistance of internals to social influence, however, is proven to be only true with normative conformity, which occurs when people desire to be like others, but not with informational conformity, which occurs when people seek information or advice from others. Spector (1983) reported that externals tended to show normative conformity and the finding was more true for females. However, he did not find informational conformity differences between internals and externals.

In short, externals are generally assumed to be more influenced to change their attitudes and behaviors than internals. The effect of locus of control on social influence susceptibility is correlated with a normative process, but not informational process.

Influence Sources in Choice Shifts

Gender differences in conformity and persuasibility are also examined with respect to the status of influence sources. In their study of the effects of perceived status of sources of influence, Hanson, Allen, and Jones (1980) found that males were more influenced by the opinions of experts, while females were more influenced by their peer group. Their data

indicated that traditional sex-role socialization had encouraged an instrumental response (attending to experts' opinion) among males and a communal response (attending to one's peers) among females, which may result in gender differences in information dependence. They pointed out that this finding could be the predictable outcome of different socialization processes based on gender.

Theoretical Assumptions

Based on the theories and research reviewed, the following assumptions are proposed regarding gender differences in opinion shifts in this study:

- 1) Based on expectation states theory, males should be more dominant within group interaction. Therefore, female subjects are expected to be more likely to shift their opinions than male subjects following the group discussion.
- 2) Based on gender schema theory, gender personality affects gender ideology, which then influences social attitudes and behavior. In this study, measurement of gender-related personality is not included, but subjects' conception of gender role is considered to be important in predicting gender differences in opinion shifts. Thus, more traditional female subjects are expected to be more likely to shift their opinions than more traditional male subjects.
- 3) According to the gender role strain perspective, gender

role socialization leads to social and psychological strain on attitudes and behavior. Men are assumed to have more technoscientific concerns and attitudes than women. Therefore, male subjects are expected to be more knowledgeable about food irradiation than female subjects. Also, females are expected to be more influenced to shift opinions by receiving knowledge about food irradiation than males.

Considering personality factors and influence sources, five theoretical assumptions are proposed as:

- 4) Low self-esteem subjects are expected to be more likely to shift their original opinions than high self-esteem subjects.
- 5) Low self-efficacy subjects are expected to be more likely to shift their original opinions than high self-efficacy subjects.
- 6) External subjects are expected to be more likely to shift from their original opinions than internal subjects.
- 7) Personality factors are expected to be more influential for female opinion shifts than for male opinion shifts.
- 8) Females are expected to be more influenced by group members to shift opinions than males.

CHAPTER II: SOCIAL ACCEPTANCE OF FOOD IRRADIATION

The Literature review in this chapter covers the controversy and some empirical studies concerning the social acceptance of food irradiation.

Food irradiation refers to the technique for preserving and improving the safety of food products by exposing them to carefully measured amounts of electromagnetic (ionizing) radiations such as gamma or X-ray radiations.

Many experiments have shown that proper electromagnetic radiations can kill harmful bacteria to keep food fresh longer and reduce infestation by insects or contamination by the organisms causing food borne disease. Food irradiation was introduced in industrial food processing in the 1940s, and years of research have demonstrated "the usefulness and safety of irradiation as a food processing technique" (W.H.O., 1988:33). Today, more than thirty countries in the world have approved the use of food irradiation. In the U.S.A., the U.S. Food and Drug Administration (FDA) has approved food irradiation for wheat and potatoes (1963), spices (1983), pork (1985), fruits and vegetables (1986), and poultry (1990) (Sapp, 1990).

Although there are benefits of using food irradiation in food production, the technology comes under intensive debate

in the American consumer market. Arguments against food irradiation focus on its potentially harmful effects on human health. Opponents of the process contend that irradiated food can cause cancer and blood abnormalities, and the safety of food irradiation is still a question for human beings and the environment (Lochhead, 1989). Strong opposition comes from some national-level consumer groups and the sale of irradiated food has been banned in some states. Companies such as the Quaker Oats, H.J. Heinz, and Ralston-Purina are unwilling to use or support food irradiation in case of losing consumers.

Some studies focus on consumer acceptance of food irradiation as an education issue. Bruhn and Noell (1987) found that consumers with greater education would accept irradiated products. But their study was limited by only introducing favorable information about food irradiation.

Women's attitudes have been found to be more negative and influenced more by their knowledge of food irradiation. A consumer survey conducted by Ford and Rennie in 1987 indicated that, of approximately 200 shoppers interviewed, 70 percent supported food irradiation. Women, however, were found to be more resistant to irradiated food than men. Just 8.9 percent of women were willing to buy irradiated foods compared with 22.5 percent of men (Ford and Rennie, 1987). Bord and O'Connor (1989) found that female consumers' attitudes toward

food irradiation was influenced by their level of knowledge about the process. Women who knew something about food irradiation tended to accept it and the rate of female acceptance was increased when more positive information was introduced.

Sapp and Harrod (1990) found that group discussion polarized consumer attitudes in relation to the type of information they received before group discussion. Persons receiving favorable information polarized toward favorable attitudes, and persons, who received only unfavorable information, polarized toward unfavorable attitudes following group discussion. Persons receiving both favorable and unfavorable information polarized toward unfavorable attitudes. The last finding, they concluded, could be because of the disproportionate influence of negative word-of-mouth discussion. Their study indicated that consumer acceptance of food irradiation would be improved if they could get increased education and safety assurance. Social influence derived from word-of-mouth discussions was essential to enhance the education process (Sapp and Harrod, 1990).

Previous research has shown the importance of education and group discussion on consumer acceptance of food irradiation. The present study deals with the impact of group discussion on gender differences in opinion change. Consumer

acceptance of food irradiation will be examined in terms of male and female subjects' opinion shifts after group discussion. It is expected that the study may contribute to further understanding of consumer acceptance of food irradiation and of the relevant education decision process.

CHAPTER III: METHODOLOGY

The data used in this study were collected through an experiment conducted in summer, 1991, by Dr. Steve Sapp and Dr. Wendy Harrold in the Department of Sociology at Iowa State University. The project was sponsored by the Iowa State University Agricultural Experiment Station in cooperation with the U.S. Department of Agriculture.

Subjects

A convenience sample was used to obtain subjects for the experiment. A local church in Ames, Iowa, was solicited to organize its members to serve as subjects in exchange for payments to the church. A pre-experiment questionnaire was sent to 300 prospective subjects from the church, and 178 of them came to the experiment, depending on their schedule availability. Their responses before and during the experiment were guaranteed with confidentiality.

The Pre-Experiment Questionnaire

The pre-experiment questionnaire (Appendix A) consisted of three sections. The first section contained questions on food safety, knowledge, and opinions. The second section contained questions on four psychological scales: the

Traditional Egalitarian Sex Role (TESR) Scale (Larsen and Long, 1988), a self-esteem scale (Rosenberg, 1955), a self-efficacy scale (Sherer, et al. 1982), and Rotter's Locus of Control scale (Levenson, 1974; Lumpkin, 1985, 1988). The last section covered social demographic characteristics such as gender, age, education, and income.

The Experimental Design

The experiment was divided into eight sessions with four experimental groups and one control group in each session. In each session, the four experiment groups of five subjects each were assigned to different lab rooms. The experiment contained five steps:

Information about food irradiation

The experimenter gave the subjects a three-page written statement on food irradiation. The written information covered the basic concepts of food irradiation and the arguments made between proponents and opponents of the process.

Half of the subjects then viewed an edited version of 1985 Donahue show, which presented a panel discussion among four experts, two each in favor or opposition to food irradiation.

Pre-discussion opinion

After this informational input, a short questionnaire was administered to obtain the subjects' responses to the information they received (Appendix B, E.1). Next, subjects were asked to indicate their opinion of food irradiation and list their arguments in support of their opinion (Appendix B, E.2).

Group discussion

The subjects were directed to share their opinions and reach a group consensus about food irradiation (Appendix B, E.3). At this point, the experimenter made a copy of the group consensus and told the subjects they were going to share another group's opinion. Before moving to the next step, a short questionnaire (Appendix B, E.4) was given to subjects to measure the influence of group discussion on their opinions of food irradiation.

Group comparison

Each group received a pre-designed decision chart (Appendix B, E.5) that was presented as coming from one of the other groups in the experiment session. Subjects were asked to evaluate as a group the comparison group's decision and then reevaluated their own group's decision (Appendix B, E.6).

Subjects' final opinion

A final questionnaire (Appendix B, E.7) was used to measure subjects opinions of the comparison group and food irradiation, eating irradiated food and their final evaluation of food irradiation.

Operationalization of the Variables

There are five independent variables and two dependent variables in this study. The independent variables are:

Gender role attitudes

Gender role attitudes are measured by the subjects' cumulative scores on the Traditional Egalitarian Sex Role scale (Appendix A, Section 2.6). The scale contains 20 items recorded on a five-point Likert format from 1 (strongly agree) to 5 (strongly disagree).

The TESR scale was developed by Larsen and Long in 1988. They administered the scale to 484 undergraduate students at Oregon State University. The partial-whole correlation of 20 items was bigger than .48 and the corrected split-half reliability of the scale was .91 ($P < .001$). For this study, the Cronbach alpha reliability coefficient of the scale is .90.

A higher cumulative scores on the scale indicates more traditional gender role attitudes, while lower scores indicates more egalitarian gender role attitudes. The theoretical score range is from 20 to 100.

Knowledge of food irradiation

Knowledge of food irradiation is measured by the question "Are you very knowledgeable, somewhat knowledgeable or unfamiliar with----food irradiation?". There are three response categories: 1=very knowledgeable, 2=somewhat knowledgeable, and 3=unfamiliar.

Self-esteem

The ten-item Self-Esteem scale (Appendix A, Section 2.9) is used to measure the subjects' self-esteem. The internal reliability and face validity of the scale have been verified by its association with other psychological phenomenon like depression and self-opinion (Rosenberg, 1965). The statements are ranked in a five-point Likert format from 1 (strongly agree) to 5 (strongly disagree). The theoretical score range is from 10 to 50 (40 points). The Cronbach alpha reliability coefficient for the scale in this study equals .88.

Self-efficacy

Sixteen statements (Appendix A, Section 2.8) adapted from the General Self-Efficacy Subscale are used to measure the subjects' self-efficacy. The General Self-Efficacy Subscale was constructed by Sherer and his colleagues in 1982 and reported with a Cronbach alpha reliability coefficient of .86 and high content validity. For this study, the Cronbach alpha reliability coefficient equals .88.

The responses to the statements are ranked in a five-point Likert format from 1 (strongly agree) to 5 (strongly disagree). The theoretical score range is from 16 to 80.

Locus of control

Thirteen items from the Rotter's Locus of Control scale (see Appendix A, Section 2.7) are presented in a five-point Likert format to measure the subjects' locus of control.

The original Rotter's Locus of Control scale has 29 items. Recent literature, however, shows that many researchers have developed some new versions of the scale such as the abbreviated Internal-External scale (Valecha and Ostrom, 1974;), the Internal, Powerful Others, and Chance scale (Levenson, 1974), and the brief Locus of Control scale (Lumpkin, 1985, 1988). These scales are all reported with high reliability and validity. Lumpkin's scale, for example,

was reported with a Cronbach's alpha reliability coefficient of .68 and high predictive validity (Lumpkin, 1985).

The Likert Locus of Control scale used in this study consists of six items from Lumpkin's scale and seven items from Levenson's scale. The Cronbach alpha reliability coefficient for the items in this study equals .83. The responses are ranked from 1 (strongly agree) to 5 (strongly disagree). The total score on the scale is obtained by summing the values on all 13 items. Higher scores indicate more internal subjects, while lower score indicate more external subjects. The theoretical range of scores is from 13 to 65.

In this study, there are two dependent variables.

Opinion shifts

Opinion shifts are measured by responses to the questionnaires E2 and E4 (Appendix B, E.2 and E.4).

Influence sources

The subjects who watched the Donahue show videotape were asked the question: "Whose opinions did you pay most attention to when forming your opinion about food irradiation?". It has three response categories: 1) the members of the group, 2) the panel members on the Danahue show, and 3) Neither source more than the other.

The SAS program was used to analyze the data in this study. The t-Test and crosstabulation, with Chi-square test, were used to investigate the hypothesized predictions of gender differences in opinion shifts, the impacts of personality variables, and the influence sources of opinion change regarding food irradiation.

CHAPTER IV: RESULTS

The sample (experiment groups) contains 58 male subjects (38.7%) and 92 female subjects (61.3%) attending the experiment. Of them, 16 persons are high school graduates (10.7%), 21 persons have vocational or some college education (14%), 56 persons have a 4-year college education (37.3%), and 57 persons finished post-graduate work (38%). About 87% of them come from a family with the income between \$25,000 to \$99,999 in 1990. The age distribution of subjects is from 18 to 77. The hypothesis testing is based on the data from the experiment groups.

Among the total 178 subjects (including the control group), 47.2% reported they were unfamiliar with food irradiation, 50% reported they were somewhat knowledgeable with food irradiation, and about 2.8 % reported they were very knowledgeable with food irradiation. For food safety concern, 17.3% reported they were not concerned, 58.3 reported they were somewhat concerned, and 24.4 reported they were very concerned.

Concerning the experiment sample, there is a potential bias question. The sample is biased toward highly educated, economically advantaged persons. This bias should be considered in interpreting the results of the study. The

results found here may occur only for highly educated persons and/or for persons of relatively equal class position. The sample is homogeneous in that both males and females have high education and income (in fact, many of the respondents are spouses). Thus, we would not expect gender differences in opinion shifts to result from differences in education or income. This assumption holds for the analyses conducted in this study.

Tests of Hypotheses

Gender differences in choice shifts

The first objective of the study is to investigate gender differences in opinion shifts following group discussion. Theoretically, female subjects are expected to be more likely to change their opinions than male subjects. Thus, the first hypothesis tested is:

H1. Female subjects will have a higher percentage of opinion shifts after group discussion than male subjects.

Opinion shifts were indicated by the difference of opinion positions before and after group discussion.

As indicated in Table 1, about 62 percent of male subjects changed their opinions, whereas only 47 percent of female subjects changed their opinions following group discussion. This finding is contradictory with the hypothesis, but not statistically significant.

Table 1. Comparison of Opinion Shifts By Gender

Gender	Opinion shifts					
	no shift		shift		total	
	%	N	%	N	%	N
Male	37.93	(22)	62.07	(36)	100.0	(58)
Female	53.26	(49)	46.74	(43)	100.0	(92)

Chi-square=3.353 d.f.=1 P=0.067.

Further investigation shows that female subjects have a stronger negative evaluation of food irradiation before and after group discussion than male subjects (Table 2). The pre discussion mean score for females falls on the midpoint (10.5) of opposition or support for food Irradiation and is only one point higher after discussion. The pre and post discussion opinions for males, however, are both in support of food irradiation. This difference is statistically significant ($P < .01$).

Following group discussion, male subjects tended to shift toward a more negative evaluation, while females tended to be more in support of food irradiation. The results in Table 3

Table 2. t-Test of Mean Score of Pre and Post Discussion
Opinions By Gender

Pre-discussion opinions:

Gender	N	Mean	Std Dev	T	DF	Significance
Male	58	12.81	4.25			
Female	92	10.50	4.24	3.25	148	P=0.0014

Post-discussion opinions:

Gender	N	Mean	Std Dev	T	DF	Significance
Male	58	12.80	4.22			
Female	92	10.72	4.14	2.97	148	P=0.0035

indicate that males show a higher percentage of negative opinion change than females (35 percent and 17 percent respectively). About 30 percent of female subjects shift to more favorable opinions following group discussion, compared to 28 percent of male subjects shifting in a positive direction. This difference is statistically supported at the .05 level.

Table 3. Comparison of Direction of Opinion Change
Post Group Discussion by Gender

Gender	direction of opinion shifts							
	negative		no Shift		positive		total	
	%	N	%	N	%	N	%	N
Male	34.5	(20)	37.9	(22)	27.6	(16)	100.0	(58)
Female	17.4	(16)	53.3	(49)	29.4	(27)	100.0	(92)

Chi-square=6.135, d.f.=2, P=0.047.

Gender role attitudes are theoretically suggested to affect male and female opinion shifts in this study. Thus, the second hypothesis tested is:

H2. Female subjects with higher scores on the Traditional Egalitarian Sex Role (TESR) scale are more likely to shift their original opinions than male subjects with higher scores on the scale.

Subjects' gender role attitudes are represented by the sum of total values on the TESR scale. The analysis results in Table 4 shows that male subjects have higher mean scores on the TESR scale, indicating more traditional gender role attitudes, but no significant statistical evidence supports that gender role attitudes affect male opinion shifts.

Table 4. t-Test of Subjects' Mean Scores of Gender Role Attitudes by Opinion Shifts

Shifts	N	Mean	Std Dev	T	DF	Significance
<u>Male</u>						
No shift	22	39.00	9.72			
Shift	36	39.66	8.99	-0.2656	56	P=0.7915
<u>Female</u>						
No Shift	48	30.60	8.94			
Shift	43	35.60	10.18	-2.4951	89	P=0.0144

Studying female responses, it is found that females have lower mean scores on the scale, indicating more egalitarian gender role attitudes. Further, compared to male opinion shifts, gender role attitudes are shown to affect female opinion shifts with the statistical significance at .01 level.

Since knowledge of food irradiation is considered to be of importance in predicting male and female opinion shifts, the third hypothesis tested here is:

H3. Female opinion shifts will be more influenced by their knowledge of food irradiation than male opinion shifts.

To test this hypothesis, subjects' responses on the

question, "Are you very knowledgeable, somewhat knowledgeable, or unfamiliar with----food irradiation," were recoded and crosstabulated by gender. Table 5 indicates that about 68 percent of male respondents are somewhat knowledgeable with food irradiation, whereas just 43 percent of female respondents are somewhat knowledgeable with food irradiation. There is significant statistical evidence to support a gender difference on knowledge of food irradiation (Chi-square=10.59, d.f.=1, P<.01).

Table 5. Knowledge of Food Irradiation by Gender

Gender	knowledge of food irradiation					
	knowledgeable		unfamiliar		total	
	%	N	%	N	%	N
Male	68.1	(47)	31.9	(22)	100.0	(69)
Female	43.1	(47)	56.9	(62)	100.0	(109)

Chi-square=10.59 d.f.=1. P=0.001.

To investigate whether the knowledge of food irradiation affects male and female opinion shifts, three-way crosstabulation tables were obtained on the variables of gender, knowledge of food irradiation, and opinion shifts.

The results in Table 6 and Table 7 indicate that for males, knowledge of food irradiation does not affect their opinion shifts (Chi-square=0.648, d.f.=1, P=0.421), while for females, opinion shifts are significantly related to their knowledge of food irradiation (P<.05).

Table 6. Comparison of Male Subjects' Opinion Shifts by Knowledge of Food Irradiation

Knowledge of F.I.	opinion shifts					
	no shift		shift		total	
	%	N	%	N	%	N
Knowledgeable	34.2	(13)	65.8	(25)	100.0	(38)
Unfamiliar	45.0	(9)	55.0	(11)	100.0	(20)

Chi-square=0.648, d.f=1, P=0.421.

In summary, hypothesis 1 is not supported in this study. Opinion shifts are found to occur more likely among male subjects than among female subjects. Males, nevertheless, tend to have more positive evaluations of food irradiation than females. Female opinion shifts are found to be related to gender role attitudes, but not male opinion shifts. Also

Table 7. Comparison of Female Subjects' Opinion Shifts by Knowledge of Food Irradiation

Knowledge of F.I.	Opinion shifts					
	no shift		shift		total	
	%	N	%	N	%	N
Knowledgeable	67.6	(25)	32.4	(12)	100.0	(37)
Unfamiliar	42.6	(23)	57.4	(31)	100.0	(54)

Chi-square=5.495, d.f=1, P=0.019

female opinion shifts are found to be significantly affected by their knowledge of food irradiation. The second and the third hypothesis are supported by these findings.

Personality correlates of opinion shifts

The second research objective of is to examine the impact of personality factors on male and female opinion shifts. T-Tests were conducted to analyze the influence of each personality variable on opinion shifts. The research hypotheses are:

H4. The lower mean score on the self-efficacy scale is, the more likely a subject is to exhibit opinion shift.

H5. The lower mean score on the self-esteem scale is, the more likely a subject is to exhibit opinion shift.

H6. The lower mean score on the locus of control scale is, the more likely a subject is to exhibit opinion shift.

H7. Personality factors will be more significant for female opinion shifts than for male opinion shifts.

The t-Test of mean scores of personality variables by opinion shifts indicates that self-esteem and locus of control are not significant factors affecting opinion shifts in this study (Table 8). The mean scores on the self-esteem scale are identical for "shift" and "no shift" subjects (41.54 and 41.55 respectively). Different mean scores on the locus of control scale are found between the two groups (47.46 for "shift" and 49.19 for "no shift"), but not statistically significant ($P=0.0569$). Self-efficacy is found to influence opinion shifts significantly ($P<.05$) and the mean scores for "shift" and "no shift" subjects are 61.78 and 63.93. For gender differences, further t-Test of mean scores of personality variables by opinion shifts was conducted by gender (Tables 9 and 10). The results indicate that only self-efficacy is a important personality factor affecting male opinion shifts in the experiment. There is no statistical evidence to support the hypothesis that personality factors affect female opinion shifts. This finding is contradictory to the theoretical

Table 8. t-Test of Mean Scores of Personality Variables
by Opinion Shifts

Variable	N	Mean	Std Dev.	T	DF	Sign.
<u>SEF.</u>						
shift	78	61.78	5.97			
no shift	70	63.92	7.19	1.98	146	P=0.0492
<u>SEM.</u>						
shift	79	41.54	4.94			
no shift	70	41.56	5.76	0.01	147	P=0.9883
<u>LOC.</u>						
shift	79	47.46	6.17			
no shift	70	49.19	4.80	1.92	144.7	P=0.0569

predictions of gender differences in opinion shifts in relation with the personality factors.

In summary, self-efficacy is found to be a significant factor in explaining subjects' opinion shifts following the group discussion. Locus of control is found to have a moderate effect on opinion shifts. There is no significant statistical relation between a subject's self-esteem and opinion shift in this study. Again, personality factors such

Table 9. t-Test for Male Subjects' Mean Scores of
Personality Variables by Opinion Shifts

Variables	N	Mean	Std Dev	T	DF	Sign.
<u>SEF.</u>						
shift	35	61.83	6.14			
no shift	22	65.28	6.87	1.97	55	P=0.0540
<u>SEM.</u>						
shift	36	41.67	5.39			
no shift	22	42.78	5.29	0.76	56	P=0.4482
<u>LOC.</u>						
shift	36	47.41	5.75			
no shift	22	50.00	4.13	1.84	56	P=0.0717

as self-efficacy and locus of control seem to be more related to male opinion shifts rather than to female opinion shifts.

Differences in influence sources

The third objective concerns the gender differences in influence sources. The research hypothesis is:

H8. For the subjects who watch the Danahue show, females are more likely to get in-group influence than males.

Table 10. t-Test for Female Subjects' Mean Scores of
Personality Variables by Opinion Shifts

Variables	N	Mean	Std Dev	T	DF	Sign.
<u>SEF.</u>						
shift	43	61.74	5.90			
no shift	48	63.31	7.31	1.12	89	P=0.2669
<u>SEM.</u>						
shift	43	41.40	4.60			
no shift	48	41.00	5.93	-0.39	89	P=0.6946
<u>LOC.</u>						
shift	43	47.50	6.58			
no shift	48	48.81	5.08	1.08	89	P=0.2827

Table 11 shows that 44 percent of female subjects report to be influenced by in-group members when making their opinion decisions, while the percentage is only 29 for males. This finding suggests that there exists in-group influence on female opinion decision in the experiment. The analysis shows that about 50 percent of male subjects, compared with 38 percent of female subjects, responded that they were independent in making their opinion decisions (influenced by

Table 11. Comparison of Reference Resources by Gender

Gender	reference sources						total	
	group member		panel member		neither		%	N
	%	N	%	N	%	N	%	N
Male	28.6	(8)	21.4	(6)	50.0	(14)	100.0	(28)
Female	44.4	(20)	17.8	(8)	37.8	(17)	100.0	(45)

Chi-square=1.86, d.f.=2, P=0.394.

neither in-group members nor by the Donahue panel). Although gender differences are found here, it is not statistically significant (Chi-square=1.86, d.f.=2, P>.05) and the research hypotheses is not supported.

Other Findings

Besides the research focus, the author also analyzed the subjects' social demographic backgrounds in relation to opinion shifts. Tables 12 and Table 13 show that education and age are significant factors affecting female opinion shifts, but not male opinion shifts. For females, the mean score of age is 43 for "shift" group while it is 38 for "no shift" group. The difference of mean scores is statistically significant (P<.05). Concerning education, higher education

Table 12. t-Test of Mean Scores of Male Subjects'

Age, Income and Education by Opinion Shifts

Variables	N	Mean	Std Dev	T	DF	Sign.
<u>Age</u>						
shift	36	42.22	9.09			
no shift	22	46.09	10.99	1.45	56	P=0.1521
<u>Income</u>						
shift	34	2.65	0.77			
no shift	22	2.82	0.96	0.74	54	P=0.4652
<u>Education</u>						
shift	36	4.33	0.86			
no shift	22	4.23	1.07	-0.42	56	P=0.6795

mean scores are found in "no shift" group and this indicates that female subjects with higher level of education tend to stay in their original opinion position on the opinion scale following the group discussion. It is statistically significant ($P < .01$). These findings could be helpful in understanding gender differences in opinion shifts in the present study.

Table 13. t-Test of Mean Scores of Female Subjects'
Age, Income and Education by Opinion Shifts

Variables	N	Mean	Std Dev	T	DF	Sign.
<u>Age</u>						
shift	43	43.18	10.86			
no shift	48	38.25	9.28	-2.32	83	P=0.0230
<u>Income</u>						
shift	40	2.45	0.75			
no shift	48	2.81	1.20	1.67	86	P=0.1001
<u>Education</u>						
shift	43	3.56	1.08			
no shift	48	4.10	0.78	2.75	76	P=0.0075

CHAPTER V: DISCUSSION AND SUMMARY

Discussion

This study examines gender differences in opinion shifts, the impact of personality factors on opinion shifts, and gender differences in influence sources regarding food irradiation. Previous literature suggests that gender role socialization evokes gender differences in social behavior and attitudes. In this study, females are assumed to be less knowledgeable of food irradiation and more likely to shift their opinions after group discussion. They are also assumed to be more likely to be influenced by in-group members in forming their opinions. Based on previous research, self-esteem, self-efficacy, and locus of control are predicted to affect opinions shifts, especially female opinion shifts.

The data analysis shows that male subjects are more knowledgeable about food irradiation and have more positive attitudes than female subjects. Female opinion shifts are found to be significantly influenced by their knowledge of food irradiation. Thus, the research hypothesis that female opinion shifts are more likely to be influenced by the knowledge of food irradiation is empirically supported.

A measure of gender role attitudes was found to be a significant variable affecting gender differences in opinion

shifts. The influence of gender role attitudes is more significant for female opinion shifts than for male opinion shifts. The finding supports the hypothesis that more traditional female subjects are more likely to shift their opinions than more traditional male subjects.

Gender differences are also found in influence sources, but the difference is not statistically significant. Thus, the research hypothesis that females are more likely to be influenced by group members than males, can't be supported.

The results also show that only self-efficacy is a significant personality factor affecting opinion change in the experiment. The data fail to support the hypothesis that personality factors are more significant for female opinion shifts than for male opinion shifts. The t-test of mean scores of personality variables by opinion change by gender indicates that only self-efficacy is a significant personality factor for male opinion shifts.

The research assumption that females are more likely to shift their opinions than males is not supported in this study. The comparison of opinion shifts by gender indicates that more male subjects shift their original opinion positions than female subjects after group discussion. Further analysis shows that male subjects have a more positive evaluation of food irradiation than female subjects both before and after

group discussion, although they shift to be more unfavorable following group discussion than female subjects.

Some theoretical considerations may be helpful in interpreting this contradictory finding.

Group gender composition

The question that if gender composition in a group affects individual behaviors has been investigated and previous findings suggest that when a person's gender is in the minority of a group, his or her behaviors are more likely attributed to his or her gender by others (Taylor et al, 1978; Heilman, 1980). Hans and Eisenberg (1985) found that gender composition within a group affected social behavior significantly.

In this study, the sample was unbalanced with regard to gender, being 58 male subjects (38.7%) and 92 female subjects (61.3%). Males were in the minority and the experimental groups were often composed of 2 males and 3 females, except one group. This gender composition may have created an indirect majority-minority influence on subjects' opinion shifts.

Social comparison of opinion

Social comparison research shows that ability and opinion comparison is mostly based on similarity rules. Similar

comparison is found to be influenced by the attributes related to the performance such as gender, age, and attractiveness (Miller, 1982; Wheeler, Koestner, Driver, 1982). An intellectual ability study by Zanna, Goethals and Hill (1975) indicated that persons tended to make same-sex comparisons. In the present study, the subjects were asked to exchange their opinions during the group discussion. Since the gender composition of a group was highly unbalanced, same-sex comparison could influence a hetero-sex comparison. Thus, a female subject could be more influenced by other female subjects in forming her own opinion. If she finds the opinions of other females are much similar to hers, she may feel more comfortable with her opinion and could stay with her pre-discussion opinion. Hence, the gender differences in opinion shifts could be the outcome of different opinion comparison situations confronted by male and female subjects, that is, they may have made different types of opinion comparison. Whether the opinion comparisons discussed is a reason to explain fewer opinion shifts among female subjects in the experiment needs to be explored later.

Personality factors

An interesting finding in this study is that self-efficacy and locus of control are more significant personality factors for male opinion shifts, whereas gender role attitudes

are significant in predicting female opinion shifts. These findings may imply that male opinion change is more related to the influence of their personality in a minority-majority situation in this study, while female opinion change is more related to the influence of their feminine values.

Age, education and income

Analysis of subjects' age, education and income indicates that age and education are significant factors affecting female opinion shifts. The female subjects who did not change their opinions are younger and have more formal education than females who exhibited opinion shifts. They are apparently the majority of female subjects. Thus, the theoretical assumption of female opinion change in view of gender role socialization may not be applicable to a young and generally well-educated female population.

Summary

In conclusion, gender differences in opinion shifts are found to be significant in this study, although the findings are opposite to the theoretical prediction in terms of gender role socialization. Female opinion change is found to be affected significantly by their gender role attitudes, knowledge of food irradiation, education and age, while male opinion shifts are affected by personality factors like self-

efficacy and locus of control. These findings imply that female susceptibility to social influence, generally speaking, is still related to gender role socialization, but we should be careful with the interpretation as these factors may not lead to female susceptibility to social influence in any circumstances. Group gender composition and the influence of personality factors in a minority-majority situation should be considered in future studies.

The findings of this study have implications for future research of food irradiation. Regarding consumer acceptance of food irradiation, female subjects are found to be less knowledgeable and have more negative evaluations than male subjects. More male subjects, nevertheless, shift their opinions to be more unfavorable following group discussion. This finding could imply that food irradiation is a special technology that people evaluate its use more in view of human benefits rather than technical and commercial benefits. At this point, the education and concerns of female consumers is of importance in interpreting the social acceptance and consumption of irradiated foods.

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APPENDIX A: THE PRE-EXPERIMENT QUESTIONNAIRE

SECTION I: FOOD SAFETY

1. Are you very knowledgeable, somewhat knowledgeable, or unfamiliar with the following technologies and policies related to food safety?

	Very Knowledgeable	Somewhat Knowledgeable	unfamiliar
Quantative risk assessment.....	1	2	3
The TAK index of food safety.....	1	2	3
Food irradiation.....	1	2	3
The Delaney Amendment..	1	2	3
The negligible risk concept.....	1	2	3
The Ames HERP index of hazard risk.....	1	2	3
Proposition 65.....	1	2	3

2. Are the following groups doing a good, adequate, poor or not responsible job of ensuring that our food is safe to eat?

	Good	Adequate	Poor	Unsure	not responsible
Governmental agencies.....	1	2	3	4	5
Industry groups...	1	2	3	4	5
Farmers.....	1	2	3	4	5
Consumer advocacy groups.....	1	2	3	4	5
Agricultural chemical companies.....	1	2	3	4	5
Food scientists...	1	2	3	4	5

3. Overall, how concerned are you that the food supply in the United States may be unsafe? Are you not concerned, somewhat concerned, or very concerned?

1 = Not Concerned.

2 = Somewhat concerned.

3 = Very Concerned.

4 = Unsure.

4. What do you think is the likelihood of your experiencing harmful effects from each of the following?

	Small	Medium	Large	Unsure
Bacteria in foods.....	1	2	3	4
Irradiated food.....	1	2	3	4
Growth hormone residues in food.....	1	2	3	4
Naturally occurring toxins in food.....	1	2	3	4
Food additives.....	1	2	3	4
Antibiotic residues in food.....	1	2	3	4
Pesticide residues in food.....	1	2	3	4

5. How strongly do you agree, or disagree with each of the following statements?

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
There is little that I can do about food safety.....	1	2	3	4	5
Trying to become more knowledgeable about food safety.....	1	2	3	4	5
It is impossible to avoid risk with food safety.....	1	2	3	4	5
I have changed my shopping habits to assure a safer food supply for my home...	1	2	3	4	5
Everything we eat these days is dangerous	1	2	3	4	5
I try not to think about the safety of food that I eat.....	1	2	3	4	5
Trust the industry to provide safe food products.....	1	2	3	4	5
Trust the government to take the necessary action to ensure a safe food supply.....	1	2	3	4	5
Life is uncertain. Take a chance with food safety like everything else.....	1	2	3	4	5
Concerns on food safety are exaggerated.....	1	2	3	4	5

SECTION II: GENERAL OPINIONS

6. How strongly do you agree, or disagree, with each of the following statement?

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
A woman's place is in the home.....	1	2	3	4	5
The role of teaching in the elementary school belong to woman.....	1	2	3	4	5
The changing of diapers is the responsibility of both parents.....	1	2	3	4	5
Men who cry have a weak character.....	1	2	3	4	5
A man who has chosen to stay at home and be a house-husband is not less masculine...	1	2	3	4	5
It is as important to educate daughters as it is to educate sons.....	1	2	3	4	5
Women should be more concerned with clothing and appear- ance than men.....	1	2	3	4	5
Women should have as much sexual freedom as men.....	1	2	3	4	5
The man should be more responsible for the economic support of the family than the woman.....	1	2	3	4	5

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
It is a myth that men make better executives than women.....	1	2	3	4	5
The word "obey" should be removed from wedding vows.....	1	2	3	4	5
A woman should submit to her husband's decision..	1	2	3	4	5
Some equality in marriage is good, but husband should have the main say-so in family.....	1	2	3	4	5
Having a job is as important for wife as it's for husband....	1	2	3	4	5
It is more appropriate that group leadership positions be held by males.....	1	2	3	4	5
I won't allow my son to play with dolls.....	1	2	3	4	5
Having a challenging career is as important as being a wife or mother.....	1	2	3	4	5
By nature, men make better leaders.....	1	2	3	4	5
Almost any woman is better off in home than in a job.....	1	2	3	4	5
Father should have final authority over the children.....	1	2	3	4	5

7. How strongly do you agree, or disagree, with each of the following statements?

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
To a great extent, my life is contro- lled by accidental happenings.....	1	2	3	4	5
There is no chance of protecting my personal interest from bad luck happenings.....	1	2	3	4	5
When I make plans, I am almost certain that I can make them work..	1	2	3	4	5
Many unhappy things in Life are partly due to bad luck.....	1	2	3	4	5
When I get what I want, it is usually because I am luck.....	1	2	3	4	5
To do the right things depends upon ability; luck has nothing to do with it.....	1	2	3	4	5
Many time I feel that I have little influence over the things that happen to me.....	1	2	3	4	5
It is not always wise to plan too far ahead as many things turn out to be a matter of good or bad fortune...	1	2	3	4	5
What happens to me is my own doing.....	1	2	3	4	5

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Getting a good job depends mainly on being in the right place at right time...	1	2	3	4	5
I have often found what is going to happen will happen.....	1	2	3	4	5
Whether or not I get into a car accident is mostly a matter of luck.....	1	2	3	4	5
It is chiefly a matter of fate whether I have a few or many friends.	1	2	3	4	5

8. How strongly do you agree, or disagree, with each of the following statement?

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
I do not seem capable of dealing with most problems coming up in life.....	1	2	3	4	5
If I can't do a job the first time, I keep trying until I can.....	1	2	3	4	5
When I set important goals for myself, I rarely achieve them...	1	2	3	4	5
I give up on things before completing them.....	1	2	3	4	5
I avoid facing difficulties.....	1	2	3	4	5

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
If something looks too complicated, I will not even bother to try it.....	1	2	3	4	5
When I have something unpleasant to do, I stick to it until I finish it.....	1	2	3	4	5
When I make plans, I am certain I can make them work.....	1	2	3	4	5
When I decide to do something, I go right to work on it.....	1	2	3	4	5
When trying to learn something new, I soon give up if I am not initially successful.	1	2	3	4	5
When unexpected problems occur, I do not handle them well.....	1	2	3	4	5
I avoid trying to learn new things when they look too difficult for me.....	1	2	3	4	5
Failure just makes me try harder.....	1	2	3	4	5
I feel insecure about my ability to do things.....	1	2	3	4	5
I am a self-reliant person.....	1	2	3	4	5
I give up easily.....	1	2	3	4	5

9. How strongly do you agree , or disagree, with each of the following statement?

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
I feel that I am a person of worth, at least on an equal basis with other....	1	2	3	4	5
I feel that I have a number of good qualities.....	1	2	3	4	5
All in all, I am inclined to feel that I am a failure..	1	2	3	4	5
I am able to do things as well as most person.....	1	2	3	4	5
I take a positive attitude toward myself.....	1	2	3	4	5
On the whole, I am satisfied with myself.....	1	2	3	4	5
I wish I could have more respect for myself.....	1	2	3	4	5
I certainly feel useless at times....	1	2	3	4	5
At times, I think I am no good at all...	1	2	3	4	5

SECTION III: BACKGROUND INFORMATION

10. What is your age? _____
11. What is your gender? 1 = Male 2 = Female
12. What is the highest grade in school that you complete?
- 1 = Less than high school graduate.
 - 2 = High school graduate.
 - 3 = Vocational school/Technical school/Some college.
 - 4 = 4-year college graduate.
 - 5 = Post-graduate.
13. How much income before taxes did your family make in 1990?
- 1 = Less than \$25,000
 - 2 = \$25,000 to \$49,999
 - 3 = \$50,000 to \$74,999
 - 4 = \$75,000 to \$99,999
 - 5 = \$100,000 or more

APPENDIX B: THE EXPERIMENT QUESTIONNAIRE

E1.

1. Circle a number to show whether the following characteristics are more descriptive of proponents or opponents of food irradiation.

	Very much like proponents				Very much like opponents			
Scientific.....	1	2	3	4	5	6	7	
Alarmist.....	1	2	3	4	5	6	7	
Not safety conscious.....	1	2	3	4	5	6	7	
Old fashioned...	1	2	3	4	5	6	7	
Cautious.....	1	2	3	4	5	6	7	
Devious.....	1	2	3	4	5	6	7	
Incorrect.....	1	2	3	4	5	6	7	
Conspiring against the public.....	1	2	3	4	5	6	7	
Idealistic.....	1	2	3	4	5	6	7	
Untrustworthy...	1	2	3	4	5	6	7	
Expert.....	1	2	3	4	5	6	7	
Understandable..	1	2	3	4	5	6	7	

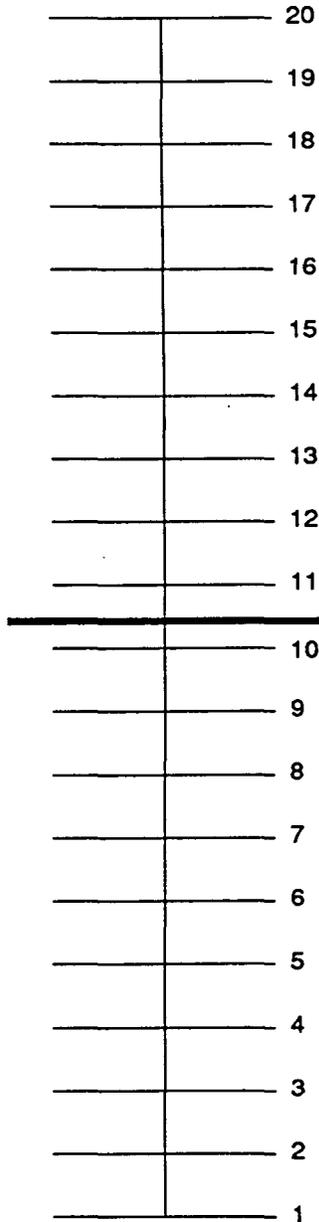
2. For the experts in the Donahue Show, circle a number that best describes that person's motivations for taking their stance on food irradiation.

	Definitely describes his/her motivation			Definitely not describes his/her motivation			
Ellen Haas							
Personality.....	1	2	3	4	5	6	7
Social/political orientation.....	1	2	3	4	5	6	7
Knowledge of the facts.....	1	2	3	4	5	6	7
Walter Burnstein							
Personality.....	1	2	3	4	5	6	7
Social/political orientation.....	1	2	3	4	5	6	7
Knowledge of the facts.....	1	2	3	4	5	6	7
Georger Giddings							
Personality.....	1	2	3	4	5	6	7
Social/political orientation.....	1	2	3	4	5	6	7
Knowledge of the facts.....	1	2	3	4	5	6	7
Ed Remmers							
Personality.....	1	2	3	4	5	6	7
Social/political orientation.....	1	2	3	4	5	6	7
Knowledge of the facts.....	1	2	3	4	5	6	7

E2.

1. Please place a mark on the chart below that best represents your opinion of food irradiation and then turn this page over and list the arguments that support your position.

VERY STRONG SUPPORT



VERY STRONG OPPOSITION

E3.

1. Please list three most important arguments that were raised during the group discussion that have influenced your opinion of food irradiation.

2. Among the other members of your group, which person do you think raised the best arguments about food irradiation?

A B C D E

3. Among the other members of your group, which persons did you pay most attention to in forming your opinion about food irradiation?

A B C D E

4. Among the panel members on the Donahue Show, who do you think made the best arguments about food irradiation?

Ellen Hass Walter Burnstein George Giddings Ed Remmers

5. Whose opinions did you pay most attention to when forming your opinion about irradiation, the other members of your group or the panel members on the Donahue Show?

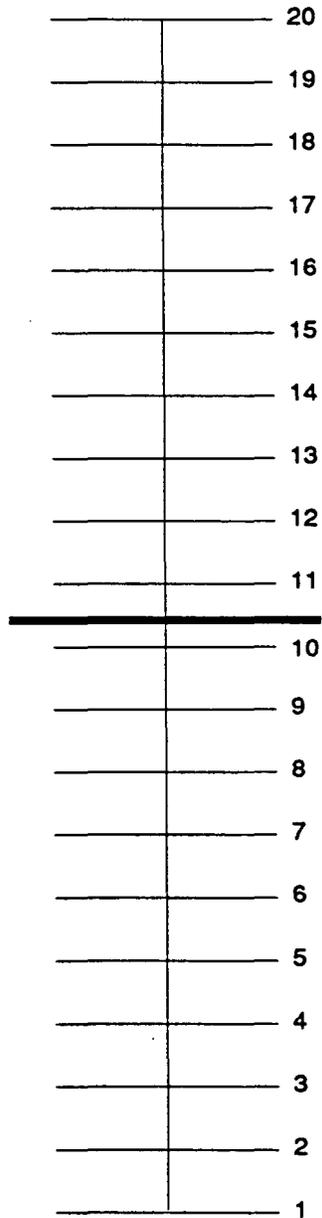
1=I was influenced more by the members of my group.

2=I was influenced more by the panel members on the Donahue Show.

3=Neither group influenced my opinion more than the other.

E4.

1. Please place a mark on the chart below that best represents the group's opinion of food irradiation. Then turn this page over and list the arguments that support this position.

VERY STRONG SUPPORT**VERY STRONG OPPOSITION**

E5.

1. You have seen the evaluation of food irradiation by another group. Try to guess the arguments used by the other group in forming their opinion. Then reevaluate your group opinion on the scale.

E6. Final Questionnaire

1. Circle a number to show the typical member of the other group rates on the following characteristics.

	Not at all like a typical member				Very much like a typical member			
Scientific.....	1	2	3	4	5	6	7	
Alarmist.....	1	2	3	4	5	6	7	
Not safety conscious.....	1	2	3	4	5	6	7	
Old fashion.....	1	2	3	4	5	6	7	
Cautious.....	1	2	3	4	5	6	7	
Devious.....	1	2	3	4	5	6	7	
Incorrect.....	1	2	3	4	5	6	7	
Against the public..	1	2	3	4	5	6	7	
Idealistic.....	1	2	3	4	5	6	7	
Untrustworthy...	1	2	3	4	5	6	7	
Expert.....	1	2	3	4	5	6	7	
Understandable..	1	2	3	4	5	6	7	
Motivated by personality.....	1	2	3	4	5	6	7	
Motivated by social/political orientation.....	1	2	3	4	5	6	7	
Motivated by the facts.....	1	2	3	4	5	6	7	
Willing to eat irradiated food..	1	2	3	4	5	6	7	
Influenced by the other group members.	1	2	3	4	5	6	7	

2. Circle the number that best shows where you think eating irradiated food rates on the following matched pairs of items.

For me, eating irradiated food would be:

Good	1	2	3	4	5	6	7	Bad
Foolish	1	2	3	4	5	6	7	Wise
Desirable	1	2	3	4	5	6	7	Undesirable
Harmful	1	2	3	4	5	6	7	Beneficial

3. How much do you agree with the following statements about food irradiation?

	Strongly	Agree				Strongly	Disagree	
Scientific experts think that I should eat irradiated food.....	1	2	3	4	5	6	7	
I want more information about irradiation before I decide if it's a good idea.....	1	2	3	4	5	6	7	
More research needs to be done on food irradiation.....	1	2	3	4	5	6	7	
This is just another example of the government and industry pushing something that may not be good for the public.....	1	2	3	4	5	6	7	
Food irradiation frightens me.....	1	2	3	4	5	6	7	
I do what scientific experts think I should do.....	1	2	3	4	5	6	7	

	Strongly Agree				Strongly Disagree			
If the FDA and USDA approve food irradiation, then can go along with it....	1	2	3	4	5	6	7	
If most persons think that food irradiation is a good idea, then I can do along with it.....	1	2	3	4	5	6	7	

4. How much do you agree, or disagree, with the following statements?

	Strongly Agree				Strongly Disagree			
Most persons will be in favor of eating irradiated food.....	1	2	3	4	5	6	7	
Eating irradiated food will be safer than eating non-irradiated food..	1	2	3	4	5	6	7	
Eating a nutritional diet is important to me.....	1	2	3	4	5	6	7	
My friends likely will favor my eating irradiated food.....	1	2	3	4	5	6	7	
I have the final say-so on selecting irradiated foods at supermarket...	1	2	3	4	5	6	7	
Eating irradiated food will increase chance of contracting cancer...	1	2	3	4	5	6	7	
Eating safe food is important to me...	1	2	3	4	5	6	7	

	Strongly Agree				Strongly Disagree			
Eating irradiated food will lead to decreased income to farmers....	1	2	3	4	5	6	7	
Avoiding cancer is important to me.....	1	2	3	4	5	6	7	
Most persons who are important to me likely will favor my eating irradiated food.....	1	2	3	4	5	6	7	
Eating irradiated food is not a safe thing to do.....	1	2	3	4	5	6	7	
Helping farmers to make a good income is important to me...	1	2	3	4	5	6	7	
Eating irradiated food will decrease the nutritional value of my diet.....	1	2	3	4	5	6	7	
My spouse likely will favor my eating irradiated food.....	1	2	3	4	5	6	7	
Eating irradiated food likely will be accepted by the American public.....	1	2	3	4	5	6	7	
The main benefits of food irradiation will go to the food processing corporations.....	1	2	3	4	5	6	7	
Eating irradiated food will increase chance of experiencing health problems later in life.....	1	2	3	4	5	6	7	

	Strongly Agree				Strongly Disagree			
I do what persons most important to me think I should do...	1	2	3	4	5	6	7	
Consumers advocates think that I should eat irradiated food..	1	2	3	4	5	6	7	
Protecting my health is important to me.....	1	2	3	4	5	6	7	
Eating irradiated food will be safer for small children than eating non-irradiated food.....	1	2	3	4	5	6	7	
I do what my spouse thinks I should do...	1	2	3	4	5	6	7	
Most supermarkets likely will stock irradiated foods.....	1	2	3	4	5	6	7	
Providing safe food for small children is important to me...	1	2	3	4	5	6	7	
Eating irradiated food will show support for the nuclear industry.....	1	2	3	4	5	6	7	
I do what my friends think I should do....	1	2	3	4	5	6	7	
Eating irradiated food will be safer for the elderly.....	1	2	3	4	5	6	7	
Eventually, most persons will eat irradiated food.....	1	2	3	4	5	6	7	

	Strongly Agree				Strongly Disagree			
I have control over if I eat irradiated foods.....	1	2	3	4	5	6	7	
Providing safe food for the elderly is important to me.....	1	2	3	4	5	6	7	
Supporting the nuclear industry is important to me.....	1	2	3	4	5	6	7	
The final decision to eat irradiated food will be up to me....	1	2	3	4	5	6	7	
I do what consumer advocates think I should do.....	1	2	3	4	5	6	7	
I think that food irradiation is a good idea.....	1	2	3	4	5	6	7	
I intend to eat irradiated food....	1	2	3	4	5	6	7	

5. How would you do the following actions?

	Very Likely				Very Unlikely			
Encourage others to eat irradiated foods.....	1	2	3	4	5	6	7	
Feed irradiated food to my children under 12.....	1	2	3	4	5	6	7	
Boycott groceries that sell irradiated food.....	1	2	3	4	5	6	7	
Pay 10% more for irradiated food....	1	2	3	4	5	6	7	

	Very Likely				Very Unlikely			
Support a ban on sales of irradiated food.....	1	2	3	4	5	6	7	
Boycott companies that sell irradiated food.....	1	2	3	4	5	6	7	
Seek more information about food irradiation.....	1	2	3	4	5	6	7	
Support a ban on the food irradiation process.....	1	2	3	4	5	6	7	
Eat irradiated food myself.....	1	2	3	4	5	6	7	

6. How strongly do you agree, or disagree, with each of the following statements?

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
When getting what I want, it is because I worked hard for it..	1	2	3	4	5
My life is determined by my own action.....	1	2	3	4	5
My life is chiefly controlled by powerful others.....	1	2	3	4	5
People like myself have very little chance of protecting our personal interests where they conflict with those of strong pressure groups.....	1	2	3	4	5

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Getting what I want needs pleasing the people above me.....	1	2	3	4	5
When I get what I want, it is because I am lucky.....	1	2	3	4	5

7. What is your final opinion of food irradiation?