

AN EXAMINATION OF THE FOOD SAFETY INFORMATION SOURCES AND CHANNELS UTILIZED AND TRUSTED BY RESIDENTS OF LUBBOCK, TEXAS

Kamy Williams Whatley, Graduate Assistant
David L. Doerfert, Associate Professor
Mark Kistler, Assistant Professor
Leslie Thompson, Associate Professor/Associate Chairman
Texas Tech University

Abstract

The United States' food supply is among the safest in the world; yet, consumers are becoming increasingly concerned with the safety of the food supply as the number of food recalls and the related media coverage has increased. The purpose of this study was to determine the preferred food safety information sources and delivery channels of Lubbock, Texas residents. A random sample of Lubbock's residents received a mailed survey instrument with 203 (52.9%) responding to the study. Results revealed that print information (including cookbooks), friends and family members and Internet websites were the most likely sources/channels that respondents would use to gain food safety information. None of the information sources studied were completely trusted by the respondents with significant differences found on the demographic variables of age, level of education, presence of children in the home, and ethnicity. Recommendations included a further examination of trust as a factor in food safety information and education.

Introduction

The United States' food supply is among the safest in the world (Food Safety Research Information Office, 1997). Yet, the Centers for Disease Control (CDC) estimates that each year 76 million Americans become ill as a result of a foodborne illness of which 325,000 are hospitalized and 5,000 die (Mead, et al., 1999). The Economic Research Service (ERS) of the United States Department of Agriculture (USDA) estimates that the economic cost associated with five major foodborne illness pathogens amounts to \$6.9 billion per year (ERS, 1999). Salmonella alone accounts for \$1 billion annually in direct and indirect medical costs (National Institute for Allergy and Infectious Diseases (NIAID), 2002). These costs include the value of premature deaths and lost wages from work (NIAID).

Consumers are becoming more concerned about the quality and safety of their food supply (Gilmore, Meehan-Strub,

& Mormann, 1992). A 1993 study that surveyed 1,135 consumers indicated that over 65% of consumers were "very" or "extremely" concerned about the safety of food, while only 11% claimed that they were "not at all" or "somewhat" concerned (Gilmore, Meehan-Strub & Mormann, 1994). Today, consumers often make their supermarket selections based on convenience, ease of preparation, limited cooking time, and taste. These convenience foods create additional steps in delivering food from the farm gate to the consumer. In addition, more Americans are eating in restaurants than ever before (National Restaurant Association (NRA), 1999). As the number of steps between the producer and final consumption increase, the higher the potential food safety risk to the consumer.

With less than 2% of the U.S. population involved in production agriculture, few Americans understand terms related to the production, processing, and handling of food products. This lack of consumer knowledge may transfer into fear of agricultural

practices such as irradiation, hormones, antibiotics, and pasteurization. Surprisingly, many food safety issues concern consumers. As the public becomes more aware of the benefits and risks associated with food production, distribution, preservation, and preparation, more attention has been given to food safety related issues in the media.

Food Safety Information Sources

Food safety information is supplied by both the private sector and governmental agencies. The literature identifies five primary sources of food safety information: (a) experiential or family, (b) government agencies, (c) professional associations, (d) formal education, and (e) media.

Food handling practices are often handed down in families from generation to generation much as family traditions are. Children learn a great deal about daily life from their parents, and food handling and preparation are no exceptions. Families “are a child’s first teachers in life,” (Page, 2003, p. 29). Adolescents reported parents/guardians were a common source of food safety information (McCullum, & Achterberg, 1997). Additionally, families may unknowingly pass down potentially harmful food handling practices. A survey of 3rd through 10th graders revealed that when asked why they would complete an unsafe food handling practice, such as eating non-refrigerated leftovers, children responded with answers which included, “My family/friends do it” and “No one told me I shouldn’t” (Barclay et al., 2003).

Within the U.S. government, there are six main agencies that regulate food production/ processing and they are responsible for a large portion of the food safety standards and the available safety information. These agencies are the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), the U.S. Public Health Service (USPHS), Centers for Disease Control and Prevention (CDC), the Environmental Protection Agency (EPA), and the National Marine Fisheries Service (NMFS) (NRA, 1999). The USDA is responsible for the grading and inspection of meat, meat products, poultry, dairy products, eggs, egg products, and fruits and vegetables shipped across

state boundaries (USDA, 2001). In addition, the USDA and the Food Safety Inspection Service (FSIS) research, compile, and provide data for the public. Many brochures, pamphlets, and fact sheets are prepared by the USDA for consumers. The USDA also sponsors a number of educational websites offering consumers information on topics ranging from baby food safety to information on areas of concern, such as food additives.

The Food and Drug Administration (FDA) also plays a large role in food safety education. The Model Food Code is written by the FDA and details the government’s recommendations for foodservice regulations (FDA, 2001). The FDA is also involved with the interpretation of food safety standards and random food safety inspections to foodservice operations (NRA, 1999). The Centers for Disease Control is a multi-functional federal agency whose primary goal is to detect and assess threats to public health (CDC, 2001). The CDC investigates foodborne illness outbreaks, studies the causes and control of diseases, publishes data in the *Morbidity and Mortality Weekly Report (MMWR)* and provides education regarding proper food sanitation practices (CDC, 2001). Water quality regulation, including the use of pesticides and sanitizers, and handling of wastes are the responsibility of the Environmental Protection Agency. Fish processing facilities are regulated via the U.S. National Marine Fisheries Service (National Oceanic and Atmospheric Administration, n.d.).

Many professional associations conduct and report food safety research. The International Association for Food Protection (IAFP) is a group of industry professionals that provides its members with food safety information via two of its journal publications (*Journal of Food Protection* and *Dairy, Food and Environmental Sanitation*). The Institute of Food Technologists (IFT) is an organization of food science and technology professionals whose primary goal is to be a source of scientific and professional-based food science and technology information including two journals, the *Journal of Food Science* and *Food Technology*. Food

companies and other related organizations in the private sector also provide safety-related information. Teisl (1999) argued that information provided by the private sector is vital in that it educates consumers in groups of the population that are not reachable by “more general approaches, such as public education campaigns” (p. 207). McCullum and Achterberg (1997) found that food labels on food packages and television were common sources of food safety information.

In addition to industry and professional associations, many universities extensively research and publish food safety information, often disseminated through the Cooperative Extension Service. According to Barton and Barbeau (1992), the Cooperative Extension Service has “identified food safety and quality as a priority issue to be addressed by educational programming” (p. 1). Adult and children targeted food safety workshops, demonstrations, and clinics are offered throughout the U.S. by the Cooperative Extension Service. A study conducted by the Texas Agricultural Extension Service in 1995 interviewed Texas adult residents who had completed some type of a food safety education program. Participants were interviewed before and after participation in the program. In all areas of food safety covered in the program, participants increased their knowledge from as little as 12%, to as high as 35% (Van Laanen & Nies, 1995).

For youth, organizations like 4-H clubs offer children an assortment of educational food safety activities. Food preparation demonstrations and food show contests are offered to educate children about good food hygiene practices and illnesses associated with improperly handled foods. High schools may also be a potential source of food safety information for youth through programs such as home economics/family and consumer science courses.

Food Safety Information Channels

The usage of mass media in food safety education can have both positive and negative effects. According to Griffith, Mathias, & Price, (1994), the mass media “are keen to report on food safety scares, but their use as vehicles for food safety

education seem to be ignored” (p. 20). Nonetheless, industry websites, hotlines, government regulated websites, pamphlets, product labels, newspaper articles, magazine articles, and radio broadcasts are trying to make food safety information accessible to consumers. Finding the media outlet or combination of outlets that reaches the most consumers is very important to the success of food safety education campaigns. Gilmore et al., (1992) found that 60% of the population they surveyed indicated newspapers as their preferred media outlet to obtain food safety information. Reina (1995), in a general media usage study, reported that college graduates (72%), higher-income Americans (\$50,000 or more), and age 50 or over read newspapers the most. Moreover, retired, “old-fashioned” people are heavy users of print media. People under the age of 30 were found to rely more heavily on radio and TV compared to print media (Reina). Similarly, Sheperdson and Holliday (2000) surveyed 8,000 consumers regarding their media use preferences. Respondents indicated that print publications were the medium of choice they were most likely to use.

In 1996, the Hamburger Preparation Quiz conducted by the USDA asked consumers where they heard or read about how to properly cook ground beef patties. Seventy-two percent of the respondents indicated that they heard this information primarily on television or radio, followed by newspapers (69%), family, relatives, colleagues and friends (59%), magazines (55%), label or instructions on a package (48%), and 35% of the population sampled found this information in a cookbook. Additionally, 32% had heard/read information regarding ground beef cooking temperatures via brochures at grocery stores, and 32% received information from government sources such as hotlines and extension offices (ERS, n.d.). These findings are somewhat contrasting to findings reported in the 1998 FDA/FSIS Consumer Food Safety Survey. In this survey, 43% of respondents cited food labels as their primary source of “a lot of information about food safety.” Broadcast media (37%) and print media (29%) were also as primary

sources of information while cookbooks were indicated as an information source by 26% of the respondents (ERS, n.d.).

Internet and web media offer consumers the unique option to obtain information 24 hours a day, 365 days a year, in almost any location around the globe. An Internet study funded by MSNBC found that 20.1 million U.S. Internet users (more than half of U.S. internet users) regularly log online and obtain news similar to what they used to read in newspapers or watch on television (Levins, 1998). This survey also found that 22% of those who use the Internet as a news source use it daily. Of the 20.1 million Internet users, 82% regularly read newspapers, 74% regularly watch broadcast television news, 71% watch cable TV news, and 57% read news magazines (Levins). These findings indicate that even though many Americans are using electronic media, they are not using it as their sole source of information.

Trust of Information Sources

Limited information has been collected on the perceived trust of food safety information sources. A 1998 Gallup Poll revealed that Americans continue to rely on and report faith in traditional hard news sources, while the use of "new" media as sources for news and information is lower with respect to trust and accuracy (Newport & Saad, 1998). Broadcast media were found to have a higher credibility than print. Additionally, the highest levels of trust were given to electronic news sources, CNN, public and local television news, and prime time newsmagazines. More traditional news sources such as local and national newspapers ranked significantly lower in terms of "perceived credibility" (Newport & Saad). Forty-five percent of those surveyed indicated that they could trust information provided on the Internet (Newport & Saad). On the local level, television was used more frequently and trusted more by those surveyed when compared to local newspapers. Furthermore, the Gallup Poll revealed that 64% trust information obtained from conversations with friends and family.

Consumers place a low level of trust on information supplied by industry experts (Byrne, Gempesaw, & Toensmeyer, 1991).

Trust in the Internet-based information however, seems to be more debatable. A test to determine the accuracy of information provided by the Internet was conducted by Connell and Tipple (1999). The accuracy of the Web was tested using the AltaVista search engine and 60 reference questions. Only 27% of the pages were found to have correct or mostly correct answers, while 9% provided wrong answers and the remaining 64% provided no answers (Connell & Tipple). These findings do not coincide with how students using the Internet feel about its reliability. Of the students surveyed at the State University of New York at Albany, 34% believed that the Internet was their most important resource (He & Jacobson, 1996). Moreover, a study conducted at three southeastern U.S. colleges found that 85% of the students rated the accuracy of Web resources as moderate to excellent (Lubans, 1998).

Families were found to be reliable sources of food safety information. A group of adolescents in England were surveyed to determine whom they trusted the most as a source of food safety information. The participants revealed that family was, by far, their most reliable source of food safety information (Coulson, 2002).

Summary

Consumers must realize that they are the last line of defense for ensuring the safety and quality of the food they consume (Taylor & Curtis, 1999). Moreover, findings on food handling practices indicate that consumer handling practices pose a greater risk for foodborne illness than do food service and further processing facilities (Taylor & Curtis). The media have increasingly brought food safety into the spotlight, and as a result consumers are demanding that their food supply be safe (Anderson, 2000). In order to prevent or reduce the number of foodborne illnesses, consumers need to be informed and educated about potentially hazardous foods, cross-contamination prevention, and proper cooking procedures. Understanding what information sources and channels consumers trust and utilize is the first step in educating the consumer.

Purpose and Objectives

The purpose of this study was to determine the preferred food safety information sources and delivery channels of Lubbock, TX residents. The objectives of this study were to:

1. Determine which information sources and delivery channels are most frequently utilized to access food safety information.
2. Determine which food safety information sources are the most trusted.
3. Determine if differences existed on demographic variables as to which information sources were the most trusted.

Methods

This study was a non-experimental, descriptive study and part of a larger study conducted by the lead researcher. The instrument for this study was designed by the researcher. A Likert-type scale of 1 through 4 was used to determine the consumer's perceived degree of trust or distrust associated with each source of information. Additional sections of the instrument provided information on what information sources consumers were using to obtain food safety information and the channels they used to access the information. Demographic data were also collected. The instrument was pilot tested on faculty, staff and graduate students within the Department of Agricultural Education and Communications at Texas Tech University to assess content validity. Changes to the instrument were made according to the group discussion and reliability data analysis results. The final Cronbach's alpha reliability score for the instrument was .78. The survey was printed booklet-style on 11 x 17 paper and saddle stitched.

A random sample of 400 Lubbock (N=199,564, U.S. Census Bureau, 2000) residents was purchased through the Earl Survey Research Laboratory at Texas Tech University. Krejcie and Morgan (1970) was

used to determine that a sample of 384 should be used for a population the size of Lubbock, TX. This number was randomly drawn from the 400 randomly drawn names that were purchased. Questionnaires returned as a result of bad addresses were removed from the initial sample and replaced by addresses which were also randomly drawn from the remaining names that were purchased. Subjects younger than 18 years old were not allowed to participate in the study.

Survey packets mailed to subjects included: one instrument, a stamped return envelope, a cover letter, and an entry card for a response incentive. The cover letter contained information that addressed project research goals and the usefulness of this data. Each cover letter was printed on university departmental letterhead and signed by both the researcher and the thesis committee chair. The instruments were coded using a three digit number in order to determine which subjects had completed the survey. Once a subject's completed survey was received, this name was deleted from the mailing list to ensure that this person received no additional mailings. Following the initial mailing, two reminder post cards, and an additional survey packet were mailed to the sample at one week intervals if no response was received (Dillman, 2000). The total number of respondents was 203 (52.9%).

An incentive was used during data collection to encourage survey recipients to complete the questionnaire. The incentive was a gift card worth \$200 to be used at a grocery store chain of their choice within Lubbock. Each subject received an entry card with his/her instrument. This person was asked to mail the card back with the completed survey instrument. All entry cards were separated from survey instruments as soon as they were received to maintain confidentiality. The entry cards were pooled and the gift card recipient's name drawn on October 15, 2003.

Returned survey instruments were coded and entered into a Microsoft Excel spreadsheet. Statistical analysis of the data files was completed using the SPSS for Windows version 12.0. Descriptive statistics were used to summarize the data. Data were

analyzed to determine if any differences occurred between early and late respondents on the variables examined in this study. No significant differences were found between the two groups (Lindner, Murphy, & Briers, 2001).

Results

Respondents to this survey were evenly divided in terms of gender with 101 females, 101 males, and one who chose not to answer the gender question. The age of respondents ranged from 20 to 81 years with a mean age of 48.25 years (*SD* = 16.25). Most respondents (30.5%) indicated their highest education level was “some college,” followed by 24.1% reporting having earned a bachelor’s degree, 19.7% had a graduate degree, 17.7% had a high school education or less, and 7.4% earned a vocational or technical degree. Fifty-nine percent (59.1%) of the respondent reported not having children. Eighty percent (80.1%) of the population was white, non-Hispanic with an additional 12.4% indicating they were Hispanic. Most respondents (40.2%) reported having a combined household income of less than \$50,000 with 19.6% indicated earnings under \$20,000. Most

respondents reported they were married (55.3%) with 20.1% indicated being single, 15.2% were divorced, and 9.5% were widowed.

Information Sources That Respondents Would Likely Utilize

Two questions on the instrument were used to determine what source respondents would use to obtain additional food safety information. One question posed a scenario of preparing a new meat dish (leg of lamb roast) and all the respondents had was a very basic recipe that lacked cooking time and temperatures for lamb. Respondents were asked to list two sources they would use to learn more information to safely prepare the lamb. For the scenario question (Table 1), the respondent’s main preference of a food safety information source was cookbooks and other print recipes (e.g. recipes from newspaper) with 31.5% of respondents (*n* = 120) stating this as one of their two preferred information sources. The “friends and family” category was reported to be the second most preferred source of additional food safety information by 27.7% (*n* = 114) of the respondents. Internet resources were found to be the third most likely source of food safety information.

Table 1
Most Likely Information Source Respondents Would Use if They Were Preparing a Meat Dish They Never Prepared Before

Information Source	1st Choice		2nd Choice		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Cookbooks and print recipes	80	41.0	40	21.5	120	29.5
Friends and family	47	24.1	58	31.2	105	25.8
Internet websites	38	19.4	53	28.9	91	22.4
Someone experienced with meat or meat preparation/cooking	13	6.7	16	8.6	29	7.1
Extension service	12	6.2	5	2.7	17	4.1
Other	5	2.6	14	7.5	19	5.0
TOTAL	195	100.0	186	100.0	381	100.0

Note. Respondents could indicate up to two sources they would use to prepare the dish.

The second question respondents were asked was to rank the top three resources (from a list of 12 provided) they would use to learn more about food safety issues. The number of respondents indicating each source, as their first, second, or third choice, were added together to obtain the total number of respondents who would use each source. The food safety information sources were ranked based on the total number

(Table 2). The results were similar to those received through the scenario question. The most likely information source respondents indicated they would use to learn more about food safety areas was family and friends (n=89). Print materials was the second most likely resource respondents would use to learn more about food safety (n=87) followed by Internet websites (n=76).

Table 2
Food Safety Information Sources and Channels Preferred by Lubbock, TX Residents

Information Source	1st Choice		2nd Choice		3rd Choice		Total
	n	%	n	%	n	%	
Family & friends	32	17.8	24	13.8	33	18.4	89
Print material	33	18.4	31	17.3	23	12.8	87
Internet web sites	33	18.4	31	17.3	12	6.7	76
University sources	10	5.6	20	11.2	27	15.1	57
Cooperative Extension	21	11.7	14	8.2	15	8.4	50
Educational workshops or conference	14	8.2	6	3.4	19	10.6	39
Government sources	5	2.8	18	10.1	14	8.2	37
Self study	9	5.0	13	7.3	11	6.1	33
Radio/TV	12	6.7	6	3.4	9	5.0	27
Newspaper	5	2.8	12	6.7	8	4.5	25
Newsletter	4	2.2	2	1.1	5	2.8	11
Telephone dial access	1	0.5	2	1.1	3	1.7	6

Note. 179 of the 203 participants (82%) responded to this question. Also, the researchers were located at a non-land grant university. As such, "University sources" and "Cooperative Extension" were listed as two separate response items.

Trust of Food Safety Information Sources

Information sources were analyzed to determine level of trust for each source. Table 3 indicates the level of trust respondents perceived about each source. Educational workshops or

conferences was reported to be the information source most trusted by respondents ($M = 3.20, SD = 0.56$). It is interesting to note that none of the sources were completely trusted by respondents in this study.

Table 3
Trust of Various Food Safety Information Sources by Lubbock, TX Residents

Information Source	<i>n</i>	<i>M</i> ^a	<i>SD</i>
Educational Workshops or Conference	192	3.20	0.56
University Sources	201	3.14	0.54
Self Study	198	3.06	0.74
Family and Friends	201	3.04	0.63
Cooperative Extension Service	198	3.01	0.65
Food Labels	202	2.96	0.81
Print Material	198	2.88	0.68
Newspaper	201	2.88	0.64
Government Sources	202	2.87	0.62
Newsletter	199	2.78	0.63
Radio	202	2.72	0.64
Computer Accessed Information	197	2.70	0.67
Telephone Dial Access	197	2.30	0.82

^a Scale: 1=Do Not Trust At All, 2= Mostly Do Not Trust, 3= Somewhat Trust, 4= Completely Trust

Impact of Demographics

To accomplish objective three, demographic data were examined to determine if significant differences existed in regards to the level of trust of information sources. No significant differences were found with respect to gender, combined household income level, and marital status for trust of information sources. Significant statistical differences in the level of trust of information sources were found for age, level of education, number of children, and ethnicity.

Age

Age was found to be significantly related to trust of information sources. The information sources in which age had a significant relationship were: newsletters, government sources, and food labels. The oneway ANOVA revealed a significant difference between age groups on trust of newsletters as an information source ($F =$

2.87, $p = 0.016$). A Tukey post hoc analysis found that respondents who were 40-49 were found to trust newsletters significantly less compared to respondents who were 60-69 years old. Significant differences were also found between age groups on trust of government sources for food safety information ($F = 3.63, p = 0.004$). Respondents who were younger than 30 were found to have a significantly lower trust for government sources compared to respondents 70 or older, and respondents who were 70 or older were found to have a much higher level of trust for government sources than 30-39 year olds. Respondents who were 40-49 years old were found to be significantly less trusting of information provided by the government than respondents 70 or older. Significant differences were also found between age groups on trust of food labels as a food safety information source ($F = 3.14, p = 0.009$). Respondents who were 40-49 years

old were found to have a significantly lower trust for food labels compared to 50-59 year olds. Additionally, respondents who were 40-49 years old were found to have significantly less trust of food labels as a source of food safety information compared to respondents 70 or older.

Level of Education

Using one-way ANOVAs with a Tukey post hoc analysis, significant differences were found between the levels of education on trust of information sources (Extension Service, food labels, and the radio) ($F = 3.21, p = 0.014$). Respondents who had a high school education were found to trust the Cooperative Extension Service significantly more than the respondents with a graduate degree. Furthermore, respondents who had some college also trusted the Cooperative Extension Service more than the respondents with a graduate degree. Respondents who had a high school education were found to trust food safety information provided by food labels significantly more than respondents with a bachelor's degree ($F = 2.86, p = 0.024$). In addition, respondents with some college were found to trust food safety information on food labels significantly more than respondents with a bachelor's degree. Respondents with some amount of a college education were found to trust radio significantly more than respondents with a bachelor's degree ($F = 3.05, p = 0.018$).

Presence of Children in the Home

Trust of information sources was found to be significantly affected by presence of children in the home. The information sources that were significantly affected were government sources and food labels. An independent-samples t test was conducted to evaluate the differences between groups with or without children in the home on trust of information sources. Respondents without children in their home trusted government sources significantly more than respondents with children ($t(190) = -3.286, p = 0.001$) and trusted food labels significantly more ($t(190) = -2.241, p = 0.026$).

Ethnicity

Trust of information sources was found to be significantly affected by ethnicity with white respondents trusting several information sources significantly more than non-whites. An independent-samples t test was used to determine the relationship between ethnicity and trust of newsletters. The test was significant, indicating white respondents trusted newsletters significantly more than non-white respondents ($t(196) = -2.32, p = 0.021$). Self study was also trusted significantly more by white respondents than non-white respondents ($t(195) = -2.52, p = 0.013$). White respondents trusted computer accessed information significantly more than non-white respondents ($t(194) = -3.40, p = 0.001$), and government sources significantly more than non-white respondents ($t(199) = -2.29, p = 0.023$). Compared to white respondents, non-white respondents trusted the Extension Service significantly more ($t(195) = 2.07, p = 0.040$).

Conclusions and Recommendations

The following conclusions are made based on the results of this study:

1. The most likely sources respondents reported they would use to obtain additional information were family and friends, print materials, and electronic information.
2. Respondents did not indicate a complete level of trust in any of the potential food safety information sources studied. Differences were found within the demographic variables of age, level of education, presence of children in the home and ethnicity.

Food safety information can only be provided to those who are receptive and actively seeking it. Residents of Lubbock were found to rely on a variety of sources and channels for their food safety information, which supports previous studies. Further information needs to be obtained to determine who is currently looking for food safety information with respect to age, gender, socio-economic

status, marital status, etc. In addition, this study grouped information channels into broad categories such as print media and computer accessed information. More detailed information with respect to information sources should be collected to further clarify what channels consumers are utilizing. These results would allow for more effective, efficient utilization of resources in public education and information efforts.

One of the most puzzling findings in this study was the lack of trust for any of the information sources. In all previous literature, family and friends and hard media were indicated as trustworthy sources for information. Additional studies should be conducted with respect to trust of information sources. In addition, trust of information sources should be studied further to determine more specific information sources being utilized by consumers.

For effective and efficient food safety education and communication, sources of information must be identified which are both trusted and utilized. As indicated by the results of this study, respondents were likely to use information sources regardless of level of trust. If the factors that determine trust in safety information were known, communication and education resources may be more effective in decreasing the number of deaths and illness attributed to foodborne illness.

References

- Anderson, W. A. (2000). The future relationship between the media, the food industry and the consumer. *British Medical Bulletin*, 56, 254-268.
- Barclay, M., Greathouse, K., Swicher, M., Tellefson, S., Cale, L., & Koukol, B. (2003). Food safety knowledge, practices, and educational needs of students in grades 3 to 10. *The Journal of Child Nutrition & Management, Spring*. Retrieved September 10, 2003, from <http://www.asfsa.org/childnutrition/jcnm/03spring/barclay/>
- Barton, J., & Barbeau, W. E. (1992). Is extension ready for food safety education in the '90's? *Journal of Extension*, 30 (1). Retrieved November 10, 2002, from <http://www.joe.org/joe/1992spring/f2.html>
- Byrne, P. J., Gempesaw, C. M. & Toensmeyer, U. C. (1991). An evaluation of consumer pesticide residue concerns and risk information sources. *Southern Journal of Agricultural Economics*, 23, 176-74.
- Centers for Disease Control. (2001). *CDC fact book 2000/2001*. U. S. Department of Health and Human Services. Retrieved May 13, 2003, from <http://www.cdc.gov/maso/factbook/Fact%20Book.pdf>
- Connell, T. H., & Tipple, J. E. (1999). Testing the accuracy of information on the World Wide Web using the AltaVista search engine. *Reference and User Services Quarterly*, 18, 360-67.
- Coulson, N. S. (2002). Source of food safety information: whom do adolescents trust? *Appetite*, 38, 199-200.
- Dillman, D. A. (2000). *Mail and internet surveys: The tailored design methods*. New York: John Wiley & Sons, Inc.
- Economic Research Service. (1999). *Food marketing and price spreads: Current trends*. U. S. Department of Agriculture. Retrieved May 12, 2003, from <http://www.ers.usda.gov/Briefing/FoodPriceSpreads/trends>
- Economic Research Service. (n.d.). *Consumer food safety behavior: Consumer concerns*. U. S. Department of Agriculture. Retrieved November 18, 2002, from <http://www.ers.usda.gov/Briefing/ConsumerFoodSafety/consumerconcerns/>
- Food and Drug Administration (2001). *Food code-2001*. U. S. Department of Health and Human Services. Retrieved May 13, 2003, from <http://www.cfsan.fda.gov/~dms/fc01-toc.html>
- Food Safety Research Information Office (1997). *Food safety from farm to*

table: A national food safety initiative. Retrieved November 28, 2002, from <http://vm.cfsan.fda.gov/~dms/fsreport.html>

Gilmore, G. D., Meehan-Strub, M., & Mormann, D. (1992). Community-based, food safety survey. *Journal of Extension*, 30 (1). Retrieved November 9, 2002, from <http://www.joe.org/joe/1992spring/rb3.html>

Gilmore, G. D., Meehan-Strub, M., & Mormann, D. (1994). Food safety assessment and programming. *Journal of Extension*, 32 (2). Retrieved November 10, 2002, from <http://www.joe.org/joe/1994august/a8.html>

Griffith, C., Mathias, K., & Price, P. (1994). The mass media and food hygiene. *British Food Journal*, 96, 16-21.

He, P. W. & Jacobson, T. E. (1996). What are they doing with the Internet? A study of user information seeking behaviors. *Internet Reference Services Quarterly*, 1, 31-51.

Krejcie, R., & Morgan, D. (1970). Determining sample size for research activities. *Educational and Psychology Measurement*, 30, 607-610.

Levins, H. (1998). Growing U.S. audience reads news on Net. *Editor & Publisher*, 131, 14.

Lindner, J., Murphy, T., & Briers, G. (2001). Handling non-response in social science research. *Journal of Agricultural Education*, 42(4), 43-53.

Lubans, J. (1998). *How first-year university students use and regard internet resources*. Duke University. Available online at <http://www.lubans.org/docs/1styear/firstyear.html>

McCullum, C., & Achterberg, C. (1997). Food shopping and label use behavior among high school-aged adolescents. *Adolescence*, 32, 181-197.

Mead, P. S., Slutsker, L., Dietz, V., McCaig, L. F., Bresee, J. S., Shapiro, C., et

al. (1999). *Food-related illness and death in the United States*: Emerging Infectious Diseases. Centers for Disease Control. Retrieved April 22, 2002, from <http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm>

National Institute for Allergy and Infectious Diseases. (2002). *Fact sheet: foodborne diseases*. Bethesda, MD: U. S. Department of Health and Human Services. Retrieved May 6, 2003, from <http://www.niaid.nih.gov/factsheets/foodbornedis.htm>

National Oceanic and Atmospheric Administration (n.d.). *Seafood inspection program*. U. S. Department of Commerce. Retrieved May 13, 2003, from <http://seafood.nmfs.noaa.gov/>

National Restaurant Association. (1999). *ServSafe coursebook*. National Restaurant Association Education Foundation.

Newport, F. & Saad, L. (1998). A matter of trust. *American Journalism Review*, 20, 30-33.

Page, K. (2003). *Parents can help children learn good study habits*. Retrieved September 15, 2003, from Mississippi State University, Family, Youth & Consumer News Web site: <http://msucare.com/news/print/fcenews/fce03/030317.html>

Reina, L. (1995). Who's reading the newspapers? *Editor & Publisher, The Fourth Estate*, 128, 24-25.

Sheperdson, N. & Holliday, H. (2000). Scaling the media web. *American Demographics*, 22, p. 60-64.

Taylor, M. C., & Curtis, P. A. (1999). Development and design of a "gateway" to food safety information on the Internet for extension educators. *Journal of Extension*, 37 (2). Retrieved November 9, 2002, from <http://www.joe.org/joe/1999april/a5.html>

Teisl, M. F. (1999). The effects of education and information source on

consumer awareness of diet-disease relationships. *Journal of Public Policy & Marketing*, 18, 197-207.

United States Census Bureau. (2000). *Lubbock, City Texas statistics and demographics (US Census 2000)*. Retrieved September 24, 2003, from <http://lubbock.areaconnect.com/statistics.htm>

United States Department of Agriculture. (2001). *Protecting the public*

from foodborne illness: the Food Safety and Inspection Service. Retrieved May 13, 2003, from <http://www.fsis.usda.gov/oa/background/fsisgeneral.htm>

Van-Laanen, P. G., & Nies, J. I. (1995). Evaluating extension program effectiveness: food safety education in Texas. *Journal of Extension*, 33(5). Retrieved November 10, 2002, from <http://www.joe.org/joe/1995october/a4.html>

KAMY WILLIAMS WHATLEY graduated from the Department of Agricultural Education and Communications at Texas Tech University with her master's degree in December 2003. She currently resides in Fabens, TX. E-mail: kamy_williams@hotmail.com.

DAVID L. DOERFERT is an Associate Professor in the Department of Agricultural Education and Communications at Texas Tech University, MS 42131, Lubbock, TX 79409. E-mail: david.doerfert@ttu.edu.

MARK KISTLER is an Assistant Professor in the Department of Agricultural Education and Communication at the University of Florida, 217B Rolfs Hall, P.O. Box 110540, Gainesville, FL, 32611-0540. E-mail: mjkistler@ufl.edu.

LESLIE THOMPSON is Associate Professor/Associate Chairman in the Department of Animal and Food Sciences at Texas Tech University, MS 42121, Lubbock, TX 79409. E-mail: leslie.thompson@ttu.edu.