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MAD COWS AND POISONED APPLES: AN ANALYSIS OF NEWSPAPER PORTRAYAL OF FOOD SCARES IN THE US

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Walaka Appuhamilage Dilshani Eranga Sarathchandra

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By

Walaka Appuhamilage Dilshani Eranga Sarathchandra

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ABSTRACT

MAD COWS AND POISONED APPLES: AN ANALYSIS OF NEWSPAPER PORTRAYAL OF FOOD SCARES IN THE US

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Walaka Appuhamilage Dilshani Eranga Sarathchandra

This study focuses on US newspaper coverage of Alar, Genetically Modified Food (GMF), and Mad Cow Disease (BSE) during the period 1985 to 2007. Using a combined conceptualization of framing by Gamson and Modigliani (1989) and Goffman (1974), the study analyses how US-based newspapers have framed and presented the debate on Alar, GMF, and BSE. Furthermore, the study analyzes specific portrayals that have been used to frame the US public in connection with these issues. Given the importance of food in terms of both domestic and international economic and policy impacts, it is argued that by analyzing media coverage of food scares, we can gain a better understanding of how media discourse may affect public perception around issues related to food purchasing and consumption. The study concludes that there are persistent patterns of media reporting that follow food scares similar to other environmental and health hazards that have been reported. The study employs frame analysis as a useful tool through which these patterns can be studied.

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LIST OF ABBREVIATIONS

BSE - Bovine Spongiform Encephalopathy

EPA - Environmental Protection Agency

FDA – Food and Drug Administration

GMF - Genetically Modified Food

NRDC - Natural Resources Defense Council

UPI - United Press International

USDA - United States Department of Agriculture

vCJD - Creutzfeldt-Jakob Disease

INTRODUCTION

Media discourse on food has continued to grow over the past few decades, leading some to argue that these discussions are influencing public perceptions of risk, trust, and uncertainty about the food industry (Frewer 2000; Priest 1994; Teneyck and Williment 2003). In 1989, a major environmental and personal health risk issue -- the spraying of Alar on apples -- created a flurry of media activity, as well as concerns about apples among domestic and foreign buyers of American apples. This was followed by the introduction of Genetically Modified Food (GMF) to the US market in 1996, which led to another wave of public and media attention to issues related to food safety. In 2003, the US public was once again put on alert by the discovery of Mad Cow Disease (Bovine Spongiform Encephalopathy- BSE) in a cattle herd in the state of Washington. Among other food scares reported in the media during the past two decades such as E-coli outbreaks, concerns about food irradiation and presence of Salmonella in food, --Alar, GMF and BSE-- have gained extensive media attention and continue to be debated in various public arenas.

This study focuses on US newspaper coverage of Alar, GMF, and BSE during the period 1985 to 2007 to gain a sense of how these issues were covered. Using a combined conceptualization of definitions by Gamson and Modigliani (1989) and Goffman (1974), this paper defines a 'media frame' as a central organizing idea or a story line to a controversy that provides meaning to an unfolding series of events, suggesting what the controversy is about and the essence of an issue. Within this framework, the study analyses how US-based newspapers have framed and presented the debate on Alar, GMF, and BSE. Furthermore, the study analyzes specific portrayals that have been used to

frame the US public in connection with these issues. The way media portray the public can help us understand both the agendas of news organizations and their sources (such as the government and food manufacturers), and how these groups think about the intersections between the general public and the food supply. Given the importance of food in terms of both domestic and international economic and policy impacts, I argue that by analyzing media coverage of food scares, we can gain a better understanding of how media discourse may affect public perception around issues related to food purchasing and consumption.

LITERATURE REVIEW

It seems that most days we can find reports about food scares somewhere in the US or around the world. In the past few years there have been concerns with everything from spinach to peanut butter to beef, and from eating too much (obesity) to not eating enough (anorexia). Although experts say the US food supply is the safest in the world, a skeptical American public reading these media reports tends to rank food safety high on its' list of concerns (Friedman 1991). In recent years, public attention has focused on issues such as trace amounts of chemical pesticides and herbicides that can be found on food, genetic alterations of food products, and bacterial contamination of food among other things. According to a Food Marketing Institute survey conducted in 2001, 85% of people polled said that pesticide residues are a serious health hazard (http://www.fmi.org; accessed October 17, 2009). In contrast, experts on food safety and public health maintain that chemical residues do not pose a great danger to consumers.

Beardsworth and Keil (1997:163) attempt to distinguish the principle features of a food scare, which they define as "an acute outbreak of collective nutritional anxiety which can seize hold of public awareness and give rise to significant short- and long-term consequences." In their view, 'a typical food scare' exhibits a consistent pattern with the following sequence of steps:

1. An initial 'equilibrium' state exists in which the public is largely unaware of, or unconcerned about, a potential food risk factor.
2. The public is initially sensitized to a novel potential food risk factor.
3. Public concern builds up as the risk factor becomes a focus of interest and concern within the various arenas of public debate.
4. Public response to the novel risk factor begins, often consisting of the avoidance of the suspected food item.
5. Public concern gradually fades as attention switches away from the issue in question and a new 'equilibrium' state establishes itself. However, chronic low-

> level anxiety may persist, and can give rise to a resurgence of the issue at a later date.
> (Beardsworth and Keil 1997:163)

In the Beardsworth and Keil frame, media discourse is one of the main mechanisms by which the public is sensitized to the potential of novel food risk factors. Due to extensive media attention given to Alar, GMF, and BSE during the past two decades these three food scares are used as the focus of this study. These food scares will be discussed below.

Analyzing the mass media coverage of scientific issues is particularly important because, as noted by Priest and Teneyck (2003:29), the media are the sole providers of information about science and technology to a very large segment of the population. While most of us rely on information sources as diverse as friends, family, coworkers, and religious leaders for information about political, economic, and social issues, most people do not have first hand access to scientific journals, researchers, and data to help construct and define personal perceptions of scientific issues (Reis 2008). In this sense, I argue that the newspapers and wire services play a major role in making news (including issues related to food scares) accessible to the general public in a way that they can comprehend.

In my attempt to understand media portrayal of food scares, the concept of framing provides a useful tool for analyzing journalistic messages. Many scholars who use the concept of framing begin with Goffman's (1974) perspective on framing. Goffman (1974) argued that to study any social event a researcher (as well as others) must put boundaries around what is taking place. To take into consideration everything that might be impacting the interaction would be impractical, pointless, meaningless and

paralyzing. In his analysis, Goffman (1974) identified two types of primary frames, natural frames and social frames. Natural frames are purely physical and naturally determined whereas social frames are "guided doings" of human beings. Social frames involve motive and intent, and "their imputation helps select which of the various social frameworks of understanding is to be applied" (Goffman 1974:22). The individual can be "wrong" in his interpretation of a frame. "However, in many cases an individual in our society is effective in his use of particular frames. The elements and processes he assumes in his reading of the activity often are ones that the activity itself manifests" (Goffman 1974:26). Goffman (1974) argued that at any one moment of activity, an individual is likely to apply several frameworks. "To proceed however, an operating fiction might be accepted, at least temporarily, namely, that acts of daily living are understandable because of some primary framework (or frameworks) that informs them and that getting at this schema will not be a trivial task" (Goffman 1074:26). To take into consideration activities outside these identified frames, Goffman discussed "out-of-frame" activities. In this way, researchers could think about activities happening outside a specific action frame that were known to affect what was happening within the situation under investigation.

Reporters must also frame stories in the same way. The limited carrying capacity of newspapers and broadcasts related to length, time, and accessibility to information sources makes it impossible to discuss every facet of every story or report. In addition, scholars argue that reporters and editors make story frames in the sense that most, if not all, stories have some underlying, though often unconscious, thematic or ideological slant that fits with the editorial demands of the larger media outlet (Teneyck 2000).

According to Nisbet and Huge (2007), frames are 'thought organizers,' devices for packaging complex issues in persuasive ways by focusing on certain interpretations over others, suggesting what is relevant about an issue and what should be ignored. Framing occurs at the policy level, the media level and/or at the public level. At the media level, frames may best be thought of as abstract principles, tools, or schemata of interpretation that work through media texts to structure social meaning. By giving more weight to some dimensions of a controversy than others, "the frames in news coverage help guide policy and citizen evaluations about the causes and consequences of an issue, and what should be done" (Nisbet and Huge 2007:197).

In their study of the framing of nuclear power, Gamson and Modigliani (1989) show how media discourse provides interpretations and meanings for relevant events. They argue that we encounter this discourse not as individual items, but as *interpretive packages* that consist of elements such as metaphors, catchphrases, visual images, moral appeals, and other symbolic devices that characterize these reports. According to Gamson and Modigliani (1989), at the core of an interpretive package is a central organizing idea, or *frame*, for making sense of relevant events, suggesting what is at issue. Media frames therefore, organize the world both for the journalists who report it and for us who rely on their reports to make sense of the world around us. These frames typically imply a range of positions, rather than any single one, allowing for a degree of controversy among those who share a common frame. Finally, a framing package offers a number of different condensing symbols that suggest the core frame and positions in shorthand, making it possible to display the package as a whole with a deft metaphor, catchphrase, or other symbolic devices (Gamson and Modigliani 1989:3). In analyzing the media discourse of

nuclear power, Gamson and Modigliani show that stories were anchored in frames, ranging from anti-corporate concerns (*public accountability package*) to economic concerns (*not cost effective package*) to worries over technologies that we would not be able to control (*runaway package*). To illustrate their point, Gamson and Modigliani (1989) discuss how the *progress* frame has been positioned in a positive manner by the mass media to present nuclear power as a safe and worthwhile technology. By attributing resistance to nuclear power to certain groups such as those who might have been opposed to electricity in the past, for example, a certain media article makes use of framing elements that can be identified and categorized by attentive media analysts (Reis 2008).

Gamson and Modigliani (1989) state that media discourse and frames evolve over time. For example, a well-publicized news report on the dangers of nuclear power may lead to more funding for nuclear programs from legislative bodies which feel that nuclear energy is something to pursue. In short, negative publicity can have positive effects, just as positive coverage can cause harm, such as when a tropical island is overrun and damaged by tourists after the area is promoted on a travel show. In such situations, depending on the initial frames used the later frames may evolve and change.

Frames as general organizing devices should not be confused with specific policy positions. Individuals can disagree on an issue but share the same interpretative frame. Each frame as an organizing device for arguments and interpretations is 'valence neutral,' meaning that it can take pro-, anti,- or neutral positions, though one position might be more commonly used than others (Gamson and Modigliani 1989). Consider the ethical/religious frame on which we elaborate later in this study. This interpretation could be applied to packaging Genetically Modified Food as 'playing God' and violating the

natural order of things, therefore leading to negative attributions about the issue. But the ethical/ religious frame could also be used to portray GMF in a positive light, emphasizing the moral duty to pursue a 'gene revolution' that could 'end world hunger' or bring an end to diseases such as cancer and Parkinson's.

Several studies have applied the concept of media framing to analyze issues related to news coverage of health and scientific research. Priest and Teneyck (2003), for example, studied media coverage of biotechnology and analyzed how the media framed various debates surrounding the use of biotechnology in food production that legitimated certain points of view while marginalizing others. Likewise, Raul Reis (2008) used framing to determine the differences between North American and Brazilian media coverage of stem cell research. Reis (2008) argued that while in Brazil the issue has been presented from a scientific (and mostly positive) point of view, in the US the debate has been dominated by its political and ethical dimensions. These and other studies reinforce the idea that, by studying how the mass media frame an issue, it is possible to understand how the topic is disseminated. In addition, one can look at how a story is perceived and understood by audiences, and consequently how it plays out in the public arena in both political and social terms (Reis 2008).

This idea of frames as organizing principles within media coverage has led to developing the following questions.

Q1: What are the patterns of reporting on food scares in US news reports?

Q2: What are the main frames used in US news stories regarding Alar, GMF and Mad Cow Disease?

Q3: How do news stories on food scares portray the US public?

In order to answer these questions I combine content analysis and preliminary textual analysis to identify and describe framing elements as suggested by Gamson and Modigliani (1989), and Goffman (1974) in their definitions of media frames. Before analyzing the media reports, I will provide a brief background on the three food scares of concern.

Alar, GMF, and Mad Cow Disease

Alar was first marketed in 1968 as a chemical that apple growers could spray on trees to make their apples ripen longer before falling to the ground. This chemical became problematic in the winter of 1989 when it was argued to be a carcinogen in a report issued by the environmental organization Natural Resources Defense Council (NRDC). The amount of concern this report generated continued to grow and affect public perceptions of the dangers of pesticide residues on food (Friedman 1991). The NRDC report linked Alar to increased rates of cancer, particularly in children. Cancer is a powerful specter that hangs over the American public, and it was a central focus for the Alar coverage because of the chemical's carcinogenic potential (Friedman 1991). The NRDC charges, which were disseminated by a well planned and effective public relations campaign, brought counter charges from the US Environmental Protection Agency (EPA), which accused the NRDC of basing its study on incomplete and questionable data, among other things (Friedman 1991). The controversy eventually died down, but it positioned the US public to be aware that their food might not be safe, and that companies and science may lead to as many problems as solutions.

By the end of the Alar controversy, the US was becoming one of the foremost countries in commercializing genetically modified crops and making them part of the

human food supply. By 2008, 25 countries were growing genetically modified crops at a commercial scale, and the US is currently cultivating 62.5 million hectares of GM crops that include soybean, corn, cotton, squash, papaya, alfalfa and sugarbeet (www.isaaa.org; accessed September 17, 2009). Introduction of GM crops to the US market has not been without some controversies, as the safety of genetically modified foods has been called into question by media coverage of various discoveries, inventions, and protests, including street demonstrations against GM foods in the European Union (Stewart and McLean 2005). There is little reason to believe this controversy will be settled in the foreseeable future.

The height of the GMO coverage to this point was 2000, and just three years later the US was jolted by another food scare. Bovine Spongiform Encephalopathy (BSE), or Mad Cow Disease, was discovered in the US in December 2003, a disease that has been a concern for farmers and scientists in UK since the mid 1990s. The first infected animal in US came from a farm in Mabton, WA, which is about 40 miles southeast of Yakima in Central Washington. It was a so-called "downer" animal, meaning it was unable to walk when it reached the slaughterhouse, which under USDA rules triggers automatic testing.

Although a link has not been scientifically proven, there is strong epidemiological and laboratory data that a rare, degenerative, fatal brain disorder in humans called Creutzfeldt-Jakob Disease (vCJD) is tied to the consumption of BSE-contaminated products (USDA Food Safety Information Service; accessed August 1, 2009). Since the discovery of the first sick animal in 2003, Mad Cow disease has become a topic of interest among US public and the media.

There are several similarities and differences between these three food scares. Similarities include the fact that each gained extensive media attention during the past two decades. There is also the concern with essential food items in the US diet such as fruits, beef, corn and soybean. All three food scares generated political and ethical concerns in the US that led to FDA regulations of varying degrees. Concerns about chemical residues in food, genetically altered ingredients and Mad Cow Disease have also crossed national boundaries and become global issues in the world food system. There are also a number of differences between these food scares. For example, Alar and GMF issues generate a sense of human intervention and control through our choice to adopt these technologies, whereas Mad Cow Disease seems to be an outcome of natural processes, therefore superseding human control. From the outset, ideas of prevention and precaution seem to work better with GMF and Alar whereas curative measures seem to be needed to avoid mad cow disease.

DATA AND METHODS

This study looked at articles published in US newspapers and wire services on Alar from 1985 to 1995, Genetically Modified Foods from 1996 to 2000, and Mad Cow Disease from 2001 to 2007. The decision to select these particular periods of coverage for the study relate to three watershed events that gained media attention during these three time periods: the release of NRDC report of 1989 in the case of Alar, the introduction of GMF to the US market in 1996, and the discovery of the first sick animal in a US farm in 2003 in the case of Mad Cow Disease. Each topic gained national attention and made it to the front page of major national newspapers at least once during the periods under review.

Using the Lexis-Nexis online database, I selected 100 newspaper and/or wire service articles for each food scare within each time period for a total of 300 articles. The sample consisted of newspaper articles from national, regional, and local newspapers as well as wire services. Articles were chosen using a random digit generator, with replacements for articles that did not fit the criteria of this study (such as an article that discussed the public face of BSE but said nothing about the public and BSE). I searched on the topics mentioned, with the word "public" for each time period and topic (Alar with public, Genetically Modified Food with public, Mad Cow Disease with public). The selection of the number of articles to code for each year was based on the total number of articles that appeared during that year on a particular food scare (e.g., if 100 articles on genetic engineering appeared in 1996 and 200 appeared in 1997, then twice as many articles would be analyzed from 1997 than 1996).

Two individuals coded the articles. In order to generate inter-coder reliability, the coders began by coding the same articles and used regular discussions and comparisons of notes until the set of variables matched 85% of the time across the coding scheme. After that, the coders worked independently unless questions arose during the coding process. The coding instrument consisted of 12 variables ranging from newspaper type (national, regional, local, wire service), year, length (small <500 words, medium 500-1000 words, long >1000 words), front page (front page, not front page), author (in-house, wire service, other), headline (positive, negative, neutral), section (national news, state/ local, editorial, living/health, business, other, unknown), quoted sources, portrayal of the public and primary frames. The quoted sources included government officials, scientists, popular personnel (celebrities and athletes), general public (quotes from parents, students, community members, etc), other media sources (TV, internet), industry, environmentalists and other groups (economists, bankers, consumer groups, communication experts).

In coding for media frames and frames used for portrayal of the public, one can begin by developing pre-established frames, and then searching stories to see if they are present or not, or by developing framing categories as one reads through the articles. I used the later method in identification of main frames and the frames used for portrayal of the public, which are discussed below.

This study presents the coverage in US newspapers and wire services related to the three food scares mentioned above. It should be noted that Lexis-Nexis, while one of the most widely used archives for research on media content, has some limitations. According to Weaver and Bimber (2008), Lexis-Nexis typically ignores wire services

when searching for articles from specific newspapers – which is why we included wire service reports – leading to concerns with reliability of article counts from newspapers. The articles coded and subjected to the content analyses describe to a certain extent what was available to the US public in newspapers for the past twenty-two years and shed some light on how the public was portrayed in these reports.

RESULTS

Patterns of Media Reporting during Food Scares

Table 1 provides descriptive statistics for the three food scares being studied. All issues made front page news at some point during the times under investigation, with 20% of the GMF stories being published on the front page, 17% of Alar, and 13% of Mad Cow Disease. Front page news increases the salience of an issue and creates a sense of urgency within the public by making such news the center-pieces that require more public attention. The large number of unknowns in the Alar category stems from the wire service articles which may have appeared in any section of a newspaper. It appears that wire services played an important role in the coverage of all three food scares. Wire service articles ranged from 41% for Alar, 33% for GMF to 20% for Mad Cow Disease. Although wire service news does not generally reach the public in the same format, they are frequently used by journalists especially in developing reports for regional and local newspapers. In this sense, wire services affect the general newspaper coverage. It is important to note that while many of these articles appeared in general news sections, a considerably large number also appeared in business sections, indicating the economic importance of these issues to both specific groups (e.g., Alar for apple farmers) and areas (e.g., Mad Cow scare in Washington State). In fact, it was much more likely to find food scare issues in the business section of newspapers than in health and living sections. Most articles -- 84 % -- were short or medium in length and only 16% were considered to be long (over 1000 words). Friedman (1991) argues that short articles tend to be overwhelmingly event oriented and lack background information and in-depth analysis that would provide context and better understanding for readers.

Table 1: Descriptive Statistics (Frequency)

	Alar	GMF	Mad Cow (BSE)
Years – Total # of articles	1986 – 4 (1%) 1987 – 4 (1%) 1988 – 9 (2.2%) 1989 – 180 (45%) 1990 – 37 (9.2%) 1991 – 32 (8%) 1992 – 15 (3.7%) 1993 – 13 (3.2%) 1994 – 15 (3.7%) 1995 – 2 (.5%) 1996 – 21 (5.2%) 1997 – 14 (3.5%) 1998 – 15 (3.7%) 1999 – 17 (4.2%) 2000 – 4 (1%) 2001 – 4 (1%) 2002 – 3 (.7%) 2003 – 2 (.5%) 2004 – 4 (1%) 2005 – 4 (1%) 2006 – 1 (.25%) 2007 – 0 (0%)	1986 – 0 (0%) 1987 – 1 (.11%) 1988 – 0 (0%) 1989 – 0 (0%) 1990 – 0 (0%) 1991 –1 (.11%) 1992 – 12 (1.3%) 1993 – 7 (.7%) 1994- 4 (.4%) 1995 – 3 (.3%) 1996 – 5 (.5%) 1997 – 17 (1.9%) 1998 – 15 (1.7%) 1999 – 167 (18.9%) 2000 – 213 (24.1%) 2001 – 128 (14.5%) 2002 – 78 (8.8%) 2003 – 78 (8.8%) 2004 – 50 (5.6%) 2005 – 40 (4.5%) 2006 – 34 (3.8%) 2007 – 32 (3.6%)	1986 – 0 (0%) 1987 – 0 (0%) 1988 – 0 (0%) 1989 – 0 (0%) 1990 – 2 (.1%) 1991 – 0 (0%) 1992 – 0 (0%) 1993 –0 (0%) 1994 – 2 (.1%) 1995 – 2 (.1%) 1996 – 123 (9.2%) 1997 – 59 (4.4%) 1998 – 48 (3.6%) 1999 – 34 (2.6%) 2000 – 85 (6.4%) 2001 – 176 (13.3%) 2002 – 70 (5.3%) 2003 – 141 (10.6%) 2004 – 375 (28.3%) 2005 – 138 (10.4%) 2006 – 56 (4.2%) 2007 – 13 (.98%)
Years - # of articles coded	1986 – 1 (1%) 1987 – 1 (1%) 1988 – 3 (3%) 1989 – 58 (58%) 1990 – 12 (12%) 1991 – 10 (10%) 1992 – 55 (55%) 1993 – 4 (4%) 1994 – 5 (5%) 1995 – 1 (1%)	1996 – 1 (1%) 1997 – 4 (4%) 1998 – 4 (4%) 1999 – 39 (39%) 2000 – 52 (52%)	2001 – 18 (18%) 2002 – 7 (7%) 2003 – 15 (15%) 2004 – 39 (39%) 2005 – 12 (12%) 2006 – 7 (7%) 2007 – 2 (2%)
Front page	17 (17%)	20 (20%)	13 (13%)
Length	Small 33 (33%) Medium 48 (48%) Long 19 (19%)	Small 36 (36%) Medium 45 (45%) Long 19 (19%)	Small 44 (44%) Medium 46 (46%) Long 10 (10%)
Wire service articles	41 (41%)	33 (33%)	20 (20%)
Section	National News 14 (14%) State/Local 7 (7%) Editorial 15 (15%)	National News 7 (7%) State/Local 24 (24%) Editorial 4 (4%)	National News 3 (3%) State/Local 3 (22%) Editorial 12 (12%)

Table 1 (cont'd)

	Alar	GMF	Mad Cow (BSE)
Section	Living/Health 11 (11%) Business 18 (18%) Other 2 (2%) Unknown 33 (33%)	Living/Health 7 (7%) Business 16 (16%) Other 25 (25%) Unknown 17 (17%)	Living/Health 2 (2%) Business 14 (14%) Other 32 (32%) Unknown 15 (15%)

Figure 1,2 and 3 below presents the total number of articles published for Alar, GMF and Mad cow disease during the time period under consideration for this study. Both Alar and Mad Cow coverage seem to follow a typical media cycle where these issues had few articles prior to a major event, then a clump of articles around a specific event (Ex: NRDC report of 1989 in the case of Alar, discovery of the first sick cow in Washington state in 2003 in the case of BSE), and just a few after those events (e.g., Ten Eyck 2000). The Mad Cow news cycle also shows several peaks in coverage prior to the 2003 occurrence of the disease in US. These peaks parallel the discovery and attention given to this disease in UK between 1994 and 2003 (Washer 2006).

These media cycles can be explained by the issue-attention cycle theorized by Downs (1972). Downs argued that public attention to issues characteristically passes through five stages: (a) a pre-problem stage leads to a (b) period of alarmed discovery associated with specific problems or hazards. This period is accompanied by euphoric enthusiasm mustered to solve the problem in a relatively short period of time. Then (c) the public realizes the cost of making significant progress, and this stage is followed by (d) a gradual decline of intense public interest. This decline leads to (e) the post-problem phase in which attention toward the issue settles down (McComas and Shanahan 1999:31). In accordance with the issue-attention cycle, both Alar and Mad Cow coverage seem to have followed a cyclical pattern. However, we noticed that although GMF coverage seems to follow the typical media cycle to a certain extent, the coverage

continues at a higher steady rate. The large number of articles that appeared in 1999/2000 may be a result of the high amount of political debate surrounding the release of an international trade agreement for labeling of GMF in January 2000. More than 130 countries, including the US, signed this agreement (www.csa.com; accessed October 17, 2009).

Another important pattern of media coverage was found by analyzing the number of quoted sources in each story. I coded up to three quoted sources per article (for a total of 484 quoted sources). Reflecting the short length of most stories, only one source was quoted in 35.3 % of the coverage. Two sources were quoted in 15.6% of the articles and 20.3% used three quoted sources. Nearly 25% of the articles used more than three quoted sources (Table 2). The reader is cautioned not to confuse the most quoted source with the most covered source, since coverage includes more factors than just being quoted (Friedman 1991). Having made this distinction, Table 2 and 3 should be depicted only as a summary of the most quoted sources.

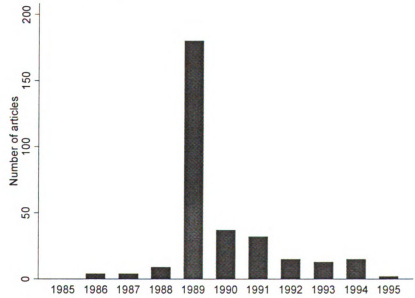

Figure 1: Frequency of Articles on Alar between 1985 and 1995

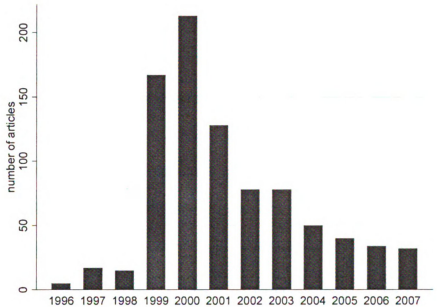

Figure 2: Frequency of Articles on GMF between 1996 and 2007

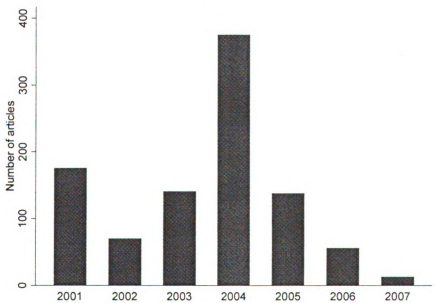

Figure 3: Frequency of Articles on BSE between 2001 and 2007

Table 3 suggests that the most quoted source for all three food scares was government officials. This category included policy makers, regulators and public service officials in various US health and agriculture agencies such as the Food and Drug Administration (FDA), United Stated Department of Agriculture (USDA), and the EPA. The second most quoted source for Alar and GMF were scientists. Priest and Teneyck (2003) state that recent surveys have shown that the US public tends to rate scientists as highly trustworthy. In addition, Priest and Teneyck (2003) argue that many people in the US only hear from scientists when they are quoted in the news, once again highlighting the importance of taking into consideration the sources used by news stories when analyzing media content. I noticed a high number of popular individuals (celebrities, athletes, etc) being quoted during the Alar scare perhaps indicating the massive publication campaigns launched by the NRDC, such as the enlistment of actress Meryl Streep and other celebrities to publicize the formation of 'Mothers and Others for Pesticide Limits' (Friedman 1991). The second highest quoted source for both Alar and GMF were the scientists. This is understandable due to the ongoing debates of scientific controversies and risk measures related to the use of Alar on apples and safety of GM food for human consumption. Note that as far as Mad Cow Disease was concerned, the second highest quoted source was the beef industry. This should come as no surprise due to how the food scare affected the US beef market both domestically and internationally. The idea that most newspaper stories quote government officials and scientists may relate to the fact that few if any of the other groups (general public, environmentalists, industry, bankers, economists) share the same amount of media spotlight as government officials and scientists (Priest and Teneyck 2003).

A study of the sources quoted by media is also helpful in understanding media norms and practices in the United States- particularly the balance norm which favors bringing to the fore certain rivals to official messages and frames. In news stories, interpretation is generally provided through quotations, and balance is provided by quoting some spokesperson with a competing viewpoints (Gamson and Modigliani 1989). The fact that I observed a high number of articles (25%) having more than 3 quoted sources may relate to this media norm where a sense of balance in reporting is created through bringing in different points of view from different sources.

Table 2: Number of quoted sources per article

Number of quoted sources per article	Frequency
No quoted sources	11 (3.6%)
1	106 (35.3 %)
2	47 (15.6%)
3	61 (20.3%)
>3	75 (25%)

Table 3: Most Quoted Sources in Articles by Food Scare (Some articles had more than one source)

	N= Number of Times quoted (%)		
Source Quoted	Alar	GMF	Mad Cow (BSE)
Government officials	52 (31.7%)	38 (22.9%)	54 (35.1%)
Scientists	30 (18.3%)	30 (18.1%)	16 (10.4%)
Popular personnel	24 (14.6%)	20 (12.05%)	16 (10.4%)
General public	8 (4.9%)	20 (12.05%)	26 (16.9%)
Other media sources	20 (12.2%)	4 (2.4%)	2 (1.3%)
Industry	18 (10.9%)	30 (18.7%)	36 (23.4%)
Environmental groups	6 (3.6%)	16 (9.6%)	0 (0%)
Other	4 (2.44%)	2 (1.2%)	2 (1.3%)
No sources quotes	2 (1.2%)	6 (3.6%)	2 (1.3%)
Total quotes	164	166	154

The discussion to this point has highlighted the fact that newspaper coverage of the three selected food scares followed typical patterns of media coverage as explained

by the issue-attention cycles, coverage in front page news, the length of the stories published, and the sources quoted. It is also interesting to note how these food scares appeared at a higher frequency in the business section of newspapers indicating their economic implications for various social actors and organizations.

Frame Analysis: Primary Frames

An analysis of the media framing of the food scares based on the conceptualizations of Goffman (1974), and Gamson and Modigliani (1989) moves me toward answering the second research question of this study: identification of the main frames used in newspaper coverage of the three food scares. This part of the analysis resulted in identification of four major frames within the articles.

1. **Public accountability frame** – Indicated that some entity needed to be responsible to the public, either in terms of protecting them from tainted food or providing reassurances to them.
2. **Economic frame** – Indicated that food scares cause considerable economic impacts and affect the industries negatively.
3. **Medical/ Scientific frame** – Indicated resolutions based on science and technology, advances made in detection technologies and public health issues.
4. **Ethical/ Religious frame** – Indicated how novel food technologies go against the rules of nature, affect moral and religious beliefs, put poor minority groups and people of developing countries at a disadvantage due to the lack of new technologies, and other moral and ethical concerns.

To further illustrate my reading of the news stories to determine their predominant frames, let me now turn to some examples for each major frame.

In an article appearing in the *St. Louis Post-Dispatch* (Missouri) on November 28, 2000, the following was said about GMF and food biotechnology.

> Saying his company had been "blinded by enthusiasm," Monsanto president and chief executive Hendrik Verfaillie on Monday promised a new era of open dealings and dialogue with skeptics of biotechnology.
>
> "We missed the fact that this technology raises major issues for people -- issues of ethics, of choice, of trust, even of democracy and globalization," Verfaillie said, speaking at a Farm Journal conference in Washington.

> Verfaillie said his company was committed to developing global standards for biotech foods. For now, he said, Monsanto intends to bring new, modified crops to the market in the United States only after they have received approval in the United States and Japan...

The public accountability frame is found in the indication that Monsanto needed to be responsible to the public in terms of protecting them from tainted food or providing reassurances to them that such food items will not be introduced to the market without rigorous testing and approval both in the US and Japan. This kind of accountability is supposed to reassure the public that big business is on their side.

Another article that appeared in an *UPI (United Press International)* release on December 24, 2003 argued that Mad Cow scare will negatively affect the beef industry and cost billions of dollars in losses.

> Cattlemen are nervous about how the public will react to the suspected case of mad cow disease, but spokesmen for beef producers said Wednesday it is still too early to really gauge what impact it might have on the $175 billion beef industry.
>
> The "presumptive" report of the disease in a Washington state dairy cow has already caused at least 12 nations to temporarily halt imports of U.S. beef. Exports total about $3.2 billion a year, but they are only about 10 percent of the nation's total production.
>
> Most U.S. beef is consumed in this country, and industry leaders say what further impact the report of mad cow has will depend on the findings of the U.S. Department of Agriculture, which only uncovered the diseased cow on Friday....

This article was coded as having an economic frame due to its overall organization around the idea of how Mad Cow Disease may affect the beef industry. The concern was not with the welfare of the public, but the feasibility of the cattle industry to withstand an attack around a potentially devastating foodborne illness.

On July 21, 1992, the *Chicago Sun-Times* used the opinion of a researcher to point out that the Alar scare was overblown and was not based on accurate scientific evidence or risk estimates. This article was coded as having a scientific/medical frame, as the main point is that science is needed to understand the real risks associated with food concerns.

> ... Prof. Thomas Jukes, an award-winning researcher on cancer chemotherapy who serves as a consultant to the California State Advisory Committee on Cancer, calls the Alar scare "one of the most outrageous abuses of the public trust I have ever seen," noting that only 5 percent to 10 percent of all apples were produced with Alar and that of those tested, the highest concentration found was 1/40th the EPA safe limit. "The irony of this," Dr. Jukes says, "is that apples raised without pesticides generally show up to 45 parts per million of patulin," a natural carcinogen....

An article published on December 6, 1999 in the *San-Diego Union Tribune* was coded as having an ethical/religious frame due to its overall construction of the issue of GMF around the idea of changing the natural order of things and meddling with the 'universe of new traits' though it is important to notice the juxtaposition with science.

> [T]he biotechnology industry argues that no special testing or labeling is required because genetic engineering is no different from traditional plant breeding, which dates back centuries. The FDA hearings, however, produced deep disagreement on the point.
>
> A spokesperson of the Environmental Defense Fund, described the difference as follows: "There is an unlimited universe of genes that can be introduced into genetically engineered plants that make it different from conventional plant breeding." Traditional breeding, she said, means you can "breed a potato with a different kind of potato, say a wild potato. Genetic engineering means you can breed a potato with a fish, or a chicken, a moth, bacterium or virus. This universe of new traits changes the food, and that merits regulation in a way traditional methods do not." The biotechnology industry is wrong to argue that its work doesn't represent something radically new and different and doesn't require special testing and labeling.

Using this approach to understanding and analyzing frames, Table 4 provides the percentages of the articles published on the three food scares based on their major frames. The predominant frame for all three issues was the public accountability frame, as many of the articles presented the idea that some entity needs to be responsible to the public, either in terms of protecting them from tainted food or providing reassurances to them. The fact that most media reports on these food safety issues used public accountability as a major frame may be a key in showing that the public was not thought to be in control of the situation. Although consumers have the ability to change their behaviors (stop buying the product being discussed), reporters were quick to frame the public as needing protection, followed by concerns with economic ramifications as shown by the high percentages of articles that used an economic frame.

Notice that for Alar and GMF ethical concerns were more frequent than medical ones, while this was reversed for Mad Cow Disease. This may be a key to understanding that journalists saw the appearance of Alar and GMF as stemming from voluntary, conscious decisions on the part of farmers and scientists (for GMF), while everyone was trying to avoid Mad Cow Disease – a disease that would spread among cattle without people knowing it. Slovic (1989) argued that people are more willing to accept voluntary risks than involuntarily imposed risks which would be the difference between Alar ("the farmers could stop using Alar") and GMF ("farmers could just keep growing traditional crops") and Mad Cow Disease ("it is a disease that appears unknown to us"). This is not to say that these attitudes are correct, but possibly to indicate why these stories were covered and framed in different ways.

Table 4: Percentage of articles by Frame

Frame	Alar	GMF	Mad Cow (BSE)
Public accountability	66%	52%	51%
Economic/ Business	22%	25%	28%
Ethical/ Religious	11%	19%	6%
Medical/ Scientific	1%	4%	15%

Framing the Public

Tables 5 and 6 contain the portrayals of the public during the three food scares. As mentioned previously, how the public is portrayed during food scares could tell us something about the perceived role of consumers among those making decisions about the food supply. In this section of the analysis, I coded up to three portrayals per article (for a total of 603 portrayals), with the top two portrayals being that the public was concerned (21.9%) and in need of protection (18.6%). This was followed by being scared (15.4%), outraged (13.8%), and misled (7.4%). In the Alar situation (161 portrayals coded) the foremost concern with the public was that public needed to be protected (27.3%). This was the fourth most used portrayal with genetically modified foods (11.7%), and the second with Mad Cow (19.0%). The major concern with GMF (222 portrayals coded) and Mad Cow (220 portrayals) was that the public was concerned (22.9% and 24.5%, respectively). Public concern for Alar ranked third (16.7%), behind needing protection and being scared. In all three cases, the public is rarely considered knowledgeable or optimistic.

Table 5: Portrayals of the Public (up to three codes per article)

Portrayals	N (% of total portrayals)
The public is concerned	132 (21.9%)
The public needs protection	112 (18.6%)
The public is scared	93 (15.4%)
The public is outraged	83 (13.8%)
The public has been misled	45 (7.4%)
The public is idealistic	38 (6.3%)
The public is ignorant	36 (6.0%)
The public is vulnerable	26 (4.3%)
The public is knowledgeable	20 (3.3%)
The public is optimistic	18 (3.0%)

Table 6: Portrayals of the Public (up to three codes per article) by Food scare

	N (% of total portrayals)		
	Alar	GMF	Mad Cow (BSE)
The public is concerned	27 (16.7%)	51 (22.9%)	54 (24.5%)
The public needs protection	44 (27.3%)	26 (11.7%)	42 (19.0%)
The public is scared	28 (17.4%)	28 (12.6%)	37 (16.8%)
The public is outraged	23 (14.3%)	39 (17.6%)	21 (9.5%)
The public has been misled	26 (16.1%)	13 (5.8%)	7 (3.2%)
The public is idealistic	1 (0.6%)	19 (8.5%)	17 (7.7%)
The public is ignorant	6 (0.6%)	18 (8.1%)	12 (5.4%)
The public is vulnerable	3 (1.8%)	10 (4.5%)	13 (5.9%)
The public is knowledgeable	3 (1.8%)	11 (4.9%)	6 (2.7%)
The public is optimistic	0 (0%)	7 (3.1%)	11 (5%)
Total	161	222	220

Since this study analyzed three food scares over the time period of 1985 to 2007, the analysis also helps in explaining the general trend over time on how the public was being portrayed during food scares. Between 1985 and 1995 during the Alar scare, the highest number of articles portrayed the public as a group that needed to be protected (27.3% of the total portrayals). However from 1996 to 2000 and 2000 to 2007, during the GMF and BSE scares, the predominant public portrayal changed from 'need to be protected' to a 'public that is concerned' as reflected by the public portrayal percentages 22.9% and 24.5% for GMF and BSE respectively. Therefore, the trend over time seems

to be a movement from protecting the public to a public that is concerned (though protection remains an important component of the reporting). This could possibly be understood as a change in journalistic practices, or at least focus. With more and more food scares being covered and reported, it is no longer necessary to say the public is at risk; they know that. Instead, reporters are discussing what it is about each specific food scare that the public should be concerned about.

Textual Analysis

To explain media framing further, I turn to an analysis of the framing devices used in media narratives. Gamson and Modigliani (1989) established a media analysis matrix structured around five framing devices (metaphors, exemplars, catchphrases, depictions, and visual icons) and three reasoning devices (causal analysis, consequences or effects, and appeal to principles such as moral or ethical claims). Based on this matrix I conducted a preliminary textual analysis of ten randomly selected news stories each per food scare for a total of 30 stories. The news stories were carefully read for identification of framing devices. Table 7 summarizes the framing devices identified for the three food scares based on the textual analysis.

In stories with the scientific/medical frame, I found that the coverage emphasized the positive, with words such as "technological revolution," "gene revolution," and "promising technology" often being used to describe scientific and medical research. However, the news stories with ethical/religious frames consisted of framing devices that had overwhelmingly negative connotations such as "controversy," "greatest risk," and "high-flying panic." Therefore, the results of the study indicate that the prevailing tone in the coverage of US newspapers was somewhat optimistic and slanted towards

highlighting the positive aspects in stories of scientific discovery, medical achievements, and technology. However, there were other stories such as those with ethical/religious frames that utilized framing elements that had negative connotations. Therefore, in accordance with Gamson et al.'s (1992) contention that the media are multivalent, we can argue that the larger stories of food scares take into account a number of different views.

Table 7: Examples of Framing Devices Used in Media Narratives

	Metaphors	Catchphrases	Depictions
Alar	Poisoned apples Alar scare = Witchcraft scare	Pesticide controversy Cancer causing	We are healthiest we have been in human history
GMF	Frankenstein food Gene-spliced food	Playing God, Technological revolution, Gene revolution, Storm of outrage, Thrusting products down people's throats	Increased farm productivity, Ground breaking technology, end world hunger
Mad Cow Disease (BSE)	Mad cows Downers	Animals will be buried on farm High-flying panic Cross species outbreak	The greatest risk of new and emerging diseases we face today

CONCLUSION AND DISCUSSION

Any perceived threat to public health is likely to be regarded as potentially newsworthy by journalists. In this context, food scares make for good headlines and copy, with the hope that a well-written article that scares people about their food will increase sales of the newspaper (or the audience of radio and television stations). The mere hint of controversy is likely to attract the attention of a wide array of pertinent stakeholders, each with their own media agendas to pursue (Allan 2002). As such, the media may contribute substantially to societal debates and discussions about managing food scares. In this paper we focused on persistent patterns of media reports, main framing elements used by media during food scares, as well as how the media presented the public in three different food scares.

From the content analysis I learned that many articles appeared in the business section of the newspapers perhaps due to the framing used by the media to highlight the economic importance of the issues being discussed. Most articles were short or medium in length, and only about a quarter of the stories were long. All three coverages –Alar, GMF, BSE- seemed to follow a typical media issue-attention cycle. We also observed a consistent pattern in the number of sources quoted in each story. Reflecting their short length, most stories quoted only one source. The predominantly quoted source for all three food scares was government officials. This may be linked to news organizations' accessibility to government officials through regular news conferences that are held by government institutions such as the FDA and USDA to educate and inform the public through creating media awareness.

As stated by Friedman (1991), heavy coverage of government and establishment officials, extensive use of wire services, and primarily short articles with little depth has now become a typical pattern of media reporting of risk issues, despite a great deal of criticism about it from media scholars. The present study has discovered similar patterns of media coverage in the context of food scares discourse in US.

Through our frame analysis I identified four main frames that ran through the stories on all three food scares -- a public accountability frame, ethical/religious frame, economic frame and medical/scientific frame. In news reports, a predominant number of articles were framed around public accountability. This was a way of portraying the public as a segment that was in need of protection and reassurance. I also learned that the major public portrayal differed for the three food scares. In the case of Alar, the public was portrayed as needing protection, while for GMF and Mad Cow Disease the public was portrayed as concerned. Another common trend that was identified throughout the analysis of public portrayal was that newspapers used predominantly negative connotations such as being concerned, scared or outraged to describe the public rather than knowledgeable and/or optimistic.

I also identified that the coverage often overemphasized the positive aspects in stories using the scientific/medical frame. However, the news stories with a predominantly ethical/religious frame consisted of framing devices that had overwhelmingly negative connotations. So, while the news was slanted towards positive aspects of technology, there were stories that showed the other side of various issues.

Stemming from the findings of this study I argue that framing as defined by Goffman (1974), and Gamson and Modigliani (1989) is a useful tool to identify core

organizational elements of newspaper articles and to categorize news reports based on their framing practices. Within each story there are interpretive keys given to the readers for understanding the ways in which the story should be read. This study also points out the relevance of the typical media issue-attention cycle that operates within media discourse and public perception – little attention is given to a topic before or after a major event.

Overall, this study highlights that there are persistent patterns of media reporting that follow food scares similar to other environmental and health hazards that have been reported by others (Friedman 1991). Furthermore, the study employs frame analysis as a useful tool through which these patterns can be studied. However, there are some important limitations in the study that needs to be taken into consideration.

I have only made a preliminary attempt at determining some of the framing devices such as metaphors and catch phrases that media discourse utilized in the event of food scares. Further analysis using a larger sample that looks at both framing devices (metaphors, exemplars, catchphrases, depictions, and visual icons) and reasoning devices (causal analysis, consequences or effects, and appeal to principles such as moral or ethical claims) may help to identify other patterns of framing (Gamson and Modigliani 1989). These are important considerations in determining the landscape through which readers must be able to navigate.

In trying to identify trends I was able to get a general sense of how the public is portrayed over time during issues of food scares. However, this study fails to explain trends between and in comparison to each specific food scare as we looked at three different food scares in three non-overlapping time periods.

Entman (1993) argues that to frame is to select some aspect of a perceived reality and make them more salient in a communication text in a way that affects *public interpretation* of what the topic is and its related issues are. Accordingly, it will be interesting to conduct a further study that relates media framing to public perception during the three food scares to get a sense of how media framing affects actual public perception. This study can also benefit from exploring how media frames relate to or affect other forms of framing such as collective action frames.

In conclusion, this study identified overall patterns of media reporting, major frames of reporting during food scares and the frames used to portray the public when faced with a food scare. Hence, the paper contributes to existing literature by explaining the process of media 'story-telling' about food scares. By studying how the media frame food scares and the public, this study contributes to a more nuanced understanding on how these topics have been presented to the reading audience, and how they have played out in the public arena in both political and social terms.

REFERENCES

REFERENCES

Allan, Stuart (2002). *Media, Risk and Science*. Open University Press: Buckingham.

Beardsworth, A. and T. Keil. 1997. *Sociology on the Menu*. London: Routledge.
Brossard, D., J. Shanahan and T.C. Nesbitt, editors. 2007. *The Public, the Media and Agricultural Biotechnology*. UK: Biddles.

CSA Discovery Guides. Retrieved October 17, 2009 (http://www.csa.com/discoveryguides/gmfood/overview.php)

Entman, R.M. 1993. Framing: Toward Clarification of a Fractured Paradigm. *Journal of communication* 43:51-58.

Freidman, S. 1991. Alar and Apples: Newspaper Coverage of a Major Risk Issue. Paper presented at the Annual Meeting of the Association for Education in Journalism and Mass Communication (Boston, MA).

Frewer, Lynn 2000. Risk Perception and Risk Communication about Food Safety Issues. British Nutrition Foundation *Nutrition Bulletin* 25:31-33.

Food Marketing Institute. Retrieved October 17,2009 (http://www.fmi.org).

Gamson, W. A. and Andre Modigliani. 1989. Media Discourse and Public Opinion on Nuclear Power: A Constructionist Approach. *American Journal of Sociology* 95:1-37.

Gamson, William A., David Croteau, William Hoynes, and Theodore Sasson. 1992. "Media Images and the Social Construction of Reality." *Annual Review of Sociology* 18:373-393.

Goffman, Erving. 1974. *Frame Analysis*. New York: Harper & Row.

International Service for Acquisition of Agri-biotech Applications. Retrieved August 20, 2009(http://www.isaaa.org/resources/publications/briefs/39/executivesummary/default.html).

McComas, K. and James Shanahan (1999). Telling Stories about Global Climate Change: Measuring the Impact of Narratives on Issue Cycles. Communication Research 26: 30-57.

Nisbet, M.C. and M. Huge 2007. "Where do Science Debates come From? Understanding Attention cycles and Framing." Pp 193-230 in *The Public, the Media and Agricultural Biotechnology*, edited by D. Brossard, J. Shanahan and T.C. Nesbitt. UK: Biddles.

Priest, S.H. 1994. Structuring Public Debate on Biotechnology: Media Frames and Public Response 16:166-179.

Priest, S.H. and Toby Teneyck (2003). News Coverage of Biotechnology Debates. *Society* 40 (6):29-34.

Reis, R. (2008). How Brazilian and North American Newspapers Frame Stem Cell Research. *Science Communication* 29:316-334.

Slovic, P. 1987. Perceptions of Risk. Science 236:280-285.

Stewars, P.A. and William P. McLean (2005). Public Opinion toward the First, Second and Third generation of Plant Biotechnology. *In Vitro Cellular Development Biology* 41: 718- 724.

Ten Eyck, Toby A. 2000. "The Marginalization of Food Safety Issues: An interpretative approach to popular mass media coverage." *Journal of Applied Communication* 84:29-47.

Ten Eyck, Toby A. and Melissa Williment. 2003. The National Media and Things Genetic: Coverage in the New York Times (1971-2001) and the Washington Times (1977-2001). *Science Communication* 25:129-152.

Ten Eyck, Toby A. and Melissa Williment. 2004. "The More Things Change . . . : Milk pasteurization, food irradiation, and biotechnology in the *New York Times*." *The Social Science Journal* 41:29-41.

U.S. Food Safety and inspection Service. Retrieved August 1, 2009 (http://www.fsis.usda.gov/Fact_Sheets/Bovine_Spongiform_Encephalopathy_Mad_Cow_Disease/index.asp).

Washer, P. 2006. "Representations of Mad Cow Disease." Social Science and Medicine 62: 457-466.

Weaver, David A. and Bruce Bimber. 2008. "Finding News Stories: A comparison of searches using LexisNexis and Google News." *Journalism and Mass Communication Quarterly* 85(3):515-530.

Zwaneneberg, P.V. and Eirk Millstone. 2005. *BSE: Risk, Science and Governance*. UK: Oxford University Press.