

Media Dependency during a Food Safety Incident Related to the U.S. Beef Industry

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Abstract

Food safety issues are an important topic in the mainstream media. Media coverage of food safety, particularly the beef industry, has the potential to alter consumers' perceptions of and attitudes toward the beef industry. Much of the media coverage about food safety incidents related to beef is negative, causing concerns and frustrations among the industry. The media has an important and powerful influence on society; there is a benefit to understanding the role of the media and how people use media in their everyday lives. This study examined consumers' dependencies on media during normal times when a food safety incident has not occurred or is not expected to occur and during a potential food safety incident in the beef industry. The results showed that consumers use different mediums to receive information during a food safety incident than during normal times. Internet, television news channels, and radio were the top mediums that respondents considered helpful in receiving information related to food safety incidents. Respondents spent more time per week on mediums during normal times than during a food safety incident. Agricultural communicators need to send messages to the mediums consumers use daily to educate the public about food safety issues.

Keywords

media dependency, beef, food safety, U.S. beef industry, agricultural communications, consumers

Introduction

Food is a basic necessity for all consumers, and less than 30 years ago, consumers accepted that the food they purchased was safe (Anderson, 2000; Charlebois, 2008). A shift in consumer attention toward food safety issues has occurred in recent years as a result of various food scares, including *Salmonella*, *Escherichia coli* 0157:H7 (*E. coli*), and *bovine spongiform encephalopathy* (BSE) (O'Neill, 2005; Schroeder & Mark, 2000; Schupp, Gillespie, O'Neil, & Prinyawiwatkul, 2006). Although many consumers would consider the United States food supply the safest in the world, food safety incidents cause concerns for consumers (Crutchfield & Roberts, 2000; Verbeke, 2005). Consumers are becoming more interested in the processing and quality of their food, which has caused quality differentiation to be a deciding factor in food choices (Grunert, 2005; Piggott & Marsh, 2004; Schroeder & Mark, 2000).

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Most consumers receive agricultural information from the media (Sitton, 2000), and misperceptions about the industry stem from a lack of basic agricultural knowledge (Frick, Birkenholz, & Machtmes, 1995). The media plays an important role in today's society, making news, Internet, magazines, and other media consumption an everyday routine (McCullagh, 2002). The media has changed significantly over time from a thing of curiosity to its present role as an information system vital to society (DeFleur & Ball-Rokeach, 1989). This vital information system is used to report and inform individuals of events occurring across the world (McCullagh, 2002). Food safety concerns are increased by negative media coverage of food safety incidents, particularly beef-related incidents, and negative messages have the potential to affect consumers' perceptions of the industry (Anderson, 2000; Buzby, 2001; Schupp et al., 2006). Although consumers are supplied with a wealth of information from the media, Swinnen, McCluskey, and Francken (2005) suggested that some information regarding food safety issues is misinforming.

A beef-related food safety incident can damage the agricultural industry and economy, causing concern for the industry (Burton & Young, 1996; Economic Research Service, 2010; Johnson, 2008; O'Neill, 2005; Schroeder, Tonsor, Pennings, & Mintert, 2007; Schupp et al., 2006). *Salmonella* and *E. coli* cost more than \$3 billion in 2009 (ERS, 2010). Foodborne illnesses contracted by these pathogens are also an area of concern. According to the Centers for Disease Control and Prevention (CDC, 2011), approximately 48 million Americans become ill and 3,000 die each year as a result of foodborne pathogens. *E. coli*, the pathogen highly associated with contaminated beef, was one of the top five pathogens contributing to hospitalization and death (CDC, 2011). The U.S. beef industry experienced a decline in beef exports after the 2003 BSE incident, when 53 countries closed their borders to the U.S. beef market (Johnson, 2008; O'Neill, 2005; Schroeder et al., 2007). Additionally, BSE cases in Europe caused a decrease in meat consumption (Charlebois, 2008).

Consumers also believe that foodborne illnesses pose a high risk to their health (Schroeder et al., 2007). A survey by Schroeder et al. (2007) found that 50% of consumers believed *E. coli* was the largest risk associated with food safety. Risk perceptions among consumers also were the main driver for reduced beef consumption (Schroeder et al., 2007).

Media Dependency Theory

Because of the influence of mass media and research describing it as an entity that is consumed constantly, the media dependency theory (MDT) was used to support this study. MDT describes the relationship among audiences and the media and how that relationship affects society (Ball-Rokeach & DeFleur, 1976). Dependency is described as "a relationship in which the satisfaction of needs or the attainment of goals by one party is contingent upon the resources of another party" (Ball-Rokeach & DeFleur, 1976, p. 6). In the case of media and society, the media is dependent on society, and that dependence determines how individuals use media.

The information presented by the media is needed for individuals to attain their goals (Loges, 1994). Information is considered as a resource for individuals; they must rely on the media to supply those resources (DeFleur & Ball-Rokeach, 1989). The three types of resources—gathering and creating, information processing, and dissemination—allow individuals to achieve the personal and collective goals of understanding, orientation, and play (DeFleur & Ball-Rokeach, 1989).

The goals of media dependency are further divided into self and social aspects (DeFleur & Ball-Rokeach, 1989). Understanding and orientation, more specifically social understanding, interaction orientation, and action orientation, are most related to this study. Social understanding is achieved

when individuals use the media to understand and interpret the world around them (DeFleur & Ball-Rokeach, 1989). Lowrey (2004) found that most individuals used the media after the 9/11 terrorist attacks to meet their understanding goals. A state of chaos and uncertainty made individuals seek information from the media to understand what was happening (Lowrey, 2004). Closely related is action orientation, in which individuals use the media as a guide to forming behaviors of their own (DeFleur & Ball-Rokeach, 1989). Interaction orientation is achieved by the media supplying information about handling new or difficult situations (DeFleur & Ball-Rokeach, 1989).

The mass media is an outlet that offers “speed of transmission and structural connectedness to ‘expert’ sources of information,” which satisfies the needs of the public (Lowrey, 2004, p. 339). This dissemination role of the media is especially needed when issues of important international trade and health concerns arise (Buzby, 2001). When an issue arises that heightens social conflict or ambiguity, dependency on media is increased (Ball-Rokeach & DeFleur, 1976). Examples of social conflict or change include environmental problems, energy crises, wars, and political corruption (Ball-Rokeach & DeFleur, 1976), and could be extended to food safety incidents.

Purpose and Objectives

With changing consumer perceptions and concerns (Verbeke, 2005), agricultural communicators must provide effective food safety messages to the public. Also, communicators must be aware of the outlets consumers depend on to receive general information and food safety information. The purpose of this study was to describe consumers’ self-reported dependencies on media channels during normal times when a food safety incident has not occurred or is not expected to occur and during a food safety incident related to the U.S. beef industry. The following objectives were used to guide this study:

1. Describe consumers’ dependency on media for general information.
2. Describe consumers’ dependency on media for information during a food safety incident related to the U.S. beef industry.
3. Describe differences in consumers’ use of media for general information and information during a food safety incident.
4. Describe differences among rural, urban, and suburban consumers’ use of media for general information.
5. Describe differences among rural, urban, and suburban consumers’ use of media for information during a food safety incident.

Methods

The accessible population for the study included Texas A&M University former students (N = 160,208) with a valid email address who were registered with The Association of Former Students of Texas A&M University. The database was stratified by college, and a predetermined number of individuals were selected from each college to produce a sample (n = 4,500) that reflected the distribution of graduates from all of the colleges represented in the database. In a previous study (Robertson, 2009) that used similar sampling methodology, a response rate of approximately 12% was obtained. In this study, the expected response rate was 10%, so a sample size of 4,500 was selected to ensure the number of respondents would meet sample size guidelines described by Krejcie and Morgan (1970).

This study used an online questionnaire modeled after a previous media dependency study and appropriate literature (Ball-Rokeach, 1985; Ball-Rokeach & DeFleur, 1976; CFI, 2010; DeFleur &

Ball-Rokeach, 1989; Jakob, 2010; Robertson, 2009). The questionnaire consisted of five sections: knowledge of agriculture, normal media use, media use during a beef-related food safety incident, perceptions of the beef industry, and demographics. The knowledge of agriculture and demographic sections included multiple-choice and fill-in-the-blank items. Respondents reported their estimated normal use and media use during a beef-related food safety incident in hours per week; explanations of “normal” and “food safety incident” were provided. The perceptions of beef industry section included scaled items using a 5-point rating scale ranging from strongly disagree (1) to strongly agree (5).

Content validity was established through a panel of four experts. Revisions to the questionnaire were made based on the feedback from the panel of experts. Reliability was established through a pilot study of Texas A&M University agriculture and life sciences graduate students. Using Cronbach's alpha, reliability was calculated for 83 scaled items and resulted in a Cronbach's alpha coefficient of .968.

The questionnaire was implemented based on the principles of the Tailored Design Method outlined by Dillman, Smyth, and Christian (2009). An introductory email was sent to the selected individuals. Beginning one week after the introductory email, two reminders were sent on a weekly basis to individuals who had not yet responded to the survey. Nonresponse error was examined by comparing the means of early respondents to the mean of the late respondents (Linder & Wingenbach, 2002). No significant differences were found between early and late respondents.

Findings

Descriptive analyses for the media use sections of the questionnaire are reported in this paper. Inferential analyses related to media use and analyses of the knowledge of agriculture and perceptions of the beef industry sections will be reported in future papers.

Responses were obtained from 579 of the 4,500 former students emailed, resulting in a response rate of 12.9%. Of the respondents who indicated their gender ($n = 471$), 52.5% were male and 28.8% were female. Thirty-nine percent of the respondents ($n = 475$) described the area they lived in as suburban, 21.2% as urban, and 20.9% as rural. The respondents ($n = 471$) ranged in age from 23 to 84 years with a mean age of 50.16 years ($SD = 12.66$). More than half of the respondents (54.6%) lived in Texas; thirty-two other states and 19 countries were represented. The longest time lived in the respondent's present community was 84 years.

Of the respondents who reported their level of education ($n = 476$), 29.0% indicated they completed a bachelor's degree, 28.5% had a master's degree, and 14.9% had a doctoral or law degree. Nine percent of respondents indicated they had completed some graduate school. About two-thirds (67.5%) of the respondents ($n = 391$) have not served in the military, and 13.8% indicated they have served in the military. Respondents ($n = 471$) indicated whether they were conservative (29.0%), moderately conservative (19.9%), moderate (16.8%), moderately liberal (8.5%), liberal (4.8%), or other (2.4%).

In regards to marital status, 60.1% of respondents were married, 3.3% divorced, and 12.8% single; 176 respondents have at least one child under 18 years of age living with them, with a range from zero to six children. In regards to employment status ($n = 467$), 60.1% of respondents are employed full-time, 8.6% of respondents are employed part-time, and 11.9% of respondents are not employed. Based on respondents' 2010 household income before taxes ($n = 440$), 40.4% of respondents earned more than \$100,000; 13.0% of respondents earned \$75,000 to \$100,000; 12.4% of respondents

earned \$50,000 to \$75,000; 8.6% of respondents earned \$25,000 to \$50,000; and 1.6% of respondents earned less than \$25,000. Almost three-quarters (73.6%) of the respondents ($n = 426$) said they are white; 0.9% of respondents indicated they are African American; and 3.6% of respondents indicated they are Hispanic, Spanish, or Latino.

Normal Times

Respondents were asked to indicate how many hours per week they spent gathering information for personal use from a provided list of mediums (see Table 1). Internet was the medium people used most for gathering information. Respondents used the Internet an average of 10.58 ($SD = 11.03$, $Mdn = 7.00$) hours per week. Television shows and movies and television news channels were the next highest in hours of use per week, with means of 7.98 ($SD = 7.38$, $Mdn = 6.00$) and 5.79 ($SD = 6.99$, $Mdn = 4.00$), respectively. Respondents indicated that Twitter was used least often for gathering information, averaging 0.14 ($SD = 0.6$, $Mdn = 0.00$) hours per week.

Table 1
Hours per Week Spent on Media for Personal, Business, and/or Entertainment use

Medium	<i>n</i>	<i>M</i>	<i>SD</i>	Range	<i>Mdn</i>
Internet	502	10.58	11.03	80	7.00
Television (shows, movies)	489	7.98	7.38	50	6.00
Television (news channels)	502	5.79	6.99	90	4.00
Radio	489	5.07	6.42	50	3.00
Newspapers	475	2.20	3.72	50	1.00
Facebook	461	1.93	4.55	50	0.00
Magazines	456	1.50	2.05	20	1.00
Email list subscriptions	452	1.12	1.93	15	0.00
Other	328	0.79	3.22	40	0.00
Blogs	443	0.47	1.77	20	0.00
YouTube	445	0.37	0.88	10	0.00
RSS Feeds	439	0.23	1.23	20	0.00
Twitter	440	0.14	0.61	7	0.00

Food Safety Incident

Respondents were asked to provide how many hours per week they spent on certain media channels to get information concerning a food safety incident related to the beef industry (see Table 2). An average of 2.15 ($SD = 6.96$, $Mdn = 1.00$) hours per week was spent on television news channels, making it the most used medium for information concerning a food safety incident. The least used medium was Twitter, with respondents indicating they use it .01 ($SD = 0.14$, $Mdn = 0.00$) hours per week.

Table 2
Hours per Week Spent on Media for Food Safety Information Related to the Beef Industry

Medium	<i>n</i>	<i>M</i>	<i>SD</i>	Range	<i>Mdn</i>
Television (news channels)	456	2.15	6.96	90	1.00
Internet	446	1.94	4.24	32	1.00
Radio	438	1.20	3.19	40	0.00
E-mail list subscriptions	452	1.12	1.93	15	0.00
Television (shows, movies)	427	0.57	3.11	50	0.00
Magazines	418	0.45	1.38	20	0.00
RSS Feeds	413	0.11	1.49	30	0.00
Facebook	416	0.08	0.57	8	0.00
Blogs	412	0.05	0.31	4	0.00
YouTube	414	0.02	0.15	1	0.00
Twitter	415	0.01	0.14	2	0.00
Newspapers	436	0.91	2.87	50	0.00
Other	339	0.17	1.05	16	0.00

Rural, Urban, and Suburban Consumers

Medium use among community type also was examined during normal times and during a food safety incident. Because of the large decrease in the means after the fourth medium, only the top four mediums were reported. Suburban respondents spent the most time watching television shows and movies, while rural respondents spent the most time on television news channels and radio. Urban respondents spent the most time on the Internet (see Table 3).

During a food safety incident, media use was reported with low means (see Table 4). Suburban respondents spent the most time on television shows and movies and the Internet. Urban respondents spent the most time on television news channels, and rural respondents spent the most time on radio for information related to a beef food safety incident.

Comparison

Based on the respondents' indications of how many hours per week they used specific mediums, the mediums were ranked with the ranking of "1" being most used and "13" being least used. The rankings for the mediums were compared between normal times and times during a food safety incident related to the beef industry (see Table 5). During normal times, respondents indicated they use Internet more hours during the week than other mediums. The least used medium in a week was Twitter. During a food safety incident, television news channels were used the most per week and the category of other was least used.

Mediums used during normal times and during a food safety incident also were ranked according to community type (see Table 6). For the most part, rankings stayed consistent across the three types of community for both time periods.

Table 3
Community Type and Normal Media Use (hours per week)

Community Type	Medium			
	TV (shows and movies)	TV (news channels)	Radio	Internet
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Urban	8.03 (7.12)	6.04 (6.85)	5.14 (7.54)	12.20 (11.52)
Suburban	8.15 (7.72)	5.45 (5.46)	4.85 (4.82)	10.52 (10.79)
Rural	7.83 (7.49)	6.20 (9.01)	5.86 (8.32)	9.45 (11.38)

Table 4
Community Type and Media Use During a Food Safety Incident (hours per week)

Community Type	Medium			
	TV (shows and movies)	TV (news channels)	Radio	Internet
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Urban	0.46 (2.12)	3.08 (9.97)	0.79 (2.06)	1.83 (4.14)
Suburban	0.66 (4.03)	1.68 (3.44)	1.14 (2.36)	2.17 (4.78)
Rural	0.61 (2.09)	2.38 (8.63)	1.78 (5.04)	1.82 (3.53)

Table 5
Rank Comparisons for Media Use During Normal Times and During a Food Safety Incident Related to the Beef Industry

	Rank Order	
	Normal Times	Food Safety
Medium		
Internet	1	2
Television (shows, movies)	2	5
Television (news channels)	3	1
Radio	4	3
Newspapers	5	12
Facebook	6	8
Magazines	7	6
Email list subscriptions	8	4
Other	9	13
Blogs	10	9
YouTube	11	10
RSS Feeds	12	7
Twitter	13	11

Table 6
Rank Comparisons for Media Use During Normal Times and During a Food Safety Incident Related to the Beef Industry Based on Community Type

Medium	Normal Times			Food Safety		
	Urban	Suburban	Rural	Urban	Suburban	Rural
Internet	1	1	1	2	1	2
Television (shows, movies)	2	2	2	6	5	5
Television (news channels)	3	3	3	1	2	1
Radio	4	4	4	4	3	3
Newspapers	5	5	6	3	4	4
Magazines	6	7	7	5	6	6
Facebook	7	6	5	11	10	11
Email list subscriptions	8	8	8	7	8	7
Other	9	9	9	10	7	8
Blogs	10	11	10	9	11	9
YouTube	11	10	11	13	11	10
RSS Feeds	12	11	12	8	9	9
Twitter	13	12	13	12	12	12

Conclusions

The media plays a dominant role in society, saturating institutions and individuals (Berger, 2003; McCullagh, 2002). It is a central hub for information during a social change or conflict, invariably causing audiences to depend on the mass media for information (Ball-Rokeach & DeFleur, 1976). Respondents indicated they spent more hours per week on Internet and watching television shows and movies to receive general information during normal times. News channels and radio also were among the most used mediums during normal times. Patwardhan and Yang (2003) found that Internet users displayed dependency relations and that Internet is an “integral part of individuals’ media environments” (p. 65). A report from the Pew Internet and American Life Project (2010) found that Internet is the third most-popular news medium after national television news, which varies from the finding of this study. However, the findings are supported by the fact that 92% of Americans use multiple platforms to get daily news (Pew Internet & American Life Project, 2010). Respondents in this study indicated using multiple mediums such as the Internet, shows and movies, and news channels.

Respondents did not indicate strong media dependencies during a potential food safety incident. This could be because a major food safety incident was not occurring at the time of the study. Food recalls were reported by the USDA and the U.S. Food and Drug Administration (Food and Drug Administration, 2011); however, these recalls were not as large-scale as the BSE case in 2003. Additionally, perceived threat or ambiguous situations have been found to increase dependencies (DeFleur & Ball-Rokeach, 1989; Loges, 1994; Lowrey, 2004; Robertson, 2009); respondents in this study did not feel threatened by a food safety outbreak because no such incident was happening at the time of the survey. The finding that television news was the most-used medium during a food safety incident is supported by research concerning major crises. Television news was the medium of choice for people during two major hurricanes and after the 9/11 terrorist attacks (Gordon, 2009; Lowrey, 2004). Lowrey (2004) reported that television lends itself to threatening situations because of the immediacy of information.

The differences among media use during normal times and during a food safety incident is supported by the media dependency theory. Individuals construct their media dependencies based on the situation and on which mediums will help them achieve their goals (DeFleur & Ball-Rokeach, 1976). If the situation is a crisis or conflict, individuals will return to their normal media use after the crisis is over (DeFleur & Ball-Rokeach, 1976). Additionally, the rankings of rural, urban, and suburban media use showed that during both time periods, the use of the specific mediums stayed consistent. With only slight variations, each community type spent time on the mediums in the same order. The specific mediums used most often changed between normal times and during a food safety incident; this indicates that consumers choose to use certain mediums during a food safety incident than during normal times. Therefore, based on the media dependency theory, individuals can depend on different mediums for different situations, altering their media choices based on the situation and their goals.

Recommendations

Media dependency research includes major national disasters or conflicts that could easily be recalled by individuals, such as major hurricanes and the terrorist attacks of 9/11 (Gordon, 2009; Loges, 1994; Lowrey, 2004; Tai & Sun, 2007). Because the most recent and major food safety incident was more than seven years ago, and individuals did not indicate high media dependencies during a food safety outbreak, it is recommended that a similar study be conducted in close proximity to a national food safety outbreak. This would help determine if individuals could recall their media dependencies more accurately.

More research also could be conducted in the area of rural, urban, and suburban consumers and their use of media as news sources. Additionally, a study of a different population with a different background could produce valuable results because the population of this study was mostly conservative and educated individuals with some agricultural experience.

In regards to practice, it is recommended that agricultural communicators be aware of the mediums consumers use during normal times. By sending messages to the mediums consumers use daily, communicators will be able to educate and inform the public about agriculture and food safety issues. Additionally, it is noted that agricultural communicators should be aware of the amount of time consumers spend on certain media channels and the variety of media used in obtaining information (Robertson, 2009).

The findings in this study have implications for agricultural communicators and the beef industry. Individuals indicated that Internet, news, and radio were the most-used mediums during both

normal times and food safety incidents; however, the order of the top three differs. By targeting consumers through the mediums that appeal to them in different contexts, agricultural communicators can disseminate information more effectively to help people prevent and recover from food safety incidents. In addition, with the Internet becoming a more interactive and immediate forum for information with the web 3.0 technologies (Hendler, 2009), communicators must constantly expand their technology-related skills to be as effective as possible in sharing information, particularly in times of social conflict and ambiguity.

This study also holds implications for educating the public about agriculture and the food industry. Educating a public that has little or no knowledge about the food sector could teach consumers to search for multiple sources of information, rather than relying on a few negative media messages.

About the Authors

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