

**SOURCE CHOICE IN AGRICULTURAL NEWS COVERAGE:
IMPACTS OF REPORTER SPECIALIZATION AND
NEWSPAPER LOCATION, OWNERSHIP, AND CIRCULATION**

A Dissertation

by

JUDITH MCINTOSH WHITE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2006

Major Subject: Agricultural Education

**SOURCE CHOICE IN AGRICULTURAL NEWS COVERAGE:
IMPACTS OF REPORTER SPECIALIZATION AND
NEWSPAPER LOCATION, OWNERSHIP, AND CIRCULATION**

A Dissertation

by

JUDITH MCINTOSH WHITE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Approved by:

Chair of Committee, Tracy Rutherford

Committee Members, Randall Sumpter

Tom A. Vestal

Gary Wingenbach

Head of Department, Christine D. Townsend

December 2006

Major Subject: Agricultural Education

ABSTRACT

Source Choice in Agricultural News Coverage:

Impacts of Reporter Specialization and

Newspaper Location, Ownership, and Circulation. (December 2006)

Judith McIntosh White, B.S.J., Northwestern University;

M.S., Texas A&M University

Chair of Advisory Committee: Dr. Tracy Rutherford

This study examined coverage of the December 2003 bovine spongiform encephalopathy event to discover reporters' sources for breaking agricultural news, the impact of reporter specialization on source choices, and the impact of newspaper differences, including location, circulation, and ownership, on coverage.

Quantitative content analysis was performed on 62 stories selected through a keyword search for the period December 23, 2003 through October 31, 2004 from U.S. newspapers included in the LexisNexis database. These stories were divided into two equal groups based on reporter work-role identity and were analyzed by length, number of sources, and source variety, and by location, circulation, and ownership of the newspapers in which they appeared. ANOVA, bivariate correlation, and forced entry regression were statistical techniques used.

Results indicated numbers of stories, story length, and numbers of sources per story appear related to newspaper location, and use of scientists and agricultural scientists as sources to be correlated with type of newspaper. Newspaper circulation and

ownership type were found to explain a statistically significant amount of variance in number of sources used.

No statistically significant differences between mean length or mean number of sources used were found between stories written by science-specialty beat reporters and those written by reporters not assigned to such beats, contradicting previous research. However, while mean overall source variety did not differ between the two reporters groups, work-role identity was found to be correlated with use of scientists and agricultural scientists as sources.

Extrapolation from this study suggests it is open to question whether (a) reporters would be well-advised to pursue courses of study or to seek additional training to build defined areas of expertise, better equipping themselves to cover more complex issues; (b) editors should seek candidates with such special training and structure their newsroom routines to accommodate specialty reporters when considering adding employees to their reporting staffs; and (c) universities should offer journalism curricula that facilitate both acquisition of basic reporting skills and registration for substantive electives which build subject-matter knowledge. Answers to these questions should be actively pursued, since they may shape the future of journalism education and practice.

DEDICATION

To my family, who think mom can do anything

ACKNOWLEDGEMENTS

I would like to thank my committee chair, Dr. Tracy Rutherford, and my committee members, Dr. Gary Wingenbach, Dr. Andy Vestal, and Dr. Randall Sumpter, for their invaluable guidance and support throughout the course of this research and my entire graduate career.

Thanks also to my friends and colleagues at the department, especially Shannon Degenhardt and Kirk Edney, and to the department faculty and staff, especially Dr. Doug Starr, Dr. Gary Briers, and Dr. Kim Dooley, for their help with difficult academic concepts and statistical procedures and their constant encouragement and for making my time at Texas A&M University a great experience. I'd also like to thank Dr. Joel Schneider and Dr. Joshua Brown, both former graduate-student colleagues at this university, now faculty members elsewhere, for their constant support, and Dr. Brian Stagner of Texas A&M and Dr. Linda Benedict of Louisiana State University Extension for their encouragement and unwavering faith in my abilities.

Finally, I'd like to thank my wonderful daughter Susan White, Class of 2006, for her strong belief in my ability to persevere and achieve, and my incomparable husband, Jeffrey C. White, for supporting me in this endeavor and in all others for a lifetime together.

TABLE OF CONTENTS

| | Page |
|--|------|
| ABSTRACT | iii |
| DEDICATION | v |
| ACKNOWLEDGEMENTS | vi |
| TABLE OF CONTENTS | vii |
| LIST OF TABLES | ix |
| CHAPTER | |
| I INTRODUCTION | 1 |
| Background | 1 |
| Communication theories | 6 |
| Statement of the problem | 9 |
| Purpose of the study | 9 |
| Objectives..... | 10 |
| II REVIEW OF LITERATURE..... | 12 |
| Purpose | 12 |
| Objectives..... | 13 |
| Statement of the problem | 14 |
| Newspaper coverage of agricultural issues: | |
| Emphasis on controversy and risk..... | 15 |
| Newspaper coverage of BSE..... | 23 |
| Source choices of reporters: Theory and practice | 27 |
| Source choices of science specialty-beat reporters | 36 |
| Impact of newspaper characteristics on newspaper | |
| coverage and reporter source choice | 41 |
| Research questions and hypotheses | 44 |
| III METHODS..... | 47 |
| Purpose | 47 |
| Objectives..... | 48 |
| Study design | 49 |
| Definition of terms | 50 |

| CHAPTER | Page |
|--|------|
| Population of interest | 52 |
| Sample | 55 |
| Data analysis | 59 |
| IV FINDINGS AND DISCUSSION..... | 68 |
| Purpose | 68 |
| Objectives..... | 69 |
| Descriptive statistics..... | 70 |
| Findings related to Research Question 1 | 76 |
| Findings related to Research Question 2..... | 80 |
| Findings related to Hypothesis 1 | 81 |
| Findings related to Hypothesis 2..... | 83 |
| Findings related to Hypothesis 3..... | 86 |
| Summary | 89 |
| V CONCLUSIONS, IMPLICATIONS, AND | 92 |
| RECOMMENDATIONS | |
| Purpose | 92 |
| Objectives..... | 93 |
| Summary of methods | 94 |
| Objectives related to relationship of selected newspaper characteristics to coverage of breaking agricultural news | 97 |
| Objectives related to relationship of reporter work-role identity to coverage of breaking agricultural news | 102 |
| Contributions to the field..... | 113 |
| REFERENCES..... | 116 |
| APPENDIX: CODING INSTRUMENT..... | 145 |
| VITA | 150 |

LIST OF TABLES

| TABLE | Page |
|---|------|
| 1 Geographic Distribution of Newspapers in Population, Based upon Regions of the United States as Defined by the Associated Press (Goldstein, 2005) and as Named in Bacon’s Media Directory (Bacon’s, 2004) | 54 |
| 2 Holsti’s Coefficient | 60 |
| 3 Intercorrelations Between Number of Sources, Story Length, Source Variety, Number of Scientist Sources, and Number of Agricultural Scientist Sources | 71 |
| 4 BSE Stories by Region and Newspaper with Circulation, Number of Stories and Story Length..... | 72 |
| 5 Intercorrelations Between Newspaper Characteristics | 74 |
| 6 Job Title (Work-Role Identity) of Science Specialty-Beat Reporters | 75 |
| 7 Science Specialty-Beat Reporters Who Wrote Multiple Stories | 76 |
| 8 Correlations Among Newspaper Characteristics and Number of Sources, Story Length, Source Variety, Number of Scientist Sources, and Number of Agricultural Scientist Sources | 77 |
| 9 Forced Entry Regression Analysis for Newspaper Characteristic Variables | 78 |
| 10 R Square Data — Forced Entry Regression Analysis for Newspaper Characteristic Variables | 79 |
| 11 Forced Entry Regression Analysis for Newspaper Circulation and Ownership (Secondary Model) | 79 |
| 12 R Square Data — Forced Entry Regression Analysis for Newspaper Circulation and Ownership..... | 79 |
| 13 One-Way ANOVA for Differences in Story Characteristics and Reporter Work-Role | 80 |

| TABLE | Page |
|---|------|
| 14 Correlations Among Reporter Work-Role Identity and Story Characteristics | 81 |
| 15 Forced Entry Regression Analysis for Newspaper Characteristics and Reporter Work-Role Identity | 84 |
| 16 R Square Data — Forced Entry Regression Analysis for Newspaper Characteristics and Reporter Work-Role Identity | 84 |
| 17 Forced Entry Regression Analysis for Newspaper Circulation and Ownership (Secondary Model)..... | 85 |
| 18 R Square Data — Forced Entry Regression Analysis for Newspaper Circulation and Ownership..... | 85 |
| 19 Actual Numbers of Named Sources in Each Category, Grouped by Work-Role Identity of Reporter | 88 |

CHAPTER I

INTRODUCTION

Background

In December 2003, the first case of bovine spongiform encephalopathy — known as BSE or “mad cow disease” — in the United States was discovered in a cow in Washington state. That the sick cow had been destined to be processed into hamburger meat to be used by McDonald’s franchises added impact to a fascinating and potentially frightening story. U.S. newspaper coverage of this story unfolded over the course of the next year, as reporters consulted various types of sources to help them explain the facts of this scenario to their readers.

In covering such stories, reporters’ abilities to identify and successfully use appropriate news sources are paramount to effective, reliable news coverage. Recent, highly-publicized instances in which reporters have written stories with little or no basis in fact have highlighted media responsibility to choose and use sources honestly and wisely. Jayson Blair of *The New York Times* and Stephen Glass of *The Boston Globe*, to mention just two high-profile cases, left their prestigious employers embarrassed by including in many of their stories events that did not happen and ascribing information to sources that did not exist (Shafer, 2003). Of course, these reporters paid for their mistakes with their jobs, but the long-term damage to the credibility of their employers and of journalism in general has yet to be calculated.

This dissertation follows the style of the *Journal of Applied Communications*.

Complex stories like the December 2003 BSE event lie outside the everyday experience of most reporters and require knowledge beyond their usual education. The identification of knowledgeable sources and the scrupulous attribution of the information they provide is crucial to the accurate telling of such science-intensive stories (Albaek, Christiansen, & Togeby, 2003). Not only must reporters involved with coverage of such events not make up information or fabricate sources, they must identify and accurately report the “right” sources to explain such matters to their readers (Lee, 2004).

It is generally accepted that opinion leaders help define those issues about which the public should think (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail, 1994) and that the media helps communicate such agenda salience. Reporters’ selection of sources plays an important part in agenda setting because story sources can drive issue discussion in particular directions. Framing, on the other hand, helps guide the public as to *how* it should think about a particular issue. Framing provides context for opinion formation and discussion (DeFleur & Ball-Rokeach, 1989; McQuail, 1994). Frames developed by reporters help to construct schema to help the public place issues into understood and shared contexts. Reporters themselves are susceptible to agenda setting and framing of issues by the coverage of such stories by media they regard as particularly prestigious and credible (Breed, 1955; Dunwoody, 1979; Havick, 1997; Ten Eyck, 2000).

A story frame is built around a reporter’s concept of newsworthiness, comprising such factors as conflict and proximity, as well as that reporter’s sense of the story’s contextual salience. Agenda-setting and the news waves of arterial effects (Breed, 1955)

it generates may mean reporters are forced to adopt others' frames via consulting the same or similar sources. While this dissertation does not explore news selection variables and their relationship to framing and agenda-setting per se, it does use those theoretical ideas to help select variables that should be studied.

Those concerned with the source choices of reporters covering the December 2003 BSE event and with the impact of such sources on the quality of information available to the public may look to an extensive body of research on the factors that influence the sourcing of breaking agricultural news. Those factors include newspaper coverage of agriculture in general and of BSE in particular, reporters' relationships with their sources, additional considerations in the relationships between science specialty-beat reporters and their sources, and the extent to which characteristics of newspapers themselves may influence coverage of topics such as BSE.

The amount of coverage afforded agriculture by newspapers, both in numbers of stories and in extent of column inches, has declined over the past decade, largely because of the increasingly urban nature of American life (Hays, 1993). Other factors contributing to this decline include indications that agricultural producers and scientists may not turn to newspapers as the preferred medium of information exchange (Bouare & Bowen, 1990; Bruening, 1991; Bruening & Martin, 1992; Bruening, Radhakrslma, & Rollings, 1992; Oskam, 1992; Reisenberg & Gor, 1989, Rollings, Bruening, & Radhakrslma, 1991) and that most newspaper reporters possess low levels of agricultural literacy (Haygood, Hagins, Akers, & Keith, 2002). Existing coverage has concentrated on controversy and risk, with positive stories receiving little play

(Beaudoin & Thorson, 2004; Ten Eyck, 2000). Other researchers note that newswriters' routines and newsrooms' structures have not been conducive to covering agricultural news (Logan, 2001).

Into this climate of inattention to agricultural news burst BSE, a new and little-understood disease that met the criteria of controversy and risk so prized by journalists. First emerging in the United Kingdom in the early 1990s, BSE generated a large amount of emotionally-charged coverage in Europe (Sturloni, 2003), with subsequent outbreaks in Japan and the United States gaining attention from the press because of the potential economic, social, cultural, and geographic impacts of the disease (Ruth & Eubanks, 2005; Ten Eyck, 2000). Researchers have criticized the media for failing to report accurately about BSE and other zoonotic diseases (Roche & Muskavitch, 2003), often exaggerating its immediate risks to humans (Raude, Fischler, Lukasiewicz, Setbon, & Flahault, 2004). Such reports caused decreases in beef consumption and, in the short term, hurt the U.S. beef industry (Schupp, Gillespie, O'Neil, & Prinyawiwatkul, 2004).

Even before these events, however, much research had been devoted to investigating the source selection process, a job function common to all reporters. Studies focused on, among other topics, the role of information subsidies (Gandy, 1982), the gatekeeping role of newspaper editors (Schmierbach, 2005; Donohue, Olien, & Tichenor, 1989), the part played by reporters' and editors' personal characteristics (Armstrong, 2004; Shoemaker, Eichholz, Kim, & Wrigley, 2001), and the contribution of newswriters' organizational routines (Clark & Illman, 2003; Dunwoody, 1979; Kitzinger & Reilly, 1997). Perhaps chief among the comments that can be made about

these studies is that (a) all such studies identify these factors as playing a part in how reporters select sources but (b) they do not often agree on the nature or the degree of influence exerted on source choice by each of them.

Researchers have noted that coverage by science specialty-beat reporters differs from that by general assignment reporters in quantity, type, and tone (Craft & Wanta, 2004; Long, 1995; Shoemaker, Eichholz, Kim & Wrigley, 2001). Other studies concentrating on relationships between specialty-beat reporters and their sources found that such reporters often use the same sources continually, building strong bonds with them (Chermak, 1995; Dunwoody, 1979; Gandy, 1982; Ten Eyck, 2000) and often focusing almost exclusively on institutional representatives who may be depended upon to furnish information (Ericson, Baranek, & Chan, 1993; Sumpter & Braddock, 2002). Other researchers have called for media to concentrate to an even greater extent on scientists as sources for complex stories (Ramsey, 1999), although they note that a reporter's ability to deal effectively with such expert sources may depend heavily upon that reporter's science training (Grantham & Irani, 2004; Vestal & Briers, 1999; Wingenbach, Rutherford, & Dunsford, 2003).

Finally, a number of studies have addressed the impact upon coverage and source use of such newspaper characteristics as circulation size, with larger papers seen as having more reporting resources; location, including geographical proximity to a story (Bendix & Liebler, 1999) and a newspaper's urban or rural setting and the size of the municipality in which it is situated (Martin, 1988; Morton & Ramsey, 1994; Griffin & Dunwoody, 1995, 1997; Hindman, 1996; Chambers, 2003); and ownership,

with concerns emerging about homogenization of coverage even in the face of increased personnel and other resources resulting from common corporate ownership of a number of different outlets (Harry, 2001; Aronoff, Ward, & Kenyon, 2004; Busterna, 1988; Lacy & Blanchard, 2003; Miljan & Howorun, 2003).

Thus, newspaper coverage of agriculture and the impact of various reporter, editor, and newspaper characteristics on source choice have garnered significant attention from researchers. This study continues that investigation, attempting to place such issues in the context of significant communication theory.

Communication theories

Several authors have posited that source choice may be driven by agenda-setting competition among issues, including the news wave that influences reporters themselves, and/or may reflect effects of framing.

It is generally accepted that opinion leaders help define those issues about which the public should think (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail, 1994) and that the media helps communicate such agenda salience. Reporters' selection of sources plays an important part in agenda setting because story sources can drive issue discussion in particular directions. Framing, on the other hand, helps guide the public as to *how* it should think about a particular issue. Framing provides context for opinion formation and discussion (DeFleur & Ball-Rokeach, 1989; McQuail, 1994). Frames developed by reporters help to construct schema to help the public place issues into understood and shared contexts. Reporters themselves are susceptible to agenda setting and framing of issues by the coverage of such stories by media they regard as

particularly prestigious and credible (Breed, 1955; Dunwoody, 1979; Havick, 1997; Ten Eyck, 2000).

Agenda-setting theory accepts the proposition that opinion leaders set public perceptions of which issues are important to consider. Media play an important part in this process, helping to determine issue salience for the public. Agenda-setting theory further contends that issues of public salience comprise agenda for action, with media input helping to define issue content and relative importance (McQuail, 1994). Agenda-setting may be seen as a process of issues and their proponents competing for reporters' and editors' attention, as well as the attention of decision-makers and the public (Dearing & Rogers, 1996). In the context of this struggle for control of limited media time and space, source choice becomes paramount, as each particular source may drive issue discussion in a particular direction, skewing the agenda presented as important to the public. Editors and reporters themselves may also be influenced by a type of agenda-setting that Ten Eyck (2000) and Havick (1997) called the "news wave," the tendency of media to deem important those stories first covered by prestigious news outlets.

Framing theory, on the other hand, conveys *how* the public should think about a particular issue, providing context for discussion and opinion formation. Framing's theoretical constructs posit that the media help to construct schema which the public use to place news content into readily understood and widely shared contexts (McQuail, 1994), assisting individuals to construct meaning out of larger events (DeFleur & Ball-

Rokeach, 1989; Reber & Berger, 2005), often by employing themes based on self-interest (Rodriquez, Farnall, Geske, & Peterson, 1998).

A story frame is built around a reporter's concept of newsworthiness, comprising such factors as conflict and proximity, as well as that reporter's sense of the story's contextual salience. Agenda-setting and the news waves of arterial effects (Breed, 1955) it generates may mean reporters are forced to adopt others' frames via consulting the same or similar sources. While this dissertation does not explore news selection variables and their relationship to framing and agenda-setting per se, it does use those theoretical ideas to help select variables that should be studied.

Agenda setting and framing of particular events both may be influenced by reporter/editor and newspaper characteristics. Source selection plays a major role in constructing media agenda and frames, with agenda-setting theorists maintaining that reporters choose their sources based on the agenda their newspapers seek to advance (Dearing & Rogers, 1996) and that sources contribute in major ways to constructing story frames (Zoch & Turk, 1998). Additionally, agenda and frames may evolve over the course of an ongoing story, with sources changing to match that evolution as a story "matures" (Chyi & McCombs, 2004; Sumpter & Braddock, 2002; Martin, 2003).

However, despite the amount of attention given the matter of source choice and its implications for and reification of prominent communication theories, an exhaustive search of the relevant literature in agriculture, agricultural communications, and journalism yielded no studies directly on point for this current research.

Statement of the problem

Although the research consensus is that factors such as the news wave, reporter/editor individual characteristics, newsroom organization, newsworker routines, use of information subsidies, and newspapers' circulation may impact reporters' source choices, few guideposts exist by which to gauge the relative importance of the influence of these different factors on selection of sources. Further, most source-choice research has focused on coverage of political or crime news or on reporter/editor gender, ethnicity, or work routines. No published studies were found applying agenda-setting or framing theory to explanations of source-choice in coverage of agricultural breaking news, nor were any found showing how reporter, editor, newsroom, or newspaper characteristics impact such coverage. Thus, the current study sought to illuminate to what extent reporters' designation as science specialty-beat reporters, combined with their newspapers' locations and circulation, influenced their use of experts in their coverage of the December 2003 BSE event in the United States.

Purpose of the study

This study examined source choices for the December 2003 BSE event in the context of agricultural journalism, seeking to discover the sources reporters use when covering breaking agricultural news, the impact of reporter specialization on their choosing sources for agricultural news stories, and the impact of newspaper differences, including location, circulation, and ownership, on coverage of such issues.

Objectives

This study sought to determine the effects of reporter work-role specialization and of newspaper location, circulation, and ownership on coverage of breaking agricultural news and, to the extent possible based on the data used, to quantify those effects.

Coverage of the December 2003 BSE event in the United States was selected for examination, because this event was timely, newsworthy, significant to the public, and related to agriculture, and required reporters to explain complex, science-intensive information. Answers were sought as to whether newspaper location, circulation size, and/or ownership, and reporter beat assignments affected the length of stories about the event and the number and variety of sources used in such stories.

In addition, with regard to coverage of this event, statistically significant differences were hypothesized in the length of stories and in the number and the variety of sources used by reporters based on their assignment to science-specialty beats. Data were analyzed using SPSS 12.0 in an attempt to reject the hypotheses that means for lengths, numbers of sources, and source variety for stories written by science specialty-beat reporters are equal to such means for stories written by reporters with other beat assignments.

The objective of this research was to determine the role and process of sourcing in news stories, as defined by agenda-setting and framing theories and as applied specifically to agricultural breaking news. It is hoped that such investigation ultimately may (a) provide direction for further research and (b) indicate ways in which journalism

may, through appropriate and attributed sourcing, more effectively fulfill its responsibilities of accurately and impartially reporting news of significance to the public.

CHAPTER II

REVIEW OF LITERATURE

To lay the groundwork for further exploration of the process of reporter source choice, this study first summarizes what other researchers have discovered about newspaper coverage of agriculture, about newspaper coverage of BSE in particular, about reporters' interactions with their sources, about the ways in which science specialty-beat reporters' source choices differ from those of other reporters, and about the impact of newspaper characteristics on reporters' source choices.

Relevant literature was sought from publications in the fields of agricultural communications, agricultural education, communication, and journalism, among others. Searches were conducted using keywords such as reporters, sources, sourcing, science writing, agenda-setting, framing, public relations, agriculture, BSE, mad cow, gatekeeper, newsworker, newspaper ownership, newspaper location, and information subsidy.

Purpose

This study examined source choices for the December 2003 BSE event in the context of agricultural journalism, seeking to discover the sources reporters use when covering breaking agricultural news, the impact of reporter specialization on their choosing sources for agricultural news stories, and the impact of newspaper differences, including location, circulation, and ownership, on coverage of such issues.

It is generally accepted that opinion leaders help define those issues about which the public should think (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail,

1994) and that the media helps communicate such agenda salience. Reporters' selection of sources plays an important part in agenda setting because story sources can drive issue discussion in particular directions. Framing, on the other hand, helps guide the public as to *how* it should think about a particular issue. Framing provides context for opinion formation and discussion (DeFleur & Ball-Rokeach, 1989; McQuail, 1994). Frames developed by reporters help to construct schema to help the public place issues into understood and shared contexts. Reporters themselves are susceptible to agenda setting and framing of issues by the coverage of such stories by media they regard as particularly prestigious and credible (Breed, 1955; Dunwoody, 1979; Havick, 1997; Ten Eyck, 2000).

A story frame is built around a reporter's concept of newsworthiness, comprising such factors as conflict and proximity, as well as that reporter's sense of the story's contextual salience. Agenda-setting and the news waves of arterial effects (Breed, 1955) it generates may mean reporters are forced to adopt others' frames via consulting the same or similar sources. While this dissertation does not explore news selection variables and their relationship to framing and agenda-setting per se, it does use those theoretical ideas to help select variables that should be studied.

Objectives

This study sought to determine the effects of reporter work-role specialization and of newspaper location, circulation, and ownership on coverage of breaking agricultural news and, to the extent possible based on the data used, to quantify those effects.

Coverage of the December 2003 BSE event in the United States was selected for examination, because this event was timely, newsworthy, significant to the public, and related to agriculture, and required reporters to explain complex, science-intensive information. Answers were sought as to whether newspaper location, circulation size, and/or ownership, and reporter beat assignments affected the length of stories about the event and the number and variety of sources used in such stories.

In addition, with regard to coverage of this event, statistically significant differences were hypothesized in the length of stories and in the number and the variety of sources used by reporters based on their assignment to science-specialty beats. Data were analyzed using SPSS 12.0 in an attempt to substantiate the hypotheses that science specialty-beat reporters wrote longer stories, cited more sources per story, and used a wider variety of sources in each story than did non-science specialty-beat reporters.

The objective of this research was to shed light on the role and process of sourcing in news stories, as defined by agenda-setting and framing theories and as applied specifically to agricultural breaking news.

Statement of the problem

Sachsman (1993) noted that

Scientists and journalists have little in common. They do not even speak the same language. Although both attended universities, they generally took very different courses. They developed different ways of looking at the world, of measuring things, and of reporting what they had learned. Scientists became specialists, judging their work by its importance to the world. Reporters became generalists. ... And journalists developed their own peculiar standards for judging their work, standards that included importance, but did not emphasize it.
(p. 1)

Reporters occupy positions of public trust, in that their code of ethics requires them to report the truth in ways that their readers can understand. Part of their responsibility to fulfill that trust involves dissemination of scientific information. Increasingly, in a rapidly changing world filled with often-perilous technologies:

[T]he media play an important role at the interface of science and policy by communicating scientific information to the public and to policy makers. In issues of theoretical risk, in which there is scientific uncertainty, the media's role as disseminators of information is particularly important due to the potential to influence public perception of the severity of the risk. (Wilson, Code, Dornan, Ahmad, Hebert, & Graham, 2004, p. 1)

But in doing so, reporters must balance their responsibility to raise the public's awareness of important issues with their equally important responsibility not to alarm the public unnecessarily. In writing stories about risks, reporters should take into account audience decision-making behaviors concerning the risks and the perceptions upon which such behaviors are based. For example, Rodriguez and Peterson (1996) found that "factors such as knowledge about the technology and [more importantly] trust in technology-generating institutions influenced people's decisions about the acceptability" of adopting new technologies containing aspects of risk (p. 12).

Fulfilling their responsibilities to the public requires reporters to seek out the best information and to interpret accurately and clearly what they have learned.

Newspaper coverage of agricultural issues: Emphasis on controversy and risk

Media influence public perceptions about agriculture, including ideas about its scientific aspects (McInerney, Bird, & Nucci, 2004). And, as these researchers point out, people are interested in science — they cited polls indicating that 4 of 10 people actively

seek out science news. However, although Nordstrom, Wilson, Richards, Coe, Fivek, and Brown (1999) found that 96 U.S. newspapers had science sections in 1990, only 47 had them just two years later:

The public wants science-based information but the information gatekeepers (news editors) do not feel these stories are newsworthy or profitable and thereby withhold coverage. News editors, however, seem willing to include sensationalized stories, such as celebrities campaigning for animal rights or human health impairments resulting from voids in food safety knowledge. This view may create a discrepancy between public understanding and existing reliable information. (p. 10)

In general, the increasingly urban nature of American life has meant a decline in the amount of coverage afforded agriculture topics by urban newspapers (Hays, 1993; Cartmell, Dyer, & Birkenholz, 2001), although the necessity to use a medium easily accessible to a majority of an area's population in communicating about agriculture can be extrapolated from studies such as Van Crowder's (1991). Whitney, Fritzler, Jones, Mazzarella, and Rakow (1989) found "geographic bias in television news (i.e., that a disproportionate share of U.S. news emanates from a handful of U.S. cities) ... [with that bias] toward metropolitan centers which are routinely, predictably part of the 'news net'" (p. 160).

For much of the media, news coverage of agriculture, when it is present, is synonymous with coverage of controversy and/or risk (Ten Eyck, 2000); other types of agriculture news, especially positive stories, receive little attention, although research has shown that newspaper use both is more prevalent and has more positive effects in settings where agriculture predominates (Beaudoin & Thorson, 2004). News about worsening threats is more newsworthy than is news about a decreasing threat;

quantitative trends are presented in ways calculated to increase their drama (Berger, 2001). Perhaps newspapers not concentrating much of their attention on agricultural coverage may be partially explained by the fact that some studies show agricultural producers prefer face-to-face contact with information sources to learn about agricultural topics, rather than reading about them in the newspapers (Bruening, 1991; Bruening & Martin, 1992; Bruening, Radhakrishna, & Rollins, 1992; Oskam, 1992; Riesenberg & Gor, 1989; Rollins, Bruening, & Radhakrishna, 1991). Agriculture Extension agents, who originate most local agricultural information, have listed mass media as a tool they use least to communicate with their constituencies (Bouare & Bowen, 1990). Such minimal use of mass media seemingly contradicts research indicating that, for most audiences surveyed, mass media represent the only contact with Extension (Fett, Shinnars-Gray, Duffy, & Doyle, 1995) or, indeed, with any agriculture-based news (Ten Eyck, 2000).

Along the same lines, Fett and Mundy (1995) showed newspapers to be an effective means of distributing information to agricultural producers only when that information was presented in a special dedicated newspaper supplement. Similarly, Oskam (1995) found that farmers relied heavily on mass media — primarily television and magazines — for health and safety information specific to agriculture, with 89% of respondents expressing a desire for the mass media, including newspapers, to carry more such information. Urban opinion leaders also would like to receive more information about agricultural issues, primarily via newspapers (Ruth & Lundy, 2004). Indeed,

many researchers perceive using mass media crucial to disseminating such knowledge to a largely urban population alienated from agriculture (Thomson & Kelvin, 1996).

A search of recent literature concerning coverage of agricultural topics yielded results heavily concentrated in such areas as food safety, for example, food irradiation (Thomsen, Longstreth, & Miller, 2003); biosecurity, including “protecting the public” from genetically modified foods; outbreaks of foodborne diseases and those transmitted by or among animals, such as BSE, foot and mouth; controversial agricultural practices, for example, factory farms (Glenn, 2004) and genetically modified foods, again; and crises linked in some way to agriculture (Ten Eyck, 2000), such as increasing development of antibiotic resistance in humans caused by overuse of antibiotics in animals. Such overwhelmingly negative themes have led various scholars to call for more science education for reporters and to decry the media’s role in the public’s low level of scientific literacy.

King (1991) wrote that campus agricultural communicators potentially could contribute to raising reporters’ scientific literacy levels by significantly influencing interactions between reporters and university agricultural scientists through the news subsidies they provide reporters; thus, King concluded, such communicators’ credibility with and accountability to both their faculty clients and the media’s public audiences emerge as crucially important. However, many agricultural journalists have expressed concern over increasing advertiser influence on the editorial content of agriculture periodicals (Banning & Evans, 2001, 2004a, 2004b), a trend they fear could perhaps be expected to influence mainstream newspaper reporters’ seeking information from these

publications on agricultural topics and the agenda-setting clues derived from such sources.

Of course, conflict is the heart of reporters' traditional conceptions of newsworthiness, and risk controversies have become one of the staples of modern public life, a constant within a world that sees policy-making as the result of political contest and struggle: "Risks do not emerge as issues for the media, the public or even for experts according to their intrinsic importance, but in interaction with social processes including bureaucratic procedures and promotional strategies" (Miller, 1999, p. 1242). Miller wrote that one public perception of risk communications from government officials and other experts is that scientists and politicians may provide deliberate misinformation in order to manipulate public opinion according to their own agenda.

When newspapers cover issues of interest to the public, they may or may not overrepresent sources on one side of a conflict. In addition, reporters prize exclusives, excitement, or controversy, and although they may try to uphold an ideal of objectivity, often reporters lack the specialist knowledge to realize what it means to give equal time to each side in a complex issue (Wells, Marshall, Crawley, & Dickersin, 2001).

Stories about risk capture the reporter's instincts for conflict as central to the stories they write. Thus, complex topics such as the benefits and threats offered by genetically modified crops become couched as conflicts between technology and the beauty of nature, as illustrated by the story of the effects of pollen from genetically modified corn on Monarch butterflies (Shelton & Sears, 2001). Larson, Nerlich, and Wallis (2005) noted the predominance of militaristic metaphors used to describe

agricultural controversies, citing examples of treatment of invasive species and foot and mouth disease. And Alaszewski and Horlick-Jones (2003) wrote, “While experts can measure risk and (attempt to) communicate their measurements to the public, this information is filtered through various media and interpreted by social groups and individuals” (p. 730).

Blaine and Powell (2001) wrote that the slant of media risk coverage may have its origins in differences between the ways in which scientists and members of the public perceive risk, stating that “risk communication — the science of understanding scientific and technological risk and how it is communicated within a sociopolitical structure — is a relatively new scientific endeavor” (p. 180). Clarke (2003) noted given that people in North America receive most of their scientific information from media, including newspapers, television, radio, and the Internet, it becomes increasingly critical for scientists to learn how better to communicate risk in terms that both the press and the public can understand, as well as how to dialogue more effectively with farmers and others.

Although the idea of informed consent for medical or scientific procedures is presented to the public as the ideal, most people are unfamiliar with the idea of scientific uncertainty and the need to balance risks and benefits: “It can be difficult for professionals to judge the quality of evidence, and it may be unrealistic to expect a detailed discussion and understanding of these issues in the lay press, where space is limited and unequivocal messages preferred” (Wells, Marshall, Crawley, & Dickersin, 2001, p. 1035).

For example, DeSilva, Muskavitch, and Roche (2004) found that 90% of newspaper stories addressing the development of resistance to antibiotics did not outline simple precautions the public could take to prevent the problem:

In only twenty-four words, journalists could cover two key measures with a sentence such as “Individuals can reduce the development of antibiotic resistance by only taking antibiotics for bacterial illnesses, and by taking the full course of antibiotic prescriptions.” ... Experts could help journalists by offering information in clear, organized and concise messages that are geared toward the public as an audience, and with recognition of the deadlines and other contingencies faced by members of the print media. Experts could be particularly helpful by emphasizing key take-home messages, so that journalists could in turn include those messages in their stories. (p. 40)

Other studies have highlighted the links between media coverage and the public's acceptance of technological innovations in agriculture like biotechnology (Besley & Shanahan, 2005). But to report about such innovations, reporters must have an adequate knowledge base from which to interact with experts. Wingenbach, Rutherford, and Dunsford (2003) wrote that science specialty-beat reporters strive to be objective, but that they do best when they understand the topics about which they are writing; thus, respondents in their survey “formed their perceptions about biotechnology through knowledge and experience (science classes and labs), which is conducive to understanding and reporting accurately the science of biotechnology” (p. 1).

Other researchers agree that coverage is highly dependent on the agricultural literacy of those in the media (Haygood, Hagins, Akers, & Keith, 2002), with specialty reporters interpreting their subject areas more narrowly and being more likely to consult scientists (Dunwoody, 1978). Reporters' and editors' agricultural literacy levels play an

important part in their abilities to explain the science in their stories to a public when only 20% of its members may meet basic definitions of scientific literacy (Haygood, Hagins, Akers, & Keith, 2002). Media coverage of stories of risk centering upon agricultural products also may influence policy makers, as in the case of decisions by the Environmental Protection Agency (EPA) concerning pesticide use, with the greater the amount of coverage, the greater the effect (Yates & Stroup, 2000). Journalists' agricultural literacy may prove problematic, however, given that Frick, Kahler, and Miller's (1992) survey of agriculture faculty members at land-grant universities

identified 11 broad areas of agricultural knowledge and identified [numerous] concepts that fit under [each] one of the 11 broad agriculture subject areas [so] identified. The definitions, subject areas and concepts generated demonstrate the vast amount of knowledge agriculture applies to produce food and fiber. (p. 42)

Clearly, then, achieving agricultural literacy is no simple endeavor.

Other researchers believe that the nature of media coverage of agriculture topics does not explain nearly so much of such stories' effects as do the characteristics of different audiences: "Although few would argue that mass media content is always fair, this perceptual bias can be clearly attributed to preexisting attitudes in the partisan audience rather than to the media content itself" (Gunther & Schmitt, 2004, p.69).

Another line of reasoning suggests that the media's "challenges and problems in covering agrobiotechnology might be linked to structural organization and traditions within the nation's newsrooms" (Logan, 2001, p. 194); for example, food biotechnology traditionally was seen as falling within the realm of food or business, rather than that of science, environment, or investigative stories. Dunwoody (1979) also noted the

influence of organizational constraints in news selection and of individual reporter characteristics in information gather and, by extrapolation, source selection. Logan would fault traditional news beat structures for the dearth of insightful coverage of modern agriculture. Other researchers agree that news organizations themselves help to define what is news: “Journalists are stationed where news, as defined by their organizations, is presumed most likely to occur, at the expense of locations and sources not in the [news]net” (Whitney, Fritzler, Jones, Mazzarella, & Rakow, 1989, p. 160).

Clearly, newspaper coverage of agricultural issues remains problematic, and all the organizational and situational elements that impact coverage became manifest in the media’s response to the BSE crisis.

Newspaper coverage of BSE

Sturloni (2003) wrote that food-related risks are one of the “hottest” issues in mass media, both in terms of reader interest and reporters’ perceptions of newsworthiness; thus, the initial emergence of BSE in Britain may be called “the perfect paradigm of European food scares” (p. 4). Sturloni contended that mad cow disease, down to its ominous and metaphorically inaccurate name, became a media event, with identifiable victims, many of whom were young and attractive; a blameworthy source, an irresponsible industry; a community principle that had been violated, the expectation that food will be safe; and a sensational sense of uncertainty:

... media representation of “mad cow” disease takes place according to a script which starts with an alleged “scandal” followed by an immediate attempt to understand its origins and goes on with a search for “culprits” or ways to “make amends.” Even when the story is clearly a scientific one — a rare event because scientific information is often mixed with news reporting — the narrative elements are

there: there is always a scandal (an infectious agent, prion, which seems to violate a dogma of biology), an original sin (having transformed herbivores into cannibals, thus favoring prion dumping between species) and a way of making amends (a vaccine of similar remedy that only scientific research can provide). (p. 8)

Sturloni further wrote that the perception of BSE's severity was based not on its small number of victims but on the idea that science was powerless to overcome it.

Indeed, outbreaks in the United Kingdom, Japan, and the United States were seen as having serious consequences for the industry, with the U.S. event potentially reducing domestic beef consumption by 10% and exports by as much as 75%, resulting in declines in prices for slaughter and feeder cattle (Jin, Skripnitchenko, & Koo, 2004). Thus, BSE was certain to gain attention from the press because of its economic, social, cultural, and geographic impacts (Ruth & Eubanks, 2005; Ten Eyck, 2000).

Harris and O'Shaughnessy (1997) wrote that although initial coverage about the risks associated with BSE should have been "structured about technical communications [such coverage instead] inadvertently became organized and perpetuated through a series of (impulsive) rhetorical acts and (incompetent) symbolic events" (p.29). Reporters in Britain, where the disease first emerged into the public eye, gave the crisis a highly negative meaning through the use of symbols that became important to persuasive efforts, in this case, the British government's efforts to convince the public that the disease posed no threat to human health. Indeed, Powell and Leiss (1997) and Jensen (2004) detail these events as representing an almost textbook case for how risk communication should not be handled, stating that the British government's efforts did not contain a clear presentation of the facts, did not communicate the state of scientific

uncertainty that existed at the time, and gave little credit to the public's ability to weigh the evidence in a rational and balanced manner (Jensen). In the United Kingdom, most BSE coverage highlighted emotions and sensationalism, whereas U.S. papers emphasized the health risk and the threat to humans of illness and death (Ruth & Eubanks, 2005). Brookes (1999) found British media's BSE coverage to be excessive and hysterical, linking the outbreak and the response to an eroding national identity. Additionally, Lundy and Irani (2004) found British newspapers to have written more editorials commenting on BSE than did their American counterparts. Thus, the public remains skeptical about what they read in the media (Ten Eyck, 2000); they believe that no one — not physicians, veterinarians, the government, scientists, agricultural producers, the media — takes responsibility for the bad information propagated about BSE (Ratzan, 1997).

In the case of diseases that may be transmitted from animals to humans, researchers contend that the media have failed to present “even basic risk-assessment information regarding ... emerging threats to public health” (Roche & Muskavitch, 2003, p. 361). These authors cited media coverage about such health threats as West Nile virus and BSE as imprecise and lacking the information needed to put events in context.

Information provided to reporters about BSE has been called a textbook example of amplification of risk, making it difficult for the media to compile accurate information about the disease: “The ‘mad cow disease’ case typifies a special class of hazards, those that trigger intense media coverage and strong public concerns, high institutional

attention, and large secondary or higher order consequences ... ‘socially amplified’ hazards” (Raude, Fischler, Lukasiqicz, Setbon, & Flahault, 2004, p. 174).

Ruth and Eubanks (2005) found four frames to have been used by newspapers in reporting the BSE outbreak in Canada: industry crisis — the most popular, citing the devastating consequences of the outbreak; economic calamity; blame/responsibility (least frequent); and health risk, ranging from zero to amplified:

Overall, the news coverage of the mad cow disease outbreak in May 2003 was negative, potentially causing uncertainty and fear in the Canadian and United States lay public. If reporters continue to cover only agricultural news that is problematic or associated with risk — like mad cow disease — then it can be expected that consumers will continue to lack accurate knowledge and understanding of agricultural and food related issues. (p. 20)

Schupp, Gillespie, O’Neil, and Prinyawiwatkul (2004) reported that although coverage of the U.K. BSE outbreaks had little effect on American consumers, coverage of the first U.S. mad cow incident, along with Oprah Winfrey’s anti-burger statement and beef recalls by meat packers, had measurable impacts on the beef consumption of respondents to one study, who reported eating from 22 to 26 % less beef for more than 15 weeks after the incident.

BSE coverage also served to link the disease in the public minds with food safety in general and with genetically modified foods in particular, altering earlier predominantly favorable coverage of agrobiotech:

The media has [sic] often been accused of sensationalism and bias in reporting of events pertaining to agrobiotechnology. Our findings confirm such bias insofar as coverage has emphasized different frames (biosafety and food safety) at different points in time, depending on unfolding events and scientific and risk management controversies. (Marks & Kalaitzandonakes, 2001, p. 206)

Certainly, however, reporters' coverage of significant agricultural issues such as BSE depends to a great extent upon their sources and the information that those sources provide. Research in the area of reporters' source choices reveals an uneven and often stormy history between the two, as well as between reporters and the public relations practitioners who may represent their sources.

Source choices of reporters: Theory and practice

“The press is where scientists meet the public” (Calsamiglia & Ferrero, 2003).

It is axiomatic that reporters report the news; they do not make it. In their role as eyewitnesses to history, certain types of reporters, such as war correspondents and sports reporters, may bring to their readers first-person accounts of what they themselves see, hear, or otherwise experience. However, many reporters craft accounts of events that have taken place outside of their immediate experience; they must seek out others who can tell them about what has happened and who can help them interpret what events mean to the public (Simonson, 1999). Such others are called sources, and source choice is a job function common to all reporters. Reporters try to choose the best sources for a given story based on the source's institutional position, knowledge, accessibility, or cooperativeness, or some combination of these characteristics, although a source's political power or social influence often unduly influences such choices, causing government officials and corporate spokespersons to be overrepresented in the source pool (Whitney, Fritzler, Jones, Mazzarella, & Rakow, 1989); such

factors in source-choice may reflect media agenda-setting or framing effects (Salwen, 1995; Lee, 2004; Kitzinger & Reilly, 1997).

The most frequently cited theories in communication journal research articles in the 21st century were framing, agenda setting, and cultivation (Bryant & Miron, 2004). Much of this research has been devoted to investigation of the source selection process and indicates that source choice may be driven by agenda-setting competition among issues or may reflect effects of framing. Reporters also may be swamped by the “news wave” generated by story coverage choices of large media organizations, an effect which can dampen independent thinking about sources on the part of smaller media outlets. As a particular story develops through its lifespan, reporters may choose different sources that reflect event maturation or may even narrow the scope of sources consulted (Sumpter & Braddock, 2002). Reporters’ institutional roles and work routines, including designation as “science writers” or other types of science specialty-beat reporters, as well as their personal characteristics, impact their use of news sources (Dunwoody, 1979); similarly, editors’ exercise of their gatekeeping functions may depend on newsroom organization, procedures, and routines, and on their individual preferences. Government, institutional, and corporate information officers attempt to influence source choice through pitching experts packaged as information subsidies or by staging “‘routine’ (also known as ‘public’ or ‘pseudo’) events. These events are not spontaneous; they are preplanned and planted to be ‘found’ and to be reported by newswriters. The classic example is a press conference” (Sumpter & Braddock, 2002, p. 542). Additionally, advocacy or activist groups may seize opportunities to define

newsworthy events to their advantage (Telg & Dufresne, 2001). Interestingly, new communication technologies may be increasing such influences:

Not all the new media follow the same routines and observe the same standards that the established media do, and the added competition that they represent gives sources more power to define news and the rules for gathering it. (Sumpter & Braddock, 2002, p. 540)

And, finally, the size, circulation, and ownership of a newspaper can help determine which sources its reporters will use.

The media have long been regarded as important in determining issue salience for the public. McQuail (1994) wrote that agenda-setting theory contends that issues of public salience comprise an agenda for action, and the media's representation of such issues "exerts an independent effect on issue content and on relative salience in public opinion" (p. 357). Dearing and Rogers (1996) said that "the agenda-setting process is an ongoing competition among issue proponents to gain the attention of media professionals, the public, and policy elites" (p. 2-3). Common issue proponents include government officials, corporate representatives, public information officers and other media relations professionals, and various types of subject-matter experts. Thus, agenda-setting theorists would maintain that reporters chose their sources based on the agenda their newspapers seek to advance.

Another theory of media effects, framing, posits that the media help to construct schema which the public use to place news content into readily understood and widely shared contexts (McQuail, 1994). Such media frames contribute to individual and societal construction of meaning out of larger events (DeFleur & Ball-Rokeach, 1989;

Reber & Berger, 2005) and may best exert the effect intended by their authors when they focus on audience self-interest, for example, how to avoid a perceived threat (Rodriquez, Farnall, Geske, & Peterson, 1998). Scheufele (1999) wrote that journalistic frame-building is influenced both by the ideology, attitudes, and professional norms of individual reporters and by their organizational routines. Other researchers describe framing this way:

A frame establishes an associative pathway between a target issue and a specific set of concepts. By activating or suggesting some ideas at the expense of others, the news can encourage particular trains of thought about political phenomena and lead audience members to arrive at more or less predictable conclusions. ... Framing, or rendering certain thoughts applicable, is most likely to occur when the suggested ideas are relatively accessible prior to exposure. (Tewksbury, Jones, Peske, Raymond, & Vig, 2000, p. 807)

Zoch and Turk (1998) found that

[c]hoice of information source is one of the most important dimensions of framing — the selections reporters make from among the many possible and potential holders of information of those sources whose information and viewpoints will actually be included in the news. ... [n]ews is not necessarily what happens but what a news source said has happened. (pp. 762-763)

Sources provide reporters with story content and context, although some researchers have suggested that reporters may seek out sources most like themselves, avoiding quoting those sources who disagree with the reporter's own ideas (Donsbach, 2004). Other researchers have suggested that "a source's assertiveness, credibility (as determined by the journalist), accessibility, and quotability can affect both a source's prominence (frequency of mention) and dominance (tendency to be quoted rather than paraphrased or just written about) in news coverage" (Stempel & Culbertson, 1984, p.

675). For example, Stringer (1999) found that editors and reporters on Pennsylvania daily newspapers rated agricultural news sources affiliated with universities as “important in helping them to inform the public as quickly as possible, provide problem analysis and interpretation of complex issues, and ensure that all sides of a story are presented” (p. iii). Thus, reporters’ source choices and their stories about the 2003 BSE event may have been influenced by government and industry agendas, perhaps including their experts’ need to reassure the public about the safety of America’s beef supply.

Individual frames and media frames are linked, and reporters themselves are susceptible to frames set by news media — the so-called news wave (Dunwoody & Shields, 1984; Ten Eyck, 2000). Havick (1997) suggested that national media coverage of an individual or topic may be determined most by “typical and normal media processes” (p. 97). Kiernan (2003) found that Associated Press coverage of stories in medical journals was the prime factor in determining whether other media reported on a particular story; press releases and proximity of the research were less influential. And Cappella (2002) wrote that news media could be seen as “meme,” with stories replicated from outlet to outlet. Similarly, other research has indicated that special interest and trade publications may exert an agenda-setting influence on mainstream publications, especially “within the policy arena” (Sweeney & Hollifield, 2000, p. 27), although these authors also suggest that the converse may apply, with such specialized publications taking their coverage cues from the mainstream press. In the case under study, because BSE, especially events in the United Kingdom, had made “big news” in the recent past

and because BSE had been covered by “influential” media outlets like the Associated Press, reporters may have been more likely to report it again in 2003.

Chyi and McCombs (2004) focused on “how the media build a news event’s salience by emphasizing different aspects of the event during its life span. ... [a] journalistic strategy of using a shifting variety of frames over time — frame-changing — [keeps] the story moving and fresh” (p. 22). In addition, frames traditionally used for a certain type of story may change with societal circumstances (Martin, 2003). Such attributes of agenda-setting and issue framing suggest that different sources might be used during the life of an event’s coverage, as events move forward and stories mature over time (Sumpter & Braddock, 2002). Thus, different sources might have been used as the BSE-event coverage matured over the course of this study’s 11-month timeframe.

Reporters may see themselves as agents of mediation of information to the public from scientists and experts. However, Mormont and Dasnoy (1995) found that the media either were incompetent to transmit information about science issues as complex as global warming or they introduced confusion about it; it seemed to these researchers that the media could be trusted to communicate only simple ideas. The authors recommended a more active role for expert sources in interpreting science for the public: “The construction of news involves the commitment of actors — mainly experts — and the development of a framework of reference” (p. 63).

Reporters quote different experts in different ways, but they see scientists as particularly credible (Heinrichs & Peters, 2004). Lehmkuhl and Gopfert (2004) wrote

to most newspapers, the seal ‘scientific’ suffices to prove a result trustworthy. Never are scientific results put under scrutiny, never

do scientists have to justify their opinions, the social detachedness of science remains untouched. What has been proven “scientifically” is automatically trustworthy, seems to be the conviction of all local papers. (p. 2)

Cassidy (2004) found “scientists appeal to the public domain, frequently working the media themselves, in order to make arguments that cannot be aired via everyday academic communication routes such as journal stories or to reach audiences outside their own discipline” (p. 3). However, Heinrichs and Peters (2004) cautioned that reporters frequently may decontextualize source comments by eliminating descriptions of surrounding circumstances and of the sources themselves. Indeed, researchers have cited a journalistic practice of “rel[ying] heavily on unnamed sources (proponents, experts, environmentalists, etc.) and poorly identified advocacy groups” (Beall & Hayes, 1992, p. 6).

Sachsman (1993) believes it would be most productive to try to teach news sources how better to interact with the media, because in his opinion no amount of training can turn reporters into scientists:

If scientists wish to get their messages to the general public, they must learn the language of journalism, personalizing and simplifying as they go. There is not much point for scientists to object that reporters will not meet them halfway. If scientists are willing to assume responsibility for informing the public about issues such as hazardous waste, then they must do everything needed to achieve empathy. They must learn the values of journalism, and they must speak the language of reporters. (p. 9)

Sperbeck (1997) reported satisfaction by a number of scientists who saw themselves as working well with the media; these individuals did not fear being misquoted and “generally found media people competent, professional and pleasant to work with,” and

said “they use the news media because they can reach many people fast, effectively and economically” (p. 24).

Source choices also may be influenced by the reporter’s own institutional role and work routines (Kitzinger & Reilly, 1997), since the way journalism organizes its world has implications for topic coverage (Clark & Illman, 2003). For example, reporters view the quality of their newspapers as being negatively impacted by organization of newsroom personnel into “topic teams” based on content areas and which “cut across traditional job descriptions and newsroom departments”; such teams lead to ambiguous job descriptions, nonspecific assignments and loss of autonomy (Hansen, Neuzil, & Ward, 1998, p. 803). Such approaches to newsroom organization would appear to impact coverage and, perhaps, source choices.

Researchers agree that source choices may be influenced by a reporter’s “personal” characteristics, but they cannot agree on the extent of that influence. Armstrong (2004) wrote, “Reporters’ personal judgments about sources were most likely to influence source selection over factors including organization pressure and the professional background of the source” (p. 142). However, research by Craft and Wanta (2004) on influence of reporter gender on decisions about newsworthiness suggested that a reporter’s organizational position, rather than personal characteristics, is more likely to influence such decisions; work by Shoemaker, Eichholz, Kim, and Wrigley (2001) supports these contentions.

Once reporters have chosen their sources and crafted their stories, their relationships with experts are far from over. In fact, an ongoing conflict within the

media concerns sources' accusations that they have been unfairly or inaccurately quoted by reporters. Some researchers have recommended pre-publication review by expert sources, since reporters with little science background may not fully understand the information provided (Carsten & Illman, 2002).

Some researchers attributed agriculture reporting's lack of depth to reporters' focusing on mostly educational and governmental sources, since these are easiest to access and provide a predictable supply of news; however, other researchers found that source bureaucracies endeavor to control journalist access to information to suit their own agendas (Ericson, Baranek, & Chan, 1993). Such sourcing may introduce bias into agricultural stories; thus, some authors have recommended that reporters seek a wider variety of sources to secure diverse and accurate information (Whitaker & Dyer, 2000). These authors recommended that "due to the complex nature of agriculture, those reporters who specialize in agricultural reporting should receive special training in agricultural journalism" (p. 133). However, Reisner (1991) cautioned that some agricultural journalists have reported feeling "too close to the organizations they cover" (p. 45) and recommended that "agricultural communicators" address such possible conflicts of interest.

Reporters may question whether expert information has journalistic interest and scientific credibility; in general, they

[p]erceive peer-reviewed scholarly journals to be trustworthy but there are increasing concerns in scientific publishing about commercial pressures from pharmaceutical companies, honorary authorship, scientific error, and outright fraud, which reporters cannot be expected to detect. That is [the responsibility of] the scientific community, which must recognize the importance of

maintaining impartial sources of public information. (Wilkie, 1996, p. 1308)

Editors may influence source choice through exercise of their gatekeeping functions according to newsroom procedures and routines and, sometimes, based on their own individual characteristics (Jenkins, 2002). For example, Jenkins notes, editors evaluate scientific research, giving more credence to quantitative studies with large samples, which they see as more accurate and more newsworthy. Since newsworthiness is a key variable in gatekeeping, such methodological evaluation might impact editors' decisions, although some editors may remove from stories much of the methodological subtlety put there by more knowledgeable reporters (Schmierbach, 2005).

Editors as gatekeepers operate within constraints imposed by their profession (e.g., a sense of journalistic ethics), their organizations, and their communities (Donohue, Olien, & Tichenor, 1989). Dimmick and Coit (1982) documented a hierarchical media decision-making system that supersedes psychological and personal characteristics of gatekeepers and reporters; such a system, they contend, might dictate source selection along organizational rather than individual lines.

Much of what has been written about reporters' source choices undoubtedly applies to all reporters, regardless of their beats. However, reporter-specialists, such as science specialty-beat reporters, may have additional factors to consider in their source selections.

Source choices of science specialty-beat reporters

Source choices of science specialty-beat reporters (reporters specializing in coverage of stories with significant science components), on the other hand, may reflect

not just normal newsroom routines and practices or individual reporter characteristics, but also may be influenced greatly by such writers' special position within the news organization, by their special training, and by the narrative and expositional demands of the subject matter covered.

By extension, Shoemaker, Eichholz, Kim, and Wrigley (2001) and Craft and Wanta (2004) suggested that (a) the fact that a newspaper employs a science specialty-beat reporter may go a long way toward determining the nature of its coverage of science-based news and (b) the possibility that the unique position of a science specialty-beat reporter in a newsroom could well impact the quantity, type, and tone of science coverage provided. Science stories about complex issues often demand sources beyond the usual institutional spokespersons, requiring explanation by experts in science and technology. Science-specialty-beat reporters often use the same expert sources continually, laying a foundation for the development of special reporter-source relationships.

Gandy (1982) said that over time reporters may develop personal affinity and identification with sources of information subsidies and come to rely on them when determining which issues should become part of the public agenda. Ten Eyck (2000) agreed that reporters may repeatedly use the same sources, even for issues about which those sources may not be qualified to speak. As an example, Gandy wrote that science specialty-beat reporters seem to be particularly vulnerable to bonding with their sources:

[B]ecause they are highly trained in their specialization and are frequently in contact with scientists on a collegial basis [science specialty-beat reporters are] less likely to report science in a way that

deviates from the norms of the scientific community, particularly in areas of controversy involving scientists. (p. 11)

Such relationships resemble those that often exist between police-beat reporters and law enforcement personnel. Chermak (1995) found that “economic constraints on news production [forced] news media to rely on easily accessible information”; one reporter told Chermak that “police sources were his friends and he would not burn them,” but rather “scratched their backs” (p. 23). Police in turn use such symbiotic relationships with reporters to influence the types of information that newspapers publish. Chermak further found “that police departments seek public support and assistance by feeding news media stories that are promotional, define the boundaries of their work, and legitimate their role in society” (p. 35).

Although some reporters frequently decry their colleagues who chose to function in such “co-opted” source relationships, most of them continue to look within established organizations for predictable supplies of news. Ericson, Baranek, and Chan (1993) described daily routines of struggle and negotiation between sources and reporters in the news-gathering process. Sumpter and Braddock (2002) discussed this process as one of “winnowing” (p. 541), as over time reporters more frequently choose as sources those who “prove dependable dispensers of information ... [over] those who do not” (p. 541). These authors note, however, that media theorists

argue that the surviving sources inject bias into media content because they are “right-thinking people” who create story messages or themes that benefit a particular commercial or political ideology, block news that might embarrass those benefiting from the status quo, and displace “unaffiliated” sources. (p. 541)

Still, Ramsey (1999) found a need for media to source more of their complex stories with scientists, who, along with physicians, are considered by newspaper readers to be the most trusted sources for information about such issues as food safety (Whaley & Tucker, 2004). Ramsey wrote that reporters who elaborated science concepts in depth in their stories were characterized as gatekeepers of information emerging from the science system, while reporters who used only organization spokespersons as sources were not so critical of the authenticity of research. However, other researchers have reported that science sources, especially university scientists, suffer from a “credibility gap” with the public, perhaps influencing reporters’ and editors’ willingness to use them in stories (Marquart, O’Keefe, & Gunther, 1995). Additionally, work by Day (2003) suggested that the use of news releases, one form of information subsidy, of “nomenclatures popular with educators may reduce prospects for media exposure” (p. 7), while expanded use of more common keywords might facilitate the releases’ access via computer search engines. Nisbet, Brossard, and Kreopsh (2003) found that most stories in the biotech arena are source-generated, that is, the result of information subsidies, rather than unearthed by reporters. Interestingly, Rost, Savonen, and Duncan (1993) found that agriculture public information officers or public relations practitioners routinely manufacture non-verbatim quotes for including in information subsidies, which they then submit to a source for approval, a direct contrast to mainstream journalists’ practice of using verbatim quotes acquired directly from sources in interviews. On the other hand, information subsidies in the form of such news releases may represent an important source for journalists covering agricultural topics in light of research

indicating that agricultural news releases are used extensively and may even be run verbatim, especially by smaller outlets (Kelley, 2000; Melgares, Rutherford, & Alexander, 2003; Skillman & Miller, 2003). In addition, university agricultural communications information officers may be better assured of getting their institution's viewpoints and experts out to media by broadening their communication plans to include (a) training for faculty to interact with media and (b) facilitating forums via which the public and journalists can meet to receive information and to discuss agricultural issues of concern, for example, food safety (Thomson, Abel, & Maretzki, 2001).

But in order to interpret for the public information received from expert sources, science specialty-beat reporters also may need to provide more analysis about the relevance and implications of scientific research (Long, 1995; Steinke, 1995). Such additional information and expanded explication no doubt depend on a reporter's science training. The idea of special training for science specialty-beat reporters is supported (a) by research indicating that coursework in the sciences "provides the background needed to decode and define scientific terminology, even outside of one's area of specialization," increasing scientific literacy (Grantham & Irani, 2004, p. 48) and (b) by Vestal and Briers' (1999) findings that although metropolitan news journalists responding to their survey expressed "greatest faith in 'university scientists' as sources" (p. 22), that faith was coupled with relatively low knowledge levels about agricultural topics such as biotechnology. Reporters educated about agriculture through formal coursework or media workshops were found to be more objective in their coverage of

controversial stories (Sitton, Terry, Cartmell, & Keys, 2004) and might be expected to choose and to use sources differently.

Impact of newspaper characteristics on newspaper coverage and reporter source choice

In addition to attributes of sources, reporters, and information subsidies, newspapers' circulation sizes and locations, for example, geographic placement or being in urban or rural areas, may also affect coverage and source choice (Martin, 1988). Morton and Ramsey (1994) found that small circulation newspapers were more likely to use news releases from the *PR News Wire*. Griffin and Dunwoody (1995, 1997) and Hindman (1996) suggested that newspapers in larger, more pluralistic communities tend to give greater coverage to controversial science topics such as environmental contamination, further suggesting that involvement of an area in some way — for example, local economic dependence on the covered industry — with controversial subject matter may affect coverage. And even those daily newspapers in small but demographically and economically heterogeneous communities might be expected to favor local government and industry when reporting environmental conflict (Taylor, Lee, & Davie, 2000). However, changes occurring in the social structures of smaller media markets may be making them more like their bigger counterparts when it comes to patterns of source quotation on controversial issues (Harry, 2001). Accordingly, amount and nature of coverage of the 2003 BSE event may have varied with newspaper location and circulation size.

Bendix and Leibler's (1999) study of coverage of the spotted-owl conflict in the Pacific Northwest indicated differences in number, length, and sources used, based on newspaper location, including physical distance, social distance, and place characteristics. These authors wrote that readers relying on their own particular local newspaper may receive different viewpoints of a controversy depending on where they live.

Only 20 % of U.S. dailies are independent, reflecting an increasing trend toward concentration of ownership (Aronoff, Ward, & Kenyon, 2004), with decreases in the numbers of cities with competing dailies and increases in both "the number of chain-owned papers and [in the] size of chains" (Busterna, 1988). However, the chains themselves are largely family owned or controlled (Aronoff, Ward, & Kenyon, 2004). Lacy and Blanchard (2003) found that more and more newspapers are controlled by outside companies, but they summarize recent studies as indicating little difference in performance among newspapers regardless of ownership. Few dailies are minority owned, and few efforts are being made by generators of agricultural news subsidies to reach the minority-owned media that do exist, with obvious implications for reaching minority populations with information about agricultural issues (Cano & Bankston, 1992; Benedict, 1997).

The type of ownership a newspaper has may affect its editorial direction (Donohue, Olien, & Tichenor, 1985), most likely through its staffing decisions; newspaper owners can decide who gets hired, who gets fired, and who covers what story. Blankenburg (1982) found indications that chain ownership of a newspaper might

be related to efforts to contain cost through eliminating subscribers in distant or inner-city areas, noting “circulation policy is a form of editorial policy, and withheld circulation is akin to suppressed information” (p. 398). However, Miljan and Howorun (2003) sampled news coverage in Canada and found that, even though 95% of Canada’s newspapers are owned by chains, differences existed in coverage within the chains themselves, somewhat easing concerns that chain ownership homogenizes coverage.

Another concern, however, is whether newspaper ownership may impact coverage of issues that constitute a conflict of interest for the owners. Gilens and Hertzman (2000) found a substantial difference in how newspapers reported on the 1996 Telecommunications Act, depending on the financial interests of their corporate owners. In these cases, frequency of coverage did not vary, but content did. George (2001) found effects of ownership concentration on product position, product variety, and readership in markets with daily papers; however, she thought that these effects might actually benefit readers through introducing new content, eliminating duplication, and encouraging diversity.

According to the editorial vigor theory, “newspapers become less vigorous editorially as they acquire the characteristics of a corporate form of organization,” putting less emphasis on product quality and more on profits (Demers, 1998, p. 572). However, Demers found that, although corporate newspapers are more hierarchical and formalistic, they based employment on technical qualifications and exhibited a high degree of efficiency in decision making. He found that more social criticism of mainstream sources was exhibited by newspapers that were located in large pluralistic

communities and that had a corporate form of organization. In the Demers study, reporters at corporate papers were more likely to “emphasize active, interpretive, investigative, and crucial roles for the news media” (p. 574).

Maguire (2003) found that investment in newspapers by major Wall Street investors did cause greater emphasis on financial performance, but he also found that most such investors take a long-term view of these papers’ performance, not jumping in and out of their share ownership. However, he cautioned against regarding that long-view as necessarily good, since institutional investors also may want a say in how the paper is run and may be unwilling to subordinate financial objectives to journalistic ones.

Perhaps more important than ownership is the extent to which rural areas and smaller municipalities are served by newspapers, since the number of newspapers in small markets has decreased substantially from 1972 to 1998:

The marketplace of ideas in small media markets is an important commodity that demands careful scrutiny when considering the policies related to the structure of local media. Daily newspapers, television stations, and radio stations play a crucial role in the marketplace of ideas. (Chambers, 2003, p. 57)

Research questions and hypotheses

Issue proponents seek to tell their sides of a story through setting the public’s news agenda and/or framing the event in context of their worldviews; such influence may be achieved through sweeping reporters along in a news wave of widespread coverage or through influencing coverage of the story by prestigious news outlets, and both influences can be seen most readily in the types of sources used by reporters

covering this story. In addition to such influences, source-choice varies according to reporters' and editors' individual backgrounds, but more important, depending on the organization and circulations of their respective newspapers and on their roles within those papers' newsrooms. In particular, science specialty-beat reporters, because of their education and training and their specialized roles within their profession, use particular sources and interact predictably with those sources in ways different from interactions of unspecialized reporters covering the same story. Science-specialty-beat reporters may use the same experts continually, developing close affinity and identification with their sources, and their reliance on the information subsidies such sources provide may be different from that of general assignment reporters.

Although the research consensus is that such factors — news wave, reporter/editor individual characteristics, newsroom organization, newsworker routines, use of information subsidies, newspapers' circulation — may impact reporters' source choices, few guideposts exist by which to gauge the relative importance of the influence of these different factors on selection of sources. Further, most source-choice research has focused on coverage of political or crime news or on reporter/editor gender, ethnicity, or work routines. No published studies were found applying agenda-setting or framing theory to explanations of source-choice in coverage of agricultural breaking news, nor were any found showing how reporter, editor, newsroom, or newspaper characteristics impact such coverage. Thus, the current study will seek to investigate to what extent reporters' designation as science specialty-beat reporters, combined with

their newspapers' location and circulation, influenced their use of experts in their coverage of the December 2003 BSE event in the United States.

The study sought to answer the following general research questions:

Research Question 1 (RQ1): Did story length and the number and variety of sources used in stories about the December 2003 BSE event vary according to newspaper location, circulation size and/or type of ownership?

Research Question 2 (RQ2): Did reporters' backgrounds as indicated by beat assignments affect the length and sourcing of stories about the December 2003 BSE event?

and then to generate data in support of the following hypotheses:

Hypothesis 1 (H_{01}): The mean length in words of stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean length of such stories written by reporters with other beat assignments.

Hypothesis 2 (H_{02}): The mean number of sources used in stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean number of sources used in stories written by reporters with other beat assignments.

Hypothesis 3 (H_{03}): The mean variety of types of sources used in stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean variety of types of sources used in stories written by reporters with other beat assignments.

CHAPTER III

METHODS

To answer this study's research questions about source use in U.S. newspaper coverage of the December 2003 BSE event, a quantitative content analysis was conducted of 62 stories from a stratified sample of 190 U.S. newspapers selected from the LexisNexis database by a keyword search for the period December 23, 2003 through October 31, 2004.

Purpose

This study examined source choices for the December 2003 BSE event in the context of agricultural journalism, seeking to discover the sources reporters use when covering breaking agricultural news, the impact of reporter specialization on their source choice for agricultural news stories, and the impact of newspaper differences, including location, circulation, and ownership, on coverage of such issues.

It is generally accepted that opinion leaders help define those issues about which the public should think (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail, 1994) and that the media helps communicate such agenda salience. Reporters' selection of sources plays an important part in agenda setting because story sources can drive issue discussion in particular directions. Framing, on the other hand, helps guide the public as to *how* it should think about a particular issue. Framing provides context for opinion formation and discussion (DeFleur & Ball-Rokeach, 1989; McQuail, 1994). Frames developed by reporters help to construct schema to help the public place issues into understood and shared contexts. Reporters themselves are susceptible to agenda

setting and framing of issues by the coverage of such stories by media they regard as particularly prestigious and credible (Breed, 1955; Dunwoody, 1979; Havick, 1997; Ten Eyck, 2000).

A story frame is built around a reporter's concept of newsworthiness, comprising such factors as conflict and proximity, as well as that reporter's sense of the story's contextual salience. Agenda-setting and the news waves of arterial effects (Breed, 1955) it generates may mean reporters are forced to adopt others' frames via consulting the same or similar sources. While this dissertation does not explore news selection variables and their relationship to framing and agenda-setting per se, it does use those theoretical ideas to help select variables that should be studied.

Objectives

This study sought to determine the effects of reporter work-role specialization and of newspaper location, circulation, and ownership on coverage of breaking agricultural news and, to the extent possible based on the data used, to quantify those effects.

Coverage of the December 2003 BSE event in the United States was selected for examination because this event was timely, newsworthy, significant to the public, and agriculturally relevant, and required reporters to explain complex, science-intensive information. Answers were sought as to whether newspaper location, circulation size, and/or ownership, and reporter beat assignments affected the length of stories about the event and the number and variety of sources used in such stories.

In addition, with regard to coverage of this event, it was hypothesized that means for lengths, numbers of sources, and source variety for stories written by science specialty-beat reporters are equal to such means for stories written by reporters with other beat assignments. Data were analyzed using SPSS 12.0 in an attempt to list these hypotheses.

The objective of this research was to describe the role and process of sourcing in news stories, as defined by agenda-setting and framing theories and as applied specifically to agricultural breaking news.

Study design

To answer the study's research questions about source use in U.S. newspaper coverage of the December 2003 BSE event, a quantitative content analysis of stories in selected major U.S. newspapers was conducted: "Content analysis has been defined as a systematic, replicable technique for compressing many words of text into few content categories based on explicit rules of coding" (Stemler, 2001, p. 1). Quantitative content analysis is non-intrusive, uses the scientific method characterized by *a priori* design, reliability, validity, generalizability, replicability, hypothesis testing, and is a powerful data reduction technique (Dyer, 1996; Macnamara, 2003; Stemler, 2001).

Results of content analyses have been used to guide planning for crisis communication (Dyer, Miller, & Boone, 1991). However, Lavie and Lehman-Wilzig (2005) caution against exclusive reliance on quantitative content analysis in analyzing complex newsroom issues, since content analysis does not reflect the specific complex news-decision-making processes that take place between newswriters nor the general

organizational influences that may impact such decisions. In addition, content analysis cannot by its very nature address issues of audience impact, thus limiting framing constructs based on such analysis (Bartlett, Sterne, & Egger, 2002), nor can it highlight audience characteristics that may be important for understanding media effects (Heinrichs & Peters, 2004).

Definition of terms

Unless otherwise noted, definitions of terms used in this study are those commonly accepted in the journalism profession. The following definitions are used in this study:

Agenda-setting refers to a theory of limited media effects stating that coverage of issues by the media helps define for the public the issues it should think about (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail, 1994).

ANOVA refers to analysis of variance, a statistical technique used to compare means of several populations while avoiding the reducing the rate of error in performing such analysis. ANOVA can be used to analyze situations where there are several independent variables, telling us “how these independent variables interact with each other and what effects there interactions have on the dependent variable” (Field, 2000, p. 243).

Breaking agricultural news refers to current events, regarded by journalists as newsworthy, which have their roots in some facet of agriculture, although their immediate newsworthiness may be derived from other areas of concern, for example, their economic or public health impacts.

BSE refers to bovine spongiform encephalopathy, also known as *mad cow disease*, a brain-wasting disease of cattle believed to be caused by prions and to be transmissible to humans through infected tissue.

Framing refers to a theory of limited media effects stating that the way in which media cover an issue, for example, by placing it in context or using particular terminology, helps define for the public the way it should think about that issue (DeFleur & Ball-Rokeach, 1989; McQuail, 1994).

Gatekeeper refers to the role played by newswriters such as editors in determining what stories are written by reporters and published by media outlets. The editor serves as a gate through which only certain stories will be allowed to pass (Gandy, 1982).

Journalist refers to any person employed in the news media; *newswriter* may be regarded as synonymous with journalist.

Masthead refers to a listing printed in all issues of a newspaper or magazine, usually on the editorial page, that gives the name of the publication and the names of the editorial staff.

Media refers to the various outlets for communication of news to the public, including, but not limited to, newspapers, magazines, television, radio, and the Internet.

News wave refers to a phenomenon that occurs when smaller media outlets elect to cover issues already having been covered by larger, more prestigious media outlets, usually as a result of the attention paid to the issue by those more influential

publications, stations, or Web sites (Breed, 1955; Dunwwody, 1979; Havick, 1997, Ten Eyck, 2000).

Pitching refers to the process in which public relations (PR) practitioners contact reporters to try to persuade them to write stories about particular issues important to the PR practitioners' employers.

Reporter is a designation limited to a staff member of a newspaper whose job is to investigate issues, seek out relevant sources, and write stories thought to be newsworthy for that newspaper's audience.

Source is a person or institution from which reporters derive story information and may be identified by name or position or by category (Gandy, 1982).

Science specialty-beat reporter is defined as a reporter identified by byline, masthead or media directory (Bacon's, 2004) as a science reporter/writer or as another type of reporter or writer particularly concerned with agriculture or fields related to agriculture or science, for example, medicine, health, biotechnology, food, environment, conservation. Reporters who carry any other sorts of designations will be classed as *non-science specialty-beat reporters*.

Story characteristics refers to story attributes of length, number of sources, and source variety.

Population of interest

The newspapers selected for analysis are those represented in a census of stories on BSE from LexisNexis for the period December 2003 (when the event occurred) through October 2004. A search of the LexisNexis database was conducted on August

22, 2005, using the search terms “General News,” “Major Papers,” “mad cow” AND “production” AND “agriculture.” This search yielded 296 stories, 190 of them from U.S. newspapers, the rest from newspapers in Canada, the United Kingdom, Australia, New Zealand, and Japan and other Asian countries.

Because of potential differences in newsroom organization, policies, and practices and in national politics and culture, it was decided to include only newspapers from the United States in this study’s analysis. Temporally, the U.S. stories from the search were distributed as shown in Figure 1.

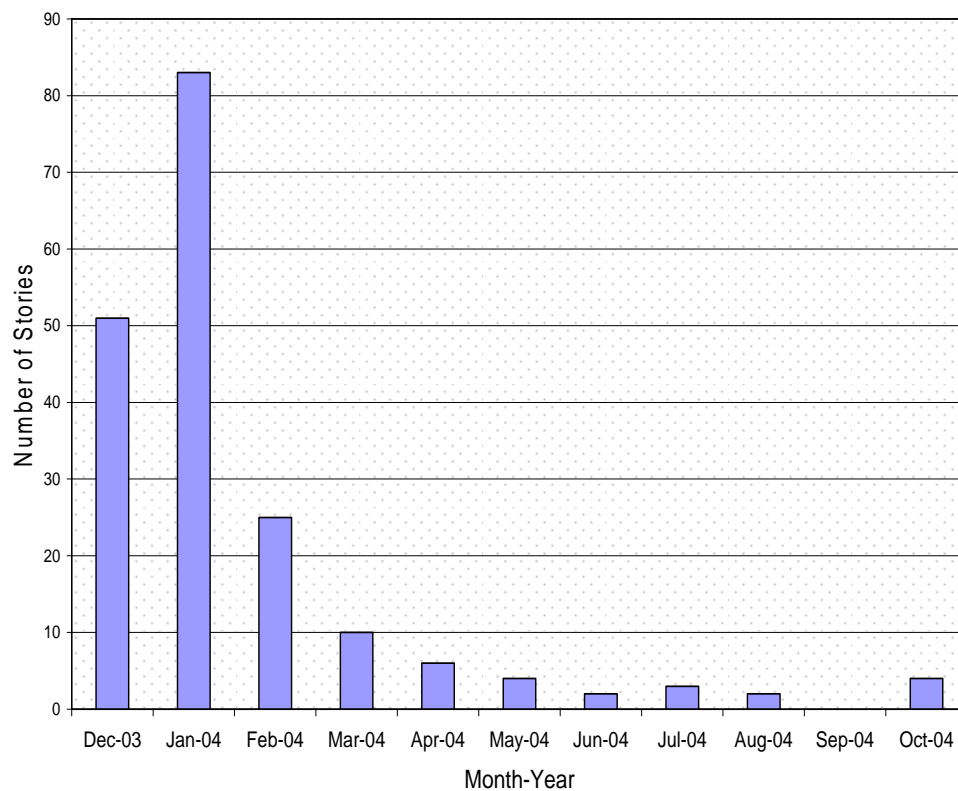


Figure 1. Stories per month about BSE appearing on Lexis/Nexis from 12/2003 through 10/2004

This distribution helped to determine the study timeframe, as stories peaked in the three months after the December 2003 BSE event, then dwindled to almost nothing by October 2004, immediately before the second U.S. BSE event.

The newspapers in the population were grouped by the geographic regions where they were headquartered (Whitney, Fritzier, Jones, Mazzarella, & Rakow, 1989). The stories from this search represented U.S. newspapers as shown in Table 1.

Table 1. *Geographic Distribution of Newspapers in Population, Based upon Regions of the United States as Defined by the Associated Press (Goldstein, 2005) and as Named in Bacon's Media Directory (Bacon's, 2004)*

| Region of United States | Newspaper | Circulation |
|-------------------------|--|-------------|
| New England | <i>The Boston Globe</i> [Massachusetts] | 448,817 |
| Middle Atlantic | <i>The Buffalo News</i> [New York] | 218,385 |
| East North Central | <i>Chicago Sun-Times</i> | 492,156 |
| | <i>The Plain Dealer</i> [Cleveland] | 373,137 |
| | <i>The Columbus Dispatch</i> [Ohio] | 261,566 |
| | <i>The Pittsburg Post-Gazette</i> [Pennsylvania] | 248,176 |
| West North Central | <i>Milwaukee Journal-Sentinel</i> | 257,599 |
| | <i>Omaha World Herald</i> [Nebraska] | 200,238 |
| | <i>St. Louis Post Dispatch</i> [Missouri] | 286,939 |
| | <i>StarTribune</i> [Minnesota] | 375,504 |
| South Atlantic | <i>The Atlanta Journal-Constitution</i> | 410,761 |
| | <i>St. Petersburg Times</i> [Florida] | 354,869 |
| West South Central | <i>San Antonio News-Express</i> | 239,912 |
| | <i>Houston Chronicle</i> | 548,508 |
| | <i>The Times-Picayune</i> [New Orleans] | 260,720 |
| Mountain | <i>Denver Post</i> | 301,108 |
| | <i>Rocky Mountain News</i> [Denver] | 301,005 |
| Pacific | <i>The Oregonian</i> [Portland] | 344,550 |
| | <i>The Sacramento Bee</i> [California] | 302,804 |
| | <i>The San Diego Union-Tribune</i> [California] | 346,387 |
| | <i>San Francisco Chronicle</i> | 514,265 |
| | <i>The Seattle Times</i> [Washington] | 239,470 |

Table 1. Continued

| Region of United States | Newspaper | Circulation |
|----------------------------|--------------------------------------|-------------|
| National | <i>The Christian Science Monitor</i> | 80,191 |
| | <i>The New York Times</i> | 1,130,740 |
| | <i>USA Today</i> | 2,250,474 |
| | <i>The Washington Post</i> | 796,367 |

Of the newspapers listed, only the *Christian Science Monitor*, the *New York Times*, *USA Today*, and *The Washington Post* can be considered “national papers”; the rest “are regional papers with regional influence” (B. Steffens, Executive Director, National Newspaper Association, personal communication, March 7, 2005).

Sample

Initially, 30 stories were selected at random from the dataset extracted from the LexisNexis database to provide a number sufficient for statistical analysis (Field, 2000; Ott & Longnecker, 2001). However, preliminary analysis revealed that only 5 of these 30 stories had been written by science specialty-beat reporters, an insufficient number to permit meaningful analysis (Ary, Jacobs, & Razavieh, 2002; Ott & Longnecker, 2001). Further inspection of the population showed that 31 articles (16%) had been written by science-specialty-beat reporters.

A census of the 31 articles written by science-specialty-beat reporters was then taken as a sample to be compared with a random sample of 31 of the remaining 159 articles, all written by non-science specialty-beat reporters. This method yielded a

sample of 62 stories stratified into two equal groups along the lines of reporter job-role identity as indicated by reporter by-line or masthead (Bacon's, 2004), according to the principles set out by Ary, Jacobs, and Razavieh (2002):

When the population consists of a number of subgroups, or strata, that may differ in the characteristics being studied, it is often desirable to use a form of probability sampling called stratified sampling ... In stratified sampling, you first identify the strata of interest and then randomly draw a specified number of subjects from each stratum ... An advantage of stratified sampling is that it enables the researcher to study the differences that might exist between various subgroups of a population ... When the population to be sampled is not homogeneous but consists of several subgroups, stratified sampling may give a more representative sample than simple random sampling ... The major advantage of stratified sampling is that it guarantees representation of defined groups in the population. (p. 167)

Use of inferential statistics with other than strictly random samples is supported by such educational research methodologists as Oliver and Hinkle (1982) and Hinkle, Wiersma, & Jurs (1979). Oliver and Hinkle noted that a “researcher must decide which statistical procedure is appropriate for use in the study to be conducted” (p. 199) and went on to write that in certain circumstances, census data may permit the use of inferential statistics if the individuals making up the population census constitute a representative sample of similar individuals over time – so-called “time and place” samples. Their example states that when data is “available for all the students in a community college during a given year,” inferential statistics may be used to examine such data if it can be assumed that “the students in a given year are a representative sample of all the students who [may] enroll in the community college over time” (p. 200).

The twin principles of stratified sampling (on the basis of reporter work-role identity) and application of inferential statistics to census data have been employed in this study. After stratification according to reporter work-role identity, the census of all science specialty-beat reporters in the population represents a time and place sample. These reporters all were employed by identifiable news outlets during the period December 23, 2003 to November 1, 2004, the time the first U.S. BSE event occurred. Therefore, they may reasonably be assumed to have had the same access to information and sources about the event as did every other reporter during that year. Additionally, this population itself was defined by a particular place, that is, locations in the United States of newspapers employing reporters that wrote stories about this particular BSE event, stories included in the LexisNexis from which both the census and the sample were drawn. This study's methodology is based on the assumption that the census of articles written by science specialty-beat reporters about the first U.S. BSE event and included in the LexisNexis database represents a strata of all stories about this event included in this database and may be compared to a random sample of all other such stories included in this database and written by reporters with other types of work-role identities.

Further support for assumption of relative homogeneity among these science specialty-beat reporters is found in the literature. Dunwoody (1979) reported that organizational constraints, such as position in the newsroom, was the major factor determining newsgathering behaviors of 24 reporters studied. A later study of specialty reporters covering the statehouse beat (Dunwoody & Shields, 1984) found that such

reporters, regardless of their backgrounds, used the same sources and structured coverage to gain the approval of their peers, evidence of the phenomenon Havick (1997) later called the news wave. These behaviors were further documented by Dunwoody (1980), who found that reporters covering science conferences felt themselves to constitute an elite club. Shoemaker and Reese (1991) suggested that newspaper reporters' coverage of science conforms to craft norms that may be assumed to homogenize such coverage. Weigold (2001) emphasized the distinct backgrounds of most science reporters, noting that they "tend to be better educated in science" and to hold "somewhat different news values than regular reporters" (p. 170).

Extrapolation of the findings from this study should be to stories written about other similar agricultural crises, based upon the assumption that the science specialty-beat reporters represented in this census share certain common characteristics as well as common work-role identities and constitute a time and place sample of the science specialty-beat reporters, working for papers included in the LexisNexis database, who might author such future stories, as does the random sample of non-science specialty-beat reporters described here (Birkenholz & Johnson, 1990; Glass, Peckham, & Sanders, 1972; Oliver & Hinkle, 1982). Because the census of all stories written by science specialty-beat writers was used, a constructed week was not employed; rather, all stories were kept in the census or randomly sampled regardless of the day of the week on which they were published.

Data analysis

Each story was reviewed and coded by two trained coders, according to a codebook based initially on the variables of interest and refined through four iterations of coder training. Initial coder training was conducted using content analysis of 10 randomly selected stories from the dataset; these stories were eliminated from the dataset before selection of the stories that form the basis of this study, except for any stories written by science specialty-beat reporters, which were kept in the census of such stories and recoded for later analysis. During coder training, additional coverage themes were identified for use in analysis of the dataset, and coders were instructed in accurate recognition of all themes/content-analysis categories (Holsti, 1969; Riffe, Lacy, & Fico, 1998).

Holsti's coefficient was calculated by dividing the total number of occurrences or agreed-on values for each variable into the sum of the responses of each coder for the same variable (Holsti, 1969). Coefficients for initial coding of actual sample data are reported in Table 2. For all but three variables, a high degree of reliability ($> .80$) was achieved. For variables initially yielding coefficients less than $.80$, coding variations were identified and addressed, and all differences were resolved by achieving coder agreement on definitions, then recoding data. Thus, acceptable intercoder reliability was achieved, as indicated by the majority of Holsti's coefficient greater than $.80$ and by intercoder correlation coefficients significant at the $p < .05$ for each pair of variables (Field, 2000).

Table 2. *Holsti's coefficient*

| Variable | Holsti's Coefficient |
|----------------------------------|----------------------|
| Story length | 1.00 |
| Newspaper location | 1.00 |
| Newspaper circulation | 1.00 |
| Newspaper ownership | 1.00 |
| Number of sources | 0.91 |
| Reporter work-role identity | 1.00 |
| Government representative | 0.88 |
| Government scientist | 1.00 |
| Business representative | 0.91 |
| Business scientist | 0.50 |
| Agricultural producer | 1.00 |
| University representative | 0.88 |
| University ag scientist | 1.00 |
| University scientist | 0.75 |
| Extension scientist | 1.00 |
| Extension representative | 0.88 |
| Trade association representative | 0.88 |
| Consumer association rep | 0.88 |
| Media | 0.94 |
| General public | 0.50 |
| Undefined/anonymous | 0.96 |
| Total # of scientists | 0.88 |
| Total # of ag scientists | 1.00 |

Certain variables were unambiguous. For example, each story was labeled on its face according to its length (interval level data) and its newspaper of origin (nominal). Whether the reporter of each story was a science specialty-beat reporter (nominal) could be ascertained either by a byline containing the reporter's work-role identity (job title) as printed on the story or by consulting *Bacon's Newspaper Directory* (2004). Newspaper circulation (interval) and identity of its owners (nominal) also were determined from its listing in Bacon's. Newspapers were classified into location by region (nominal) using the groupings in *The Associated Press Stylebook and Briefing on Media Law* (Goldstein,

2005). The number of sources (interval) included in each story was determined by counting each unique source only once.

Arbitrary categories were created for circulation level (ordinal); newspapers were classified as having 300,000 or fewer subscribers (6 newspapers in sample), as having more than 300,000 but fewer than 500,000 subscribers (7 newspapers), or as having more than 500,000 subscribers (5). Similarly, newspapers in the population were classified as being owned by a chain (12 newspapers in the sample), by an individual, family, or independent corporation (5), by an academic organization (Poynter Institute), or by a religious organization (*Christian Science Monitor*, no stories in sample).

Finally, 15 dichotomous nominal variables (present vs. not present) were established for classifying sources into types, based on extrapolation from the literature (Albaek, Christiansen, & Togeby, 2003; Armstrong, 2004; Bruening, Radhakrishna, & Rollings, 1992; Ericson, Baranek, & Chan, 1993; ; Ramsey, 1999; Salwen, 1995; Stempel & Culbertson, 1984; Stringer, 1999; Sumpter & Braddock, 2002; Sumpter & Lukaszewski, 2001; Telg & Raulerson, 1999; Whitney, Fritzler, Jones, Mazzarella, & Rakow, 1989; Zoch & Turk, 1998). Dichotomous measurement of independent variables has found to have little serious effect on the probability statements underlying parametric procedures of inferential statistics, that is, common inferential statistical procedures, for example, ANOVA, may be used on such data (Hinkel, Wiersma, & Jurs, 1979; Glass, Peckham, & Sanders, 1972).

Categories for this study comprised government representatives, government scientists, business representatives, business scientists, agricultural producers (farmers

and ranchers), university representatives, university agricultural scientists, all other university scientists, Extension representatives, Extension scientists, trade association representatives, consumer group representatives, media, consumers (general public), and undefined. Each named individual used as a source was placed into the appropriate category based on his or her institutional/organizational affiliation as identified in the story being coded. For example, Secretary of Agriculture Ann Venneman was placed in the government representative category, and the named owner of a meat market was placed in the business representative category. The decision was made to classify veterinarians as scientists rather than merely as representatives of their particular employing organizations, in order to capture their particular expertise for inclusion in the “scientist” category.

An undefined category was included because many sources were unnamed (Beall & Hayes, 1992). This category was applied to all organizations for which no individual representative was named, for example, USDA or Extension, and to all generic sources, such as industry experts, consumers, and similarly cited sources. Such a category varies from those used by some other studies, which entirely excluded “collective anonymous sources like ‘voters’ or ‘government officials’” (Sumpter & Braddock, 2002, p. 543). An exception was made for media outlets for which no individual representative was named; all citations of media outlets were coded as media rather than as undefined because it was deemed desirable to track all sourcing of other newspapers, books, Web sites, etc.

Three additional interval variables were calculated from those that had been coded. All scientist categories — business scientists, university scientists, university agricultural scientists, Extension scientists — were summed to yield the variable “total scientists,” and all agricultural scientist variables — university agricultural scientists and Extension scientists — were summed to yield the variable “total agricultural scientists.” Finally, all 15 original source categories were summed to yield the variable “source variety.”

All coded data were analyzed using SPSS 12.0. Depending on the levels of measurement for the particular variables being analyzed, the following statistical procedures and tools were employed: comparison of means using one-way ANOVA; bivariate correlation using Spearman rho; and forced-entry linear regression.

At the simplest level, means of the same variable from each of the two reporter groups — science specialty-beat vs. non-science-specialty beat — were compared to determine existence of any statistically significant differences (Field, 2000). Both reporter groups were analyzed simultaneously using the one-way ANOVA procedure.

Although not sufficient to demonstrate direct causation, bivariate correlation can be used to show the existence of a relationship between two variables (Ary, Jacobs, & Razavieh, 2002; Ott & Longnecker, 2001). Bivariate correlation indicates co-variation between two variables, the predictability of one variable given the other. The correlation coefficient between -1 and +1 indicates both the direction and magnitude of any such relationship:

A coefficient of +1 indicates that the two variables are perfectly positively correlated, so as one variable increases, the other

increases by a proportionate amount. Conversely, a coefficient of -1 indicates a perfect negative relationship: if one variable increases the other decreases by a proportionate amount. A coefficient of zero indicates no linear relationship at all and so if one variable changes the other stays the same. (Field, 2000, p. 75)

Spearman rho is the test of statistical significance that must be used if data under analysis are nonparametric, that is, if they have been measured at any level other than interval, as is the case with most of the variables of interest in this study (Field, 2000).

The statistical method of regression may be used to derive a predictive model that best fits the relationship among data under analysis (Field, 2000; Ott & Longnecker, 2001). Regression indicates the linearity of the relationship between two variables, that is, if the two are plotted on an x/y coordinate plane and the resulting points are connected, the degree to which the resulting figure approximates a straight line.

Regression analysis yields coefficients that may be placed into the algebraic equation for the straight line that best fits the distribution of data. This technique has both descriptive and inferential uses, with simple linear regression featuring one predictor (independent) variable and multiple regression, more than one predictor. Although regression is most often used with data measured at the interval or ratio level, an attempt was made in this study to use forced entry regression (“all variables of interest are forced into the model simultaneously,” Field, 2000, p. 119) to discern whether such a predictive equation could be formed for particular variables. If a statistically significant relationship was revealed by this method, a secondary regression model was generated using only those variables which had contributed to significance in the first regression analysis.

According to Ott and Longnecker (2001), multiple regression techniques may be used to construct an equation describing the relationship between a dependent variable and several independent variables:

There is an additional assumption that is implied when we use a first-order multiple regression model. Because the expected change in y for a unit change in [every x] is constant and does not depend on the value of any other x , we are in fact assuming that the effects of the independent variables are additive. (p. 621)

Thus, in multiple regression equations, unlike in those derived from simple linear regression, indirect effects can be avoided by holding all other x s constant while changing just one independent variable (Ott & Longnecker, p. 631). In addition, the “forecasting quality of a regression model” (p. 633) can be estimated by using its residual standard deviation. However, one caveat when using multiple regression is that when independent variables covary, the extent of their collinearity determines how easily the effect of each on the dependent variable may be separated out. Ott and Longnecker further caution that

When making forecasts using multiple regression, we must consider not only whether each independent variable value is reasonable by itself, but also whether the chosen combination of predictor values is reasonable. (p. 667)

Research Question 1 was whether story length and the number and variety of sources used in stories about the December 2003 BSE event vary according to newspaper location, circulation size and/or type of ownership and was addressed by content analysis and coding of each story for story length in words and by names, numbers, and types of sources cited, then by statistical comparisons using bivariate correlation (Ary, Jacobs, & Razavieh, 2002; Field, 2000) of this information for the

different newspapers, as grouped by newspaper geographic location, circulation size, and ownership type, for example, chain or independent ownership (Bacon's, 2004). A source was identified as a person or institution from which reporters derived story information; sources for each story were coded variously as identified by name or position or as undefined. Descriptive statistics were compiled for each newspaper in the study and for the sample overall (Ott & Longnecker, 2001).

Research Question 2 was whether reporters' backgrounds as indicated by beat assignments affect the length and sourcing of stories about the December 2003 BSE event and was tested through content analysis and coding of each story as to name and work-role identity of reporter and by statistical comparisons of story length, source numbers, and particular sources used according to reporter specialization — science-specialty-beat writer/reporter vs. any other type of reporter. Reporters' work-role-identity was obtained through byline or masthead information (Bacon's, 2004) and reflected whether a story was written by a specialized reporter, such as a science reporter, or by a regular reporter, one without such a specialist designation.

Hypotheses H_{01} , H_{02} , and H_{03} were tested using one-way ANOVA to compare differences of means and using correlation and intercorrelation, which has increased power to explain variance (Ary, Jacobs, & Razavieh, 2002; Field, 2000; Ott & Longnecker, 2001). In most cases, Spearman rho was chosen as the correlation test statistic, because most variables were measured at a nominal or ordinal level (Field, 2000). Significance was determined at the $p < .05$ level (Ott & Longnecker, 2001).

A forced entry multiple regression model was used to show magnitude and direction of posited differential relationships (Field, 2000; Ott & Longnecker, 2001) among newspaper characteristics with regard to length of stories written and number and type of sources used and between reporter beat assignment — science specialty-beat reporter vs. non-science specialty-beat reporter — with regard to length of stories written and number and type of sources used. *R*-squared values were used to determine percentage of variance explained by the model, and significance was determined at the $p < .05$ levels (Ott & Longnecker, 2001).

All analysis was performed using SPSS Version 12.0.

CHAPTER IV

FINDINGS AND DISCUSSION

To answer this study's research questions about source use in U.S. newspaper coverage of the December 2003 BSE event, a quantitative content analysis was conducted of 62 stories from a stratified sample of 190 U.S. newspapers selected from the LexisNexis database by a keyword search for the period December 23, 2003 through October 31, 2004.

Using SPSS 12.0, data from these 62 stories were analyzed to determine relationships between newspaper characteristics, including location, circulation, and ownership, and story length and numbers and types of sources used; between reporter work-role identity and types of sources used; and between a matrix of all independent variables — newspaper location, newspaper circulation, newspaper ownership, and reporter work-role identity — and story length and numbers and types of sources used.

Purpose

This study examined source choices for important stories such as the December 2003 BSE event in the context of agricultural journalism, seeking to discover the sources reporters use when covering breaking agricultural news, the impact of reporter specialization on their choosing sources for agricultural news stories, and the impact of newspaper differences, including location, circulation, and ownership, on coverage of such issues.

It is generally accepted that opinion leaders help define those issues about which the public should think (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail,

1994) and that the media helps communicate such agenda salience. Reporters' selection of sources plays an important part in agenda setting because story sources can drive issue discussion in particular directions. Framing, on the other hand, helps guide the public as to *how* it should think about a particular issue. Framing provides context for opinion formation and discussion (DeFleur & Ball-Rokeach, 1989; McQuail, 1994). Frames developed by reporters help to construct schema to help the public place issues into understood and shared contexts. Reporters themselves are susceptible to agenda setting and framing of issues by the coverage of such stories by media they regard as particularly prestigious and credible (Breed, 1955; Dunwoody, 1979; Havick, 1997; Ten Eyck, 2000).

A story frame is built around a reporter's concept of newsworthiness, comprising such factors as conflict and proximity, as well as that reporter's sense of the story's contextual salience. Agenda-setting and the news waves of arterial effects (Breed, 1955) it generates may mean reporters are forced to adopt others' frames via consulting the same or similar sources. While this dissertation does not explore news selection variables and their relationship to framing and agenda-setting per se, it does use those theoretical ideas to help select variables that should be studied.

Objectives

This study sought to determine the effects of reporter work-role specialization and of newspaper location, circulation, and ownership on coverage of breaking agricultural news and, to the extent possible based on the data used, to quantify those effects.

Coverage of the December 2003 BSE event in the United States was selected for examination, because this event was timely, newsworthy, significant to the public, and agriculturally relevant, and required reporters to explain complex, science-intensive information. Answers were sought as to whether newspaper location, circulation size, and/or ownership, and reporter beat assignments affected the length of stories about the event and the number and variety of sources used in such stories.

In addition, with regard to coverage of this event, it was hypothesized that means for lengths, numbers of sources, and source variety for stories written by science specialty-beat reporters are equal to such means for stories written by reporters with other beat assignments. Data were analyzed using SPSS 12.0 in an attempt to list these hypotheses.

The objective of this research was to shed light on the role and process of sourcing in news stories, as defined by agenda-setting and framing theories and as applied specifically to agricultural breaking news.

Descriptive statistics

Story length and source variety. Sixty-two stories were studied, 31 of them written by science specialty-beat reporters and 31 written by reporters who were not science specialty-beat reporters. Overall, regardless of reporter-work-role identity, stories in the sample varied in length from 220 words to 2,749 words, with a mean length of 1,086.25 words; mode could not be calculated since no two stories in the sample contained the same number of words. The number of sources used in each story varied from 1 to 18, with an average of 8.20 sources per story. Stories used between a

minimum of 1 and a maximum of 9 types of sources, with a mean source-variety score of 4.59 (total number of source types cited). With regard to use of scientists as sources, stories used from 0 to 5 scientists (mean of 1.07) and from 0 to 4 agricultural scientists (mean of .77).

The number of sources used in stories was positively correlated with both story length and source variety ($p < .05$), each of which was correlated with the other — that is, the longer the story, the more sources used and the greater the variety of sources used; the more sources, the greater the source variety, as shown in Table 3.

Similarly, the total number of scientists cited as sources and the number of agricultural scientists so used are correlated ($p < .05$), and each is correlated with both source variety and story length ($p < .05$). Again, the correlation of these two categories of scientist sources is not surprising, since agricultural scientists contribute to total scientist numbers, and both contribute to source variety (Ott & Longnecker, 2001), as shown in Table 3.

Table 3. *Intercorrelations Between Number of Sources, Story Length, Source Variety, Number of Scientist Sources, and Number of Agricultural Scientist Sources*

| | No. Sources | Story Length | Source Variety | No. Scientists | No. Ag Scientists |
|-------------------|-------------|--------------|----------------|----------------|-------------------|
| No. Sources | — | .653* | .640* | .090 | .076 |
| Story Length | .653* | — | .644* | .302* | .279* |
| Source Variety | .640* | .644* | — | .461* | .386* |
| No. Scientists | .090 | .302* | .461* | — | .849* |
| No. Ag Scientists | .076 | .279* | .386* | .849* | — |

Note. Spearman rho used as test statistic. * $p < .05$

Newspaper characteristics. As reported in Table 4, almost half of the stories in the sample (28 out of 62) were from newspapers in the Pacific West region, 12 of them from the *Oregonian* in Portland.

Table 4. *BSE Stories by Region and Newspaper with Circulation, Number of Stories, and Story Length*

| Region | # Stories | Newspaper and Circulation | # Stories and Length of Each |
|--------------------|-----------|---|--|
| New England | 0 | <i>The Boston Globe</i> [Massachusetts] | 448,817 0 – NA |
| Middle Atlantic | 1 | <i>The Buffalo News</i> [New York] | 218,385 1 – 1418 |
| East North Central | 2 | <i>Chicago Sun–Times</i> | 492,156 0 – NA |
| | | <i>The Plain Dealer</i> [Cleveland] | 373,137 0 – NA |
| | | <i>The Columbus Dispatch</i> [Ohio] | 261,566 0 – NA |
| | | <i>The Pittsburg Post-Gazette</i> [PA] | 248,176 2 – 745; 1057 |
| West North Central | 9 | <i>Milwaukee Journal–Sentinel</i> | 257,599 2 – 984; 1157 |
| | | <i>Omaha World Herald</i> [Nebraska] | 200,238 4 – 652; 969; 1138; 1508 |
| | | <i>St. Louis Post Dispatch</i> [Missouri] | 286,939 1 – 292 |
| | | <i>StarTribune</i> [Minnesota] | 375,504 2 – 448; 692 |
| South Atlantic | 3 | <i>The Atlanta Journal–Constitution</i> | 410,761 2 – 220; 1323 |
| | | <i>St. Petersburg Times</i> [Florida] | 354,869 1 – 1029 |
| West South Central | 3 | <i>San Antonio News-Express</i> | 239,912 0 – NA |
| | | <i>Houston Chronicle</i> | 548,508 3 – 533; 670; 878 |
| | | <i>The Times–Picayune</i> [New Orleans] | 260,720 0 – NA |
| Mountain | 5 | <i>Denver Post</i> | 301,108 2 – 304; 424 |
| | | <i>Rocky Mountain News</i> [Denver] | 301,005 3 – 563; 707; 2749 |
| Pacific | 28 | <i>The Oregonian</i> [Portland] | 344,550 12 – 524; 801; 956; 1207; 1306; 1337; 1408; 1514; 1519; 1708; 1769; 2433 |

Table 4. Continued

| Region | # Stories | Newspaper and Circulation | # Stories and Length of Each |
|--------------|-----------|--|--|
| | | <i>The Sacramento Bee</i> [California] | 302,804 5 – 413; 1126; 1209; 1244; |
| | | <i>The San Diego Union–Tribune</i> | 346,387 2 – 1586; 2248 |
| | | <i>San Francisco Chronicle</i> | 514,265 2 – 1154; 1548 |
| | | <i>The Seattle Times</i> [Washington] | 239,470 7 – 671; 714; 825; 907; 1006; 1094; 1638 |
| National | 11 | <i>The Christian Science Monitor</i> | 80,191 0 – NA |
| | | <i>The New York Times</i> | 1,130,740 4 – 843; 1079; 1465; 1815 |
| | | <i>USA Today</i> | 2,250,474 5 – 466; 497; 1510; 1538; 1685 |
| | | <i>The Washington Post</i> | 796,367 2 – 743; 1288 |
| | | Total | 62 |
| | | Mean | 1,086.25 |
| | | Median | 1,086.5 |
| Total | 62 | Mode | No two the same |

Newspapers with circulations greater than 300,000 but less than 500,000 accounted for nearly one-half of the stories (11 newspapers, 28 stories). Newspapers with circulations of 300,000 or less and those with circulations equal to or exceeding 500,000 accounted for almost equal numbers of stories, although twice as many papers had the smaller circulation (10 newspapers, 18 stories) as had the larger (5 newspapers, 16 stories). Table 3 provides a list of newspapers and their circulations.

Newspaper circulation was statistically significantly correlated with location, that is, the further west a paper's location, the higher its circulation ($p < .05$), although this is

perhaps to be expected (and skewed) by the fact that national newspapers, which have higher circulations by far than any other type of newspapers, were coded “9” for location as shown in Table 5. Circulation was also negatively correlated with the two ownership variables ($p < .05$) – the higher a newspaper’s circulation, the more likely it was to be part of a “chain.”

Table 5. *Intercorrelations Between Newspaper Characteristics*

| | Location | Circulation | Circulation Level | Owner | Owner Type |
|-------------------|----------|-------------|-------------------|-------|------------|
| Location | – | .555* | .587* | .056 | -.132 |
| Circulation | .555* | – | .925* | .038 | -.400* |
| Circulation Level | .587* | .339* | – | -.016 | -.498* |
| Owner | .056 | .460* | -.016 | – | .426* |
| Owner Type | -.132 | -.400* | -.498* | .426* | – |

Note. Spearman rho used as test statistic. * $p < .05$

Most stories in the sample were produced by reporters working at chain-owned newspapers (17 chained-owned newspapers, 47 stories). Six independently owned newspapers produced 14 stories, and the one newspaper owned by an academic institution produced one story.

Reporter work-role identity. Only two of the science specialty-beat reporters in the population were designed “science writer.” In fact, 14 different titles (Bacon’s, 2004) were used for the 22 science specialty-beat reporters involved in producing the stories studied as shown in Table 6.

Table 6. *Job Title (Work-Role Identity) of Science Specialty-Beat Reporters*

| Job Title | Number of Reporters |
|---------------------------------------|---------------------|
| Agribusiness reporter | 3 |
| Agribusiness writer | 1 |
| Biotechnology reporter | 2 |
| Environmental reporter | 1 |
| Environment and conservation reporter | 12 |
| Food editor | 1 |
| Food industry reporter | 4 |
| Healthcare industry reporter | 1 |
| Medical reporter | 1 |
| Medical writer | 1 |
| Medical/health reporter | 4 |
| Personal health reporter | 1 |
| Pet writer | 1 |
| Science writer | 2 |

On the other hand, most non-science specialty-beat reporters were known either as staff reporters (6) or staff writers (9) or had no title (12). Bacon's (2004) was used to verify that these untitled reporters were not science specialty-beat reporters. Three reporters were designated as business reporters, and one, as business writer.

Table 7 reports the data showing that only two non-science specialty-beat reporters produced more than one story (Jonathan Martin, *Seattle Times*, two stories, and Sue Kirchhoff, *USA Today*, two stories), but seven science specialty-beat reporters wrote or co-wrote multiple stories.

Table 7. *Science Specialty-Beat Reporters Who Wrote Multiple Stories*

| Reporter Name | Number of Stories |
|--|-------------------|
| Sandra Blakeslee (<i>Pittsburg Post-Gazette</i>) | 2 |
| Chris Clayton (<i>Omaha World Herald</i>) | 2 |
| Mark Kawar (<i>Omaha World Herald</i>) | 4 |
| Michelle Cole (<i>Oregonian</i>) | 2 |
| Andy Dworkin (<i>Oregonian</i>) | 7 |
| Richard Hill (<i>Oregonian</i>) | 3 |
| Joe Rojas-Burke (<i>Oregonian</i>) | 2 |

Stories written by non-science specialty-beat reporters averaged 1,021.484 words long; those written by science specialty-beat reporters averaged 1,172.355 words. Non-science specialty-beat reporters used a mean 8.226 sources; science specialty-beat reporters used a mean 8.355. Non-science specialty-beat reporters used a mean 4.516 types of sources in each story; science specialty-beat reporters used 4.806. Non-science specialty-beat reporters used a mean .806 scientist sources and .548 agricultural scientist sources; science specialty-beat reporters used a mean 1.355 scientists and 1.000 agricultural scientists.

Findings related to Research Question 1

Did story length and the number and variety of sources used in stories about the December 2003 BSE event vary according to newspaper location, circulation size and/or type of ownership?

As shown in Table 8, the geographic region where a newspaper is located correlated with the number of sources used per story and with story length ($p < .05$). In

other words, in this case, the farther west a newspaper, the more sources its stories used and the longer its stories were.

Table 8. *Correlations Among Newspaper Characteristics and Number of Sources, Story Length, Source Variety, Number of Scientist Sources, and Number of Agricultural Scientist Sources*

| | No. Sources | Story Length | Source Variety | No. Scientists | No. Ag Scientists |
|-------------------|-------------|--------------|----------------|----------------|-------------------|
| Location | .329* | .293* | .120 | .059 | .045 |
| Circulation | .238 | .130 | .075 | -.007 | -.017 |
| Circulation Level | .203 | .099 | .109 | .099 | .069 |
| Owner | -.182 | -.146 | -.088 | -.216 | -.172 |
| Owner Type | -.135 | -.058 | -.153 | -.331* | -.294* |

Note. Spearman rho used as test statistic. * $p < .05$

As shown in Table 8, newspaper circulation as measured in absolute number of subscribers (Bacon's, 2004) was not correlated with any of the dependent variables, although it might have been expected to correlate with the number of sources used because larger newspapers may be hypothesized to have greater reporting resources and thus the means to interview more sources (Demers, 1998; Lacy & Blanchard, 2003). Similarly, type of circulation as measured at three ordinal levels was found not to correlate with any of the other variables measured, perhaps partially due to data loss when newspapers with circulations ranging from 200,238 to 2,250,474 were compressed into three categories (Field, 2000).

Actual owner identity was not found to correlate with any of the variables measured, but ownership type as measured by four nominal variables for chain

ownership (coded as 1), independent ownership (2), ownership by an academic institution (3), and religious ownership (4) was found to be negatively correlated with the use of scientists as sources and to be negatively correlated with the use of agricultural scientists as sources ($p < .05$) — that is, chain-owned newspapers were more likely to use scientists as sources. However, although several articles were found on ownership's impact or lack of impact on news content, none of them shed any light on this particular result (Aronoff, Ward, & Kenyon, 2004; George, 2001; Griffin & Dunwoody, 1995, 1997).

The results of forced entry regression (Field, 2000; Ott & Longnecker, 2001; Wingenbach & Kahler, 1997) of all location, ownership, and circulation variables were found to be statistically significantly related only to number of sources used ($p < .05$), explaining 22.0% of the variance for number of sources used in each story, as shown in Tables 9 and 10.

Table 9. *Forced Entry Regression Analysis for Newspaper Characteristic Variables*

| Source of variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio | Sig. |
|---------------------|--------------------|----------------|-------------|---------|-------|
| Regression | 5 | 225.617 | 45.123 | 3.162 | .014* |
| Residual | 56 | 799.157 | 14.271 | | |

| Newspaper Variable | B | SE B | β | t | Sig. |
|--------------------|-----------|-------|---------|--------|------|
| Location | .272 | .299 | .128 | .912 | .366 |
| Circulation | 3.748E-06 | .000 | .511 | 2.939 | .005 |
| Circulation level | -8.28 | 1.038 | -.149 | -.978 | .428 |
| Ownership | -.290 | .112 | -.372 | -2.589 | .012 |
| Ownership type | 1.057 | 1.280 | .123 | .829 | .412 |

Note. ANOVA significant at $p < .05$

Table 10. *R Square Data — Forced Entry Regression Analysis for Newspaper Characteristic Variables*

| Forced Entry Multiple Regression Equation | Multiple R | R Square | Adjusted R Square | Standard Error |
|---|------------|----------|-------------------|----------------|
| First multiple regression model | .469 | .220 | .151 | 3.778 |

Tables 11 and 12 show the results of a secondary regression model, using newspaper circulation and newspaper ownership as the independent variables upon which the dependent variable number of sources was regressed. These two independent variables were the only statistically significant variables in the first regression equation. Results of the secondary regression model (Field, 2000; Ott & Longnecker, 2001) are statistically significant at the $p < .05$ level and explain 18.8 % of variance in the dependent variable.

Table 11. *Forced Entry Regression Analysis for Newspaper Circulation and Ownership (Secondary Model)*

| Source of variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio | Sig. |
|---------------------|--------------------|----------------|-------------|---------|------|
| Regression | 2 | 192.452 | 96.226 | 6.821 | .002 |
| Residual | 59 | 832.322 | 14.107 | | |

| Variable | B | SE B | β | t | Sig. |
|-----------------------|-----------|------|---------|--------|------|
| Newspaper circulation | 3.058E-06 | .000 | .417 | 3.410 | .001 |
| Newspaper Ownership | -.220 | .095 | -.282 | -2.311 | .024 |

Note. ANOVA significant at $p < .05$

Table 12. *R Square Data — Forced Entry Regression Analysis for Newspaper Circulation and Ownership*

| Forced Entry Multiple Regression Equation | Multiple R | R Square | Adjusted R Square | Standard Error |
|---|------------|----------|-------------------|----------------|
| Second multiple regression model | .433 | .188 | .160 | 3.756 |

Regarding Research Question 1, story length and number of sources used were found to vary with newspaper location. And selection of scientists and agricultural scientists as sources was found to be correlated with ownership type.

Findings related to Research Question 2

Did reporters' backgrounds as indicated by beat assignments affect the length and sourcing of stories about the December 2003 BSE event?

Based on one-way ANOVA, with regard to Research Question 2, stories written by science specialty-beat writers were not found to differ significantly from those written by any other types of writers, except with regard to numbers of agricultural scientists used as sources, as shown in Table 13.

Table 13. *One-Way ANOVA for Differences in Story Characteristics and Reporter Work-Role*

| Source of variation | | df | F | P |
|--------------------------------|----------------|----|-------|-------|
| Story length | Between groups | 1 | 1.306 | .258 |
| | Within groups | 60 | | |
| Number of sources | Between groups | 1 | .015 | .903 |
| | Within groups | 60 | | |
| Source variety | Between groups | 1 | .488 | .487 |
| | Within groups | 60 | | |
| Number of scientist sources | Between groups | 1 | 3.413 | .070 |
| | Within groups | 60 | | |
| Number of ag scientist sources | Between groups | 1 | 3.978 | .051* |
| | Within groups | 60 | | |

Note. * $p < .05$

As shown in Table 14, reporter work-role identity was found to be correlated with use of certain types of sources, specifically with both the numbers of scientists and the numbers of agricultural scientists used as sources in each story ($p < .05$).

Table 14. *Correlations Among Reporter Work-Role Identity and Story Characteristics*

| | Story Length | Number of Sources | Source Variety | No. Scientists | No. Ag Scientists |
|--------------|--------------|-------------------|----------------|----------------|-------------------|
| Work-Role ID | .118 | .046 | .062 | .290* | .272* |

Note. Spearman rho used as test statistic. * $p < .05$

Regarding Research Question 2, analysis of data from this sample showed that stories written by science specialty-beat reporters did not differ in length, number of sources, or source variety from stories written by non-science specialty-beat reporters, although one-way ANOVA was significant at the $p < .05$ level for differences in numbers of agricultural scientists used as sources. Reporter work-role identity was found to be correlated with the types of sources used, specifically with both the numbers of scientists and the numbers of agricultural scientists used as sources in each story, that is, science specialty-beat reporters used more scientists and agricultural scientists as sources than did other types of reporters.

Findings related to Hypothesis 1

The mean length in words of stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean length of such stories written by reporters with other beat assignments.

Based on analysis of these data, we cannot reject null hypothesis H_{01} of equal mean length of stories written by science specialty-beat reporters and those written by other types of reporters.

Analysis of the means of the two groups — science specialty-beat reporters and non-science specialty-beat reporters — using one-way ANOVA showed that the two were not statistically significantly different with regard to mean length of stories written. Moreover, using bivariate correlation, work-role identity was not found to be statistically significantly correlated with length of stories.

Similarly, forced entry regression of story length on the dichotomy of an author's being a science specialty-beat reporter or not yielded no statistically significant relationships. When all independent variables — newspaper location, newspaper circulation, newspaper circulation level, newspaper ownership, newspaper ownership type, and reporter work-role identity — were entered into the forced entry regression model, no statistically significant relationships with story length were found.

Therefore, H_{01} should be retained (Ary, Jacobs, & Razavieh, 2002) because analysis of these data offers no evidence that science specialty-beat reporters wrote longer stories than did non-science specialty-beat reporters. One-way ANOVA comparing means between the two reporter groups yields no statistically significant evidence of differences between them in mean length of stories written, and bivariate correlation shows no statistically significant relationship between work-role identity and story length. Forced entry regression analysis indicates that reporter work-role identity did not contribute to explanation of variation in story length.

Findings related to Hypothesis 2

The mean number of sources used in stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean number of sources used in stories written by reporters with other beat assignments.

Based on analysis of these data, we cannot reject null hypothesis H_{02} of an equal mean number of sources used between stories written by science specialty-beat reporters and those written by other types of reporters.

Analysis using one-way ANOVA revealed that the means of the two groups were not statistically significantly different with regard to number of sources included in stories. Moreover, work-role identity was not found to be correlated with number of sources used in each story. Similarly, forced entry regression of number of sources used per story on reporter work-role identity yielded no statistically significant relationships. However, forced entry regression of number of sources on all independent variables — newspaper location, newspaper circulation, newspaper circulation level, newspaper ownership, newspaper ownership type, reporter work-role identity — yielded a statistically significant result ($p < .05$), explaining 22.5% of the variation in number of sources used, as reported in Tables 15 and 16.

Table 15. *Forced Entry Regression Analysis for Newspaper Characteristics and Reporter Work-Role Identity*

| Source of variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio | Sig. |
|---------------------|--------------------|----------------|-------------|---------|-------|
| Regression | 6 | 230.442 | 38.407 | 2.659 | .024* |
| Residual | 55 | 794.332 | 14.442 | | |

| Variable | B | SE B | β | t | Sig. |
|-----------------------------|-----------|-------|---------|--------|------|
| Newspaper location | .271 | .301 | .127 | .902 | .371 |
| Newspaper circulation | 3.839E-06 | .000 | .523 | 2.970 | .004 |
| Newspaper circulation level | -.945 | 1.064 | -.170 | -.889 | .378 |
| Newspaper Ownership | -.310 | .118 | -.397 | -2.632 | .011 |
| Newspaper Ownership Type | .857 | 1.333 | .100 | .643 | .523 |
| Reporter Identity | -.634 | 1.096 | -.078 | -.578 | .566 |

Table 16. *R Square Data — Forced Entry Regression Analysis for Newspaper Characteristics and Reporter Work-Role Identity*

| Forced Entry Multiple Regression Equation | Multiple R | R Square | Adjusted R Square | Standard Error |
|---|------------|----------|-------------------|----------------|
| First multiple regression model | .474 | .225 | .140 | 3.800 |

Tables 17 and 18 show the results of a secondary regression model (Field, 2000; Ott & Longnecker, 2001), using newspaper circulation and newspaper ownership as the independent variables upon which the dependent variable number of sources was regressed. These two independent variables were the only statistically significant variables in the first regression equation pertaining to number of sources used. Results of the secondary regression model are statistically significant at the $p < .05$ level and explain 18.8% of variance in the dependent variable.

Table 17. *Forced Entry Regression Analysis for Newspaper Circulation and Ownership (Secondary Model)*

| Source of variation | Degrees of Freedom | Sum of Squares | Mean Square | F Ratio | Sig. |
|---------------------|--------------------|----------------|-------------|---------|------|
| Regression | 2 | 192.452 | 96.226 | 6.821 | .002 |
| Residual | 59 | 832.322 | 14.107 | | |

| Variable | B | SE B | β | t | Sig. |
|-----------------------|-----------|------|---------|--------|------|
| Newspaper circulation | 3.058E-06 | .000 | .417 | 3.410 | .001 |
| Newspaper Ownership | -.220 | .095 | -.282 | -2.311 | .024 |

Note. ANOVA significant at $p < .05$

Table 18. *R Square Data — Forced Entry Regression Analysis for Newspaper Circulation and Ownership*

| Forced Entry Multiple Regression Equation | Multiple R | R Square | Adjusted R Square | Standard Error |
|---|------------|----------|-------------------|----------------|
| Second multiple regression model | .433 | .188 | .160 | 3.756 |

Thus, H_{02} should be retained (Ary, Jacobs, & Razavieh, 2002) because analysis of these data based on differences in work-role identity offers no evidence that science specialty-beat reporters cited a larger number of sources than did non-science specialty-beat reporters. One-way ANOVA comparing means between the two groups yields no statistically significant evidence of difference between them in mean number of sources used in each story, and bivariate correlation shows no statistically significant relationship between reporter work-role identity and number of sources used. Forced-entry regression analysis indicates that reporter work-role identity alone contributes to explaining none of the variation in the number of sources used.

Findings related to Hypothesis 3

The mean variety of types of sources used in stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean variety of types of sources used in stories written by reporters with other beat assignments.

Based on analysis of these data, we cannot reject null hypothesis H_{03} of equal mean source variety for stories written by science specialty-beat reporters and those written by other types of reporters, although science specialty-beat reporters were shown to use more agricultural scientists as sources than did other types of reporters.

Analysis of the population's two groups, science specialty-beat reporters and non-science specialty-beat reporters, using one-way ANOVA revealed that the two were not statistically significantly different with regard to overall variety of sources used in stories and were not statistically significant different with regard to total number of scientists used as sources, although science specialty-beat reporters were shown to use more agricultural scientists as sources than did other types of reporters.

Results of bivariate correlation did not show work-role identity to be statistically significantly correlated with overall variety of sources used in each story using bivariate correlation, although it was found to be correlated with the number of scientists used as sources and with the number of agricultural scientists used as sources ($p < .05$).

Forced entry regression of variety of sources used per story on reporter work-role identity yielded no statistically significant relationships. Forced entry regression of source variety on all independent variables — newspaper location, newspaper circulation, newspaper circulation level, newspaper ownership, newspaper ownership type, reporter work-role identity — also yielded no statistically significant results.

Similarly, forced entry regression of number of scientists used as sources per story on reporter work-role identity yielded no statistically significant relationships. Forced entry regression of number of scientists used as sources on all independent variables — newspaper location, newspaper circulation, newspaper circulation level, newspaper ownership, newspaper ownership type, reporter work-role identity — yielded no statistically significant results.

Further forced entry regression of number of agricultural scientists used as sources per story on reporter work-role identity yielded no statistically significant relationships. Forced entry regression of number of agricultural scientists on all independent variables — newspaper location, newspaper circulation, newspaper circulation level, newspaper ownership, newspaper ownership type, reporter work-role identity — yielded no statistically significant results.

Although none of the differences in source-type relationships proved statistically significant, regardless of reporter work-role identity patterns of source choice emerged, with the largest number of named sources being selected from among industry representatives (140). Government (46) and educational (46) sources were used in equal numbers, while consumers (44) were a close second to these two groups. Reporters of both types chose a total of 27 media sources. Undefined (unnamed) sources were included in the 62 stories 175 times. These results are summarized in Table 19.

Table 19. *Actual Numbers of Named Sources in Each Category, Grouped by Work-Role Identity of Reporter*

| Source Category | No. of Citations in Stories Written by Science Specialty-Beat Reporters | No. of Citations in Stories Written by All Other Reporters |
|------------------------------------|---|--|
| Government representatives | 4 | 12 |
| Government scientists | 12 | 18 |
| Total government sources | 46 | 46 |
| Business representatives | 50 | 19 |
| Business scientists | 2 | 1 |
| Agricultural producers | 12 | 8 |
| Trade association reps | 24 | 24 |
| Total industry sources | 140 | 140 |
| University representatives | 4 | 0 |
| University agricultural scientists | 7 | 13 |
| University scientists (not ag) | 7 | 8 |
| Extension representatives | 3 | 1 |
| Extension scientists | 1 | 1 |
| Total university sources | 46 | 46 |
| Consumer association reps | 14 | 17 |
| Consumers | 8 | 5 |
| Total consumer sources | 44 | 44 |
| Media | 16 | 11 |
| Total media sources | 27 | 27 |
| Undefined | 83 | 92 |
| Total undefined sources | 175 | 175 |

Thus, H_{03} should be retained (Ary, Jacobs, & Razavieh, 2002) because analysis of these data offers no statistically significant evidence that science specialty-beat reporters cited a greater variety of types of sources than did non-science specialty-beat reporters. Comparison of means between the two groups using one-way ANOVA yielded no statistically significant evidence of differences between them in mean overall variety of sources used or in mean number of scientists used as sources, but mean number of agricultural scientists used as sources was found to be statistically significantly different between the two reporter groups. Moreover, bivariate correlation showed no statistically significant relationship between reporter work-role identity and overall variety of sources used, although this method did reveal correlation between reporter work-role identity and both total numbers of scientists and numbers of agricultural scientists used as sources.

Forced-entry regression analysis indicated that reporter work-role identity did not contribute to explanation of variation in source variety.

Summary

Analysis using SPSS 12.0 of the data collected through content analysis indicated that, with regard to Research Question 1, numbers of stories written, story length, and numbers of sources per story appear to be related to newspaper location. The apparent correlation of use of scientists and agricultural scientists as sources with type of newspaper ownership shown by these data is unanticipated and has not been explored by other researchers.

Analysis using SPSS 12.0 of the data collected through content analysis indicated that, with regard to Research Question 2, reporter work-role identity was not shown to be related to work product nor to influence number of sources or source variety, although it was shown to be correlated at the $p < .05$ level with numbers of scientists and agricultural scientists used as sources.

The three null hypotheses (H_{01} , H_{02} , H_{03}) posited in this study are retained. Comparison of means using one-way ANOVA between stories written by science specialty-beat reporters and those written by other types of reporters showed no statistically significant differences with regard to mean story length, mean number of sources used, and mean overall variety of sources used, although a statistically significant difference ($p < .05$) was found between the two groups in the mean number of agricultural scientists used as sources. Similarly, bivariate correlation and forced entry regression analysis showed no statistically significant relationships between reporter work-role identity and story length, number of sources used or overall source variety, although reporter work-role identity was found to be correlated with the types of sources used, specifically with both the numbers of scientists ($p < .05$) and the numbers of agricultural scientists ($p < .05$) used as sources in each story.

Inclusion of reporter-work-role identity with all other independent variables in a forced entry regression model explained 22.5% of variation in number of sources (ANOVA significant at $p < .05$). A secondary regression model showed that newspaper circulation and ownership together explained 18.8% of variance in number of sources used.

Regardless of reporter work-role identity, patterns of source choice emerged, with the largest number of named sources being selected from among industry representatives (140). Government (46) and educational (46) sources were used in equal numbers, while consumers (44) were a close second to these two groups. Reporters of both types chose a total of 27 media sources. Undefined (unnamed) sources were included in the 62 stories 175 times.

CHAPTER V

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

In dealing with crises, reporters' abilities to identify and successfully use appropriate news sources are of paramount importance to effective, reliable news coverage. Therefore, the factors which influence these abilities should be identified, and ways found to enhance those factors found to optimize such source choices. Previous research has explored such factors as the influence on source choice of reporters' personal characteristics and their institutional work routines, but few have focused on the dichotomy between reporters' with science specialty-beat work-role identities and those without such identities. This study adds to previous research exploring whether specialized beats requiring education and training germane to the topics covered may facilitate optimum source choice and improve the transmission to the public of the knowledge it needs to understand complex modern stories.

Purpose

This study examined source choices for important stories such as the December 2003 BSE event in the context of agricultural journalism, seeking to discover the sources reporters use when covering breaking agricultural news, the impact of reporter specialization on their choosing sources for agricultural news stories, and the impact of newspaper differences, including location, circulation, and ownership, on coverage of such issues.

It is generally accepted that opinion leaders help define those issues about which the public should think (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail,

1994) and that the media helps communicate such agenda salience. Reporters' selection of sources plays an important part in agenda setting because story sources can drive issue discussion in particular directions. Framing, on the other hand, helps guide the public as to *how* it should think about a particular issue. Framing provides context for opinion formation and discussion (DeFleur & Ball-Rokeach, 1989; McQuail, 1994). Frames developed by reporters help to construct schema to help the public place issues into understood and shared contexts. Reporters themselves are susceptible to agenda setting and framing of issues by the coverage of such stories by media they regard as particularly prestigious and credible (Breed, 1955; Dunwoody, 1979; Havick, 1997; Ten Eyck, 2000).

A story frame is built around a reporter's concept of newsworthiness, comprising such factors as conflict and proximity, as well as that reporter's sense of the story's contextual salience. Agenda-setting and the news waves of arterial effects (Breed, 1955) it generates may mean reporters are forced to adopt others' frames via consulting the same or similar sources. While this dissertation does not explore news selection variables and their relationship to framing and agenda-setting per se, it does use those theoretical ideas to help select variables that should be studied.

Objectives

This study sought to determine the effects of reporter work-role specialization and of newspaper location, circulation, and ownership on coverage of breaking agricultural news and, to the extent possible based on the data used, to quantify those effects.

Coverage of the December 2003 BSE event in the United States was selected for examination, because this event was timely, newsworthy, significant to the public, and agriculturally relevant, and required reporters to explain complex, science-intensive information. Answers were sought as to whether newspaper location, circulation size, and/or ownership, and reporter beat assignments affected the length of stories about the event and the number and variety of sources used in such stories.

In addition, with regard to coverage of this event, it was hypothesized that means for lengths, numbers of sources, and source variety for stories written by science specialty-beat reporters are equal to such means for stories written by reporters with other beat assignments. Data were analyzed using SPSS 12.0 in an attempt to list these hypotheses.

The objective of this research was to describe the role and process of sourcing in news stories, as defined by agenda-setting and framing theories and as applied specifically to agricultural breaking news.

Summary of methods

Stories from the eleven-month period between the first and second BSE events in the United States (December 23, 2003 to October 31, 2004) were retrieved from the LexisNexis database. Only stories from United States newspapers were used. Quantitative content analysis was applied to compare a census of all stories in the population written by science-specialty beat reporters (31) with an equal-sized random sample of stories written by non-science specialty-beat reporters.

Use of inferential statistics with other than strictly random samples is supported by such educational research methodologists as Oliver and Hinkle (1982) and Hinkle, Wiersma, & Jurs (1979). Oliver and Hinkle noted that a “researcher must decide which statistical procedure is appropriate for use in the study to be conducted” (p. 199) and went on to write that in certain circumstances, census data may permit the use of inferential statistics if the individuals making up the population census constitute a representative sample of similar individuals over time – so-called “time and place” samples.

After stratification according to reporter work-role identity, the census of all science specialty-beat reporters in the population represents a time and place sample. These reporters all were employed by identifiable news outlets during the period December 23, 2003 to November 1, 2004, the time the first U.S. BSE event occurred. Therefore, they may reasonably be assumed to have had the same access to information and sources about the event as did every other reporter during that year. Additionally, this population itself was defined by a particular place, that is, locations in the United States of newspapers employing reporters that wrote stories about this particular BSE event, stories included in the LexisNexis from which both the census and the sample were drawn. This study’s methodology is based on the assumption that the census of articles written by science specialty-beat reporters about the first U.S. BSE event and included in the LexisNexis database represents a strata of all stories about this event included in this database and may be compared to a random sample of all other such

stories included in this database and written by reporters with other types of work-role identities.

Further support for assumption of relative homogeneity among these science specialty-beat reporters is found in the literature. Dunwoody (1979) reported that organizational constraints, such as position in the newsroom, was the major factor determining newsgathering behaviors of 24 reporters studied. A later study of specialty reporters covering the statehouse beat (Dunwoody & Shields, 1984) found that such reporters, regardless of their backgrounds, used the same sources and structured coverage to gain the approval of their peers, evidence of the phenomenon Havick (1997) later called the news wave. These behaviors were further documented by Dunwoody (1980), who found that reporters covering science conferences felt themselves to constitute an elite club. Shoemaker and Reese (1991) suggested that newspaper reporters' coverage of science conforms to "craft norms" that may be assumed to homogenize such coverage. Weigold (2001) emphasized the distinct backgrounds of most science reporters, noting that they "tend to be better educated in science" and to hold "somewhat different news values than regular reporters" (p. 170).

Each story was coded by two coders as to length, newspaper in which it appeared, that newspaper's location, circulation, and ownership, and the number and types of sources used. As measured by Holsti's coefficient, satisfactory intercoder reliability was achieved.

SPSS 12.0 was used to generate descriptive summary statistics and to perform comparison of means (one-way ANOVA), bivariate correlation, and forced entry

regression on the data gathered by the content analysis. Statistical significance was analyzed at $p < .05$ levels.

Objectives related to relationship of selected newspaper characteristics to coverage of breaking agricultural news

This study investigated possible differential relationships between (a) story length and number and variety of sources and (b) newspaper characteristics, including geographic location, circulation, and type of ownership. A stratified sample of stories about a breaking agricultural news event, the December 2003 BSE outbreak in the United States, was chosen for analyses seeking to identify and to illuminate such relationships, through answering the following research question:

Research Question 1: Did story length and the number and variety of sources used in stories about the December 2003 BSE event vary according to newspaper location, circulation size and/or type of ownership?

Key findings. Almost half the stories in the sample were from newspapers in the Pacific West region, where the outbreak occurred, and 12 of these were published by the *Oregonian* in Portland. In addition, 28 of the 62 stories in the sample were found in newspapers with circulations between 300,000 and 500,000, and 48 of the stories were published in papers owned by chains.

Story length and number of sources used (bivariate correlation, $p < .05$) were found to vary with newspaper location. And selection of scientists ($p < .05$) and agricultural scientists ($p < .05$) as sources was found to be correlated with ownership type, that is, ownership by chain, independent group, academic institution, or religious organization. Taken together, all newspaper characteristics measured in this study were

found to explain a statistically significant amount of variance (22%, $p < .05$) only for number of sources used per story, with newspaper circulation and ownership together explaining 18.8% of that variance.

Conclusions. With regard to Research Question 1, newspaper location appears to be related to numbers of stories written, story length, and numbers of sources per story; this relationship may be at least partially explained by such factors as the links between event proximity and perceived newsworthiness and by the increased resources of national newspapers. The apparent correlation of use of scientists and agricultural scientists as sources with type of newspaper ownership shown by these data is unanticipated and has not been explored by other researchers.

Implications. In general, the findings of this study supported previous research showing that the amount and nature of coverage, as represented in this case by differences in story length and in number of sources used per story, may vary with a newspaper's geographic location. More stories in this sample were printed by newspapers in the Pacific West and the *Oregonian*, located in Portland, printed more stories than any other newspaper. Since the December 2003 BSE outbreak occurred in Washington state, this finding supports Bendix and Liebler (1999), who found that the closer to an event in physical and social distance and in place characteristics a newspaper is, the more coverage it is likely to devote to the event in terms of number of stories, story length, and source choice. Thus, newspapers in the far Midwest and on the West Coast might logically be expected to provide greater coverage (Griffin & Dunwoody, 1995, 1997; Martin, 1988; Taylor, Lee, & Davie, 2000). And, given the

possible seriousness of the event for public health and for the nation's economy, national newspapers, which were coded as geographic region 9, might also have been expected to pay particular attention to the event (Bendix & Liebler, 1999; Harry, 2001; Haygood, Akers, & Keith, 2002; Kitzinger & Reilly, 1997).

Coverage by the *Oregonian*, located in cosmopolite, urban Portland, also supported previous findings that newspapers in larger, more pluralistic communities tend to give greater coverage to controversial science topics, with mitigation by involvement of a community with the controversy; for example, Portland has no such involvement in the BSE outbreak (Griffin & Dunwoody, 1995, 1997; Hindman, 1996).

Agricultural journalists and the universities that educate them should be particularly concerned with such implications given the decreasing numbers of papers located in rural settings and the tendency of urban papers to offer short shrift to agricultural news (Carmell, Dyer, & Birkenholz, 2001; Hays, 1993; Thompson & Kelvin, 1996; Whitney, Fritzler, Jones, Mazzarella, & Rakow, 1989). If, indeed, location helps to determine extent and nature of coverage, then unless an agriculturally relevant event occurs near a major urban paper, it may not receive the coverage it deserves (Griffin & Dunwoody, 1995, 1997; Hindman, 1996). Additionally, unless agriculturally relevant news is perceived as important to owners of urban papers, fewer agricultural journalists may be needed to join their staffs.

The fact that chain-owned newspapers in this sample used a statistically significantly greater number of scientists and agricultural scientists as sources contradicted Lacy and Blanchard's (2003) findings of little difference in coverage by

chain-owned newspapers compared to coverage by newspapers with other ownership structures. Other articles that investigated ownership's impact or lack of impact on news content did not shed any light on this particular result (Aronoff, Ward, & Kenyon, 2004; George, 2001; Griffin & Dunwoody, 1995, 1997). The apparent correlation of use of scientists and agricultural scientists as sources with type of newspaper ownership is unanticipated and apparently has not been explored by other researchers, although this finding may be partially explained by the fact that chain-owned papers have greater resources, including larger and more technically accomplished staff (Donohue, Olien, & Tichenor, 1985) and so may delve more deeply into complex science-based stories. The finding that although the majority of stories in the sample (48 of 62) were from chain-owned papers, there were differences among these stories, also supported Miljan and Howorun (2003), who wrote that individual chain-owned papers exhibit coverage differences, even if their owners are the same.

Although a forced-entry regression model containing all newspaper characteristics proved statistically significant only in the case of number of sources (22% variance explained, 18.8% by newspaper circulation and ownership alone), this finding lends credence to the idea that the distinctiveness of each media outlet may impact the nature of its coverage.

This study's findings should concern agricultural journalists and the universities that educate them given the almost hostile attitude of much of the public toward the media in general; if, in fact, a media outlet's location, circulation, and ownership impact its coverage, reporters, editors, and educators appear to be ethically bound to understand

such impact and to counteract it to the extent necessary and possible in order to optimize their efforts to provide fair and comprehensive news coverage to their readerships (MacDougall, 1987). Of special concern may be the continuing trend toward concentration of newspaper ownership in the hands of just a few chains, with implications for types of sources used.

Recommendations for further research. Because newspapers must pay for the privilege of having their stories listed by the LexisNexis database, the resulting self-selection may obscure possible distinctions between large urban and smaller, rural newspapers in coverage of events like the December 2003 BSE outbreak (Chambers, 2003; Martin, 1988). Thus, further research replicating this study for a sample including smaller, more rural papers is recommended.

In addition, the closest papers to the outbreak site were in Seattle, Washington, and Portland, Oregon. Further research samples should include newspapers in communities closer to the outbreak location and newspapers in more homogenous, less pluralistic communities and/or with economic interests in the beef or dairy industry would allow comparisons with previous research (Demers, 1998; Harry, 2001; Taylor, Lee, & Davie, 2000). Additionally, investigation of the possible political agenda of papers in large cities like Portland and Seattle should be factored into future research designs. Similarly, investigation of the other interests held by the owners of the newspapers in this and other samples would allow analysis of possible economic conflicts of interest if such ownership included financial investment in agricultural industries (Maguire, 2003).

Again, self-selection by newspapers included in the LexisNexis database omitted minority-owned newspapers from the sample. A study focused on such newspapers could provide valuable insight into how minorities receive news about agricultural breaking news and about the content of that news (Benedict, 1997; Cano & Bankston, 1992).

Since significant differences were found in the use of scientist and agricultural scientist sources by chain-owned papers, focus on these variables with regard to differences among papers owned by different chains and within multiple papers owned by the same chain, as applied to the chain-owned papers in this sample, potentially could be illuminating (Lacy & Blanchard, 2003; Miljan & Howorun, 2003).

And although differences in story numbers and types of sources were found, investigation of the role of information subsidies in reporter identification of sources was beyond the scope of this study; additional research is recommended to investigate differences in the ways in which types of newspapers, based on location, circulation, ownership, handle such subsidies (Morton & Ramsey, 1994).

Objectives related to relationship of reporter work-role identity to coverage of breaking agricultural news

This study investigated possible differential relationships between (a) story length and number and variety of sources, including scientists and agricultural scientists, and (b) reporter work-role identity, as determined by beat assignment. A stratified sample of stories written by two groups of reporters — science specialty-beat reporters and non-science specialty-beat reporters — about a breaking agricultural news event, the

December 2003 BSE outbreak in the United States, was chosen for analyses seeking to identify and to illuminate such relationships, through answering the following research question and providing data to test the following three hypotheses:

Research Question 2: Did reporters' backgrounds as indicated by beat assignments affect the length and sourcing of stories about the December 2003 BSE event?

Hypothesis 1 (H_{01}): The mean length in words of stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean length of such stories written by reporters with other beat assignments.

Hypothesis 2 (H_{02}): The mean number of sources used in stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean number of sources used in stories written by reporters with other beat assignments.

Hypothesis 3 (H_{03}): The mean variety of types of sources used in stories written about the December 2003 BSE event by science specialty-beat reporters will equal the mean variety of types of sources used in stories written by reporters with other beat assignments.

Key findings. Stories by non-science specialty-beat reporters averaged 1,021.484 words; those by science specialty-beat reporters averaged 1,172.355 words. Non-science specialty-beat reporters used a mean 8.226 sources; science specialty-beat reporters used a mean 8.355. Non-science specialty-beat reporters used a mean 4.516 types of sources in each story; science specialty-beat reporters used a mean 4.806. Non-science specialty-beat reporters used a mean .806 scientist sources and a mean .548 agricultural scientist sources; science specialty-beat reporters used a mean 1.355 scientists and a mean 1.000 agricultural scientists.

Analysis using SPSS 12.0 of the data collected through content analysis indicated that, with regard to Research Question 2, reporter work-role identity was not shown to

be related to work product nor to influence number of sources or source variety, although it was shown to be correlated at the $p < .05$ level with numbers of scientists and agricultural scientists used as sources.

Similarly, forced entry regression analysis showed no statistically significant relationships between reporter work-role identity and story length, number of sources used or overall source variety. Inclusion of reporter-work-role identity with all other independent variables in a forced entry regression model explained 22.5% of variation in number of sources (ANOVA significant at $p < .05$), just .5% more than was explained by newspaper characteristics alone. A secondary regression model showed that newspaper circulation and ownership together explained 18.8% of variance in number of sources used.

Conclusions. With regard to Research Question 2, this study showed that reporter work-role identity was not related to work product nor did it influence sourcing; thus this study's finding did not support the idea that science specialty-beat reporters would afford more intensive coverage to such science-linked events as the first U.S. BSE case.

Analysis of data in this sample showed that reporters designated as science specialty-beat reporters did not (a) write longer stories, (b) use more sources, or (c) use a greater variety of sources than did reporters having other work-role identities. Although these particular issues regarding "science writers" have not been thoroughly explored in the literature, based on long-standing journalistic practice, it stands to reason that longer, more "in-depth" stories might be longer, might contain more sources, and that the more

sources used, the greater the chance for including more different kinds of sources in the mix (MacDougall, 1987). However, that was not shown to be the case here. The fact that stories written by science specialty-beat reporters, including agricultural reporters, were no different from those written by other types of reporters might be extrapolated to mean that specialty-reporter coverage of agriculturally relevant events is not more comprehensive nor of greater interest and utility to readers.

The three null hypotheses (H_{01} , H_{02} , H_{03}) posited in this study are retained. Comparison of means using one-way ANOVA between stories written by science specialty-beat reporters and those written by other types of reporters showed no statistically significant differences with regard to mean story length, mean number of sources used, and mean overall variety of sources used, although a statistically significant difference ($p < .05$) was found between the two groups in the mean number of agricultural scientists used as sources. Similarly, bivariate correlation and forced entry regression analysis showed no statistically significant relationships between reporter work-role identity and story length, number of sources used or overall source variety, although reporter work-role identity was found to be correlated with the types of sources used, specifically with both the numbers of scientists ($p < .05$) and the numbers of agricultural scientists ($p < .05$) used as sources in each story.

Inclusion of reporter-work-role identity with all other independent variables in a forced entry regression model explained 22.5% of variation in number of sources (ANOVA significant at $p < .05$), just .5% more than was explained by newspaper

characteristics alone. A secondary regression model showed that newspaper circulation and ownership together explained 18.8% of variance in number of sources used.

Implications. This study's findings that no statistically significant differences exist between coverage by reporters assigned to science-specialty beats and those not assigned to such beats contradicted previous research calling upon the media to provide more in-depth information for the public, especially about topics involving science, through encouraging reporters to attain increased levels of scientific literacy in order to provide more such in-depth coverage.

It has long been recognized that the media play an important role in disseminating science information to the public (Wilson, Code, Dornan, Ahmad, Hebert, & Graham, 2004), much of which is associated in newspaper stories with risks (Ten Eyck, 2000). Many researchers have called upon scientists themselves to learn better how to communicate about science and about risk (Clarke, 2003; Sachsman, 1993), given that journalists may lack the levels of scientific literacy necessary to effectively communicate such information and have chalked up a poor record in reporting such important topics as threats to public health (DeSilva, Muskavitch, & Roche, 2004; Frick, Kahler, & Miller, 1992; Haygood, Hagins, Akers, & Keith, 2002; Heinrichs & Peters, 2004; Mormont & Dasnoy, 1995; Roche & Muskavitch, 2003; Wells, Marshall, Crawley, & Dickersin, 2001). Researchers recommend accessing experts as sources of science information as one way to counteract reporters' lack of expertise about such matters (Heinrichs & Peters, 2004; Ramsey, 1999; Whaley & Tucker, 2004), but increased scientific and agricultural literacy on the part of reporters is almost surely

needed to choose expert sources wisely (Vestal & Briers, 1999; Whitaker & Dyer, 2000; Wingenbach, Rutherford, & Dunsford, 2003).

Source choice is a job function common to all reporters. Reporters try to choose the best sources for a given story based on the source's institutional position, knowledge, accessibility, or cooperativeness, or some combination of these characteristics.

However, previous research has documented that a source's political power or social influence often unduly influences such choices, causing government officials and corporate spokespersons to be overrepresented in the source pool (Whitney, Fritzer, Jones, Mazzarella, & Rakow, 1989), as documented in this study. Surprisingly, in this study, sources representing business, agricultural producers, and trade associations (industry, 140) overwhelmingly dominated the stories in our sample; the governmental (46), educational (46), and consumer (44) sources found to predominate in other studies were in a decided minority here, a result that doubtless deserves further scrutiny. Such factors in source-choice also may reflect media agenda-setting or framing effects (Lee, 2004; Kitzinger & Reilly, 1997; Salwen, 1995), considerations outside the framework of this study.

It is generally accepted that opinion leaders help define those issues about which the public should think (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail, 1994) and that the media helps communicate such agenda salience. Reporters' selection of sources plays an important part in agenda setting because story sources can drive issue discussion in particular directions. Framing, on the other hand, helps guide the public as to *how* it should think about a particular issue. Framing provides context for

opinion formation and discussion (DeFleur & Ball-Rokeach, 1989; McQuail, 1994). Frames developed by reporters help to construct schema to help the public place issues into understood and shared contexts. Reporters themselves are susceptible to agenda setting and framing of issues by the coverage of such stories by media they regard as particularly prestigious and credible (Breed, 1955; Dunwoody, 1979; Havick, 1997; Ten Eyck, 2000).

A story frame is built around a reporter's concept of newsworthiness, comprising such factors as conflict and proximity, as well as that reporter's sense of the story's contextual salience. Agenda-setting and the news waves of arterial effects (Breed, 1955) it generates may mean reporters are forced to adopt others' frames via consulting the same or similar sources. While this dissertation does not explore news selection variables and their relationship to framing and agenda-setting per se, it did use those theoretical ideas to help select variables that should be studied. Further study should be undertaken of the roles and manifestations of these communication theories in such coverage.

This study did address the impact of reporters' institutional roles on source choice, which other researchers have found to be more important than reporters' personal characteristics in making such selections. This study's findings did not support the idea that work-roles influence the ways in which reporters fulfill their job duties, including their choice of information sources (Clark & Illman, 2003; Craft & Wanta, 2004; Dunwoody, 1978, 1979; Kitzinger & Reilly, 1997; Logan, 2001; Shoemaker, Eichholz, Kim, & Wrigley, 2001), although such impact may be derived from sources'

influence on reporters' agendas and frames. According to the research cited, source choices of science specialty-beat reporters, reporters specializing in coverage of stories with significant science components may reflect not just normal newsroom routines and practices or individual reporter characteristics, but may be influenced by such reporters' special position within the news organization, by their special training, and by the narrative and expositional demands of the subject matter covered. However, this study found no evidence to support such a conclusion.

By extension, work by Shoemaker, Eichholz, Kim, and Wrigley (2001) and by Craft and Wanta (2004) suggests that (a) a newspaper's employing a science specialty-beat reporter may go a long way toward determining the nature of its coverage of science-based news and (b) the unique position of a science specialty-beat reporter in a newsroom could impact the quantity, type, and tone of science coverage provided. However, this study found no differences in source selection based on reporter work-role and so cannot substantiate such variations in coverage and the causative factors thereof.

Science stories about complex issues often demand sources beyond the usual institutional spokespersons, requiring explanation by experts in science and technology. Science specialty-beat reporters often use the same expert sources continually, laying a foundation for the development of special reporter-source relationships. Previous research has noted reporters' focus on educational and governmental sources, which may in fact control reporter access to meet their own agendas (Ericson, Baranek, & Chan, 1993; Miller, 1999); such focus was not supported by the results of this study. In fact,

regardless of work-role identity, reporters in this study chose industry sources by a greater than 3-to-1 margin over other source types, perhaps contributing to the economic- impact agenda and frames evident in so many of their stories.

Gandy (1982) has noted a special affinity between science specialty-beat reporters and their sources, evidenced by such writers' repeated use of the same sources, which can be compared to the practices of police-beat reporters as documented by Chermak (1995). Gandy cautions that such close relationships and repeated contacts may result in sources using reporters for agenda-setting or framing purposes of their own. Examination of the lists of sources used by science specialty-beat reporters in this sample supports Gandy's contentions that science specialty-beat reporters continually use the same sources (albeit, here, industry sources), but his conclusions about the impact of these practices on agenda-setting and framing fall outside the scope of this study.

Relatively narrow in focus, this study does not support findings of previous research that suggest coverage of complex science-based stories mandates specialized and specially knowledgeable sources and that reporters with at least some science education or training are better equipped to handle effectively these coverage demands.

Recommendations for further research. This study focused on the dichotomy in source choice between reporters with one organizational role — that of science specialty-beat reporter — and those with any other work-role identity. Although science specialty-beat reporters were not found to use different types of sources than other reporters, they did use more scientists and agricultural scientists as sources. The nature

of this relationship over time was not explored; for example, particular reporters were not followed over the eleven-month lifespan of the sampled event to discover whether their patterns of source use remained constant or changed due to story maturation or to source winnowing (Sumpter & Braddock, 2002). Such investigation could be fruitful. Additionally, the extensive use of “undefined” sources, for example, experts, advocates, critics, USDA, for which no representative was named, has not been explored in the literature, although some research exists dealing with sources termed part of the general public (Sumpter & Braddock, 2002). The impact of sourcing of unnamed individuals upon public understanding of complex stories and upon media credibility should be explored.

Only source identity was tracked across the sampled stories. Further investigation might focus on the dominance and prominence (Stempel & Culbertson, 1984) of each source in the sampled stories, determining whether these characteristics varied with reporter work-role identity. Additionally, the reliance of reporters on industry sources in covering the first U.S. BSE event is surprising and should be investigated further.

As noted in this chapter, this study grounded itself in agenda-setting (Dearing & Rogers, 1996; McCombs & Shaw, 1976; McQuail, 1994;) and framing (DeFleur & Ball-Rokeach, 1989; McQuail, 1994; Reber & Berger, 2005) theories, but left unexplored the explicit relationship of source choice and reporter work-role identification to the specific agendas and frames contained in a particular story. Since sources can promote their own agendas and put forth particular frames as they provide both content and context for

stories (Zoch & Turk, 1998), such investigation should be undertaken. Similarly, besides sources, others, such as editors, public relations persons, or activists, may influence story agendas and frames (Sumpter & Braddock, 2002; Telg & Dufresne, 2001); such influence should be explored.

Frames employed in coverage of BSE in the United States should be compared with Ruth and Eubanks' (2005) findings that four frames were used in coverage of such outbreaks in Canada, identified as industry crisis, economic calamity, blame/responsibility, and health risk. The relationship of such frames with sources used should be explored, as well as frame shifting that may occur as a story matures (Chyi & McCombs, 2004).

This study examined source choice but did not investigate the role of information subsidies in initial source identification and selection. Previous research has indicated that subsidies such as news releases and press conferences may play an important part in source choice and in agenda-setting and framing (Day, 2003; Kelley, 2000; Melgares, Rutherford, & Alexander, 2003; Nisbet, Brossard, & Kreopsh, 2003; Rost, Savonen, & Duncan, 1993; Skillman & Miller, 2003; Thompson, Able, & Maretzki, 2001); thus the role of such subsidies in coverage of BSE events should be investigated.

This study examined only reporters' work-role identity and ignored reporters' personal and educational characteristics (Grantham & Irani, 2004); given that previous research has emphasized the possible role of such characteristics in reporters' agenda-setting, framing, and source choice decisions, reporter characteristics should be examined in future studies, in conjunction with work-role identity. Such investigation

seems particularly important given the fact that science specialty-beat reporters may exhibit personal and educational characteristics different from those of other reporters.

Finally, population parameters for this study dictated the comparison of a census of science specialty-beat reporters (time and place sample) (Glass, Peckham, & Sanders, 1972; Hinkle, Wiersma, & Jurs, 1979; Oliver & Hinkle, 1982) with a random sample of other types of reporters. Thus, this study violated several methodological guidelines for performing a content analysis. In the strictest sense, the results presented in Chapter IV are not generalizable to longer time periods or to larger groups of reporters. They generally do, however, match what we would anticipate the outcome to be in an environment where specialty reporters influence one another (Dunwoody, 1979, 1980; Dunwoody & Shields, 1984; Shoemaker & Reese, 1991; Weigold, 2001) and where institutional-level decision are affected by agenda-setting, framing, and the news wave.

Future research could benefit from sampling populations with large enough numbers of science specialty-beat reporters to allow randomization.

Contributions to the field

Although the research consensus is that factors such as the news wave, reporter/editor individual characteristics, newsroom organization, newsworker routines, use of information subsidies, and newspapers' circulation may impact reporters' source choices, few guideposts exist by which to gauge the relative importance of the influence of these different factors on selection of sources. Further, most source-choice research has focused on coverage of political or crime news or on reporter/editor gender, ethnicity, or work routines. Few published studies were found applying agenda-setting

or framing theory to explanations of source-choice in coverage of agricultural breaking news, nor were any found showing how reporter, editor, newsroom, or newspaper characteristics impact such coverage. Thus, the current study sought to illuminate to what extent reporters' designation as science specialty-beat reporters, combined with their newspapers' locations and circulation, influenced their use of experts in their coverage of the December 2003 BSE event in the United States.

This study is of course limited by its sample, newspapers included in the LexisNexis database, and by its design, focused only on source-choice relative to newspaper characteristics and dichotomized by reporter work-role identity. However, its contribution to the literature of the field transcends these limitations in that it contradicts previous studies' findings concerning coverage of science-intensive stories. The fact that in this study no differences in coverage were found between science specialty-beat reporters and other types of reporters should provoke trenchant questions from both scholars and journalists. Such questions might include whether science specialty-beat reporters indeed can provide more comprehensive and informative coverage of science-intensive stories and, if not, whether their failure lies in low-levels of science literacy rooted in inadequate training or in newsroom institutions that do not accommodate the exercise of their talents and skills. In addition, relationships explored in the current study may be extrapolated and tested with regard to breaking news coverage of other agricultural crises, for example, Avian flu outbreaks.

In dealing with crises, reporters' abilities to identify and successfully use appropriate news sources are of paramount importance to effective, reliable news

coverage. The factors which influence these abilities must be identified, and ways must be found to enhance those factors found to optimize such source choices. This study adds to previous research exploring whether specialized beats requiring education and training germane to the topics covered may facilitate optimum source choice and improve the transmission to the public of the knowledge it needs to understand complex modern stories.

Therefore, extrapolation from the findings of this study suggest it is open to question whether (a) reporters would be well-advised to pursue courses of study or to seek additional training designed to build defined areas of expertise, better equipping themselves to cover more complex issues; (b) when considering adding employees to their reporting staffs, editors should seek candidates with such special training, and they should structure their newsroom routines to accommodate specialty reporters; and (c) universities should offer journalism curricula that facilitate both acquisition of basic reporting skills and registration for substantive electives which can build subject-matter knowledge. Answers to these questions should be actively pursued, since they may shape the future of journalism education and practice.

REFERENCES

- Alaszewski, A., & Horlick-Jones, T. (2003). How can doctors communicate about risk more effectively? *British Medical Journal*, 372, 728-731.
- Albaek, E., Christiansen, P.M., & Togeby, L. (2003). Experts in the mass media: Researchers as sources in Danish daily newspapers, 1961-2001. *Journalism and Mass Communication Quarterly*, 80(4), 937-948.
- Armstrong, C.L. (2004). The influence of reporter gender on source selection in newspaper stories. *Journalism and Mass Communication Quarterly*, 81(1), 139-154.
- Aronoff, C.E., Ward, J.L., & Kenyon, D.H. (2004). *Reports of our demise are greatly exaggerated: Family ownership in the U.S. newspaper industry*. Unpublished paper. Retrieved July 28, 2005, from <http://web.hhs.se/ehf/bonnier2004/files/Papers/Aronoff%20et%20al.PDF>.
- Ary, D., Jacobs, L.C., & Razavieh, A. (2002). *Introduction to research in education* (6th ed.). Stamford, CT: Wadsworth Group.
- Bacon's Information, Inc. (2004). *Bacon's newspaper directory*. (52nd ed.). Chicago, IL: Bacon's Information, Inc.
- Banning, S.A., & Evans, J.F. (2001). Fading voices: A 10-year trend within an agricultural advertiser-media-reader triad. *Journal of Applied Communications*, 85(2), 21-36.
- Banning, S.A., & Evans, J.F. (2004a). Farmers' voices: Concerns within the agricultural advertiser-media-reader triad. *Journal of Applied Communications*, 88(2), 7-20.

- Banning, S.A., & Evans, J.F. (2004b). Counting room voices in the farm publisher-reader-advertiser triad. *Journal of Applied Communications*, 88(4), 23-37.
- Bartlett, C., Sterne, J., & Egger, M. (2002). What is newsworthy? Longitudinal study of the reporting of medical research in two British newspapers. *British Medical Journal*, 325, 81-84.
- Beall, G.A., & Hayes, J.H. (1992). Big, green and careful: How major California newspapers covered two ballot initiatives in the 1990 general election. *Journal of Applied Communications*, 76(1), 7-11.
- Beaudoin, C.E., & Thorson, E. (2004). Social capital in rural and urban communities: Testing differences in media effects and models. *Journalism and Mass Communication Quarterly*, 81(2), 378-399.
- Bendix, J., & Liebler, C.M. (1999). Place, distance, and environmental news: Geographic variation in newspaper coverage of the spotted owl conflict. *Annals of the Association of American Geographers*, 89(4), 658-676.
- Benedict, L.F. (1997). Reaching the Black press with the land-grant message. *Journal of Applied Communications*, 81(1), 11-22.
- Berger, C.R. (2001). Making it worse than it is: Quantitative depictions of threatening trends in the news. *Journal of Communication*, 51(4), 655-677.
- Besley, J.C., & Shanahan, J. (2005). Media attention and exposure in relation to support for agricultural biotechnology. *Science Communication*, 26(4), 347-367.
- Birkenholz, R.J., & Johnson, D.M. (1990). Agriculture graduate perceptions of the

- levels of cognition required in undergraduate courses. *Journal of Agricultural Education*, 30, 32-38
- Blaine, K., & Powell, D. (2001). Communication of food-related risks. *AgBioForum*, 4(3&4), 179-185.
- Blankenburg, W.B. (1982). Newspaper ownership and control of circulation to increase profits. *Journalism Quarterly*, 59(3), 390-398.
- Bouare, D., & Bowen, B.E. (1990). Communications methods used by agricultural Extension agents. *Journal of Applied Communications*, 74(1), 1-7.
- Breed, W. (1955). Newspaper opinion leaders and the process of standardization. *Journalism Quarterly*, 32, 277-284, 328.
- Brookes, R. (1999). Newspapers and national identity: The BSE/CJD crisis and the British press. *Media, Culture & Society*, 21, 247-263.
- Bruening, T.H. (1991). Communicating with farmers about environmental issues. *Journal of Applied Communications*, 75(1), 34-41.
- Bruening, T.H., & Martin, R.A. (1992). Farmer perceptions of soil and water conversation issues: Implications to agricultural and Extension education. *Journal of Agricultural Education*, 32(1), 48-55.
- Bruening, T.H., Radhakrishna, R.B., & Rollings, T.J. (1992). Environmental issues: Farmers' perceptions about usefulness of informational and organizational sources. *Journal of Agricultural Education*, 32(3), 34-44.
- Bryant, J., & Miron, D. (2004). Theory and research in mass communication. *Mass Communication*, 54(4), 662-704.

- Busterna, J.C. (1988). Trends in daily newspaper ownership. *Journalism Quarterly*, 65(4), 831-838.
- Calsamiglia, H., & Ferrero, C.L. (2003). Role and position of scientific voices: Reported speech in the media. *Discourse Studies*, 5(2), 147-173.
- Cano, J., & Bankston, J. (1992). Factors which influence participation and non-participation of ethnic minority youth in Ohio 4-H programs. *Journal of Agricultural Education*, 32(2), 23-29.
- Cappella, J.N. (2002). Cynicism and social trust in the new media environment. *Journal of Communication*, 52(1), 229-241.
- Carsten, L.D. & Illman, D.L. (2002). Perceptions of accuracy in science writing. *IEEE Transactions on Professional Communication*, 45(3), 153-156.
- Cartmell, D.D., Dyer, J.E., & Birkenholz, R.J. (2001). Attitudes of Arkansas daily newspaper editors toward agriculture. *Proceedings of the 28th Annual National Agricultural Education Research Conference*, 445-458.
- Cassidy, A. (2004). Popular evolutionary psychology as public science and boundary work. *Proceedings of the PCST International Conference*. Retrieved July 27, 2005, from <http://www.pcst2004.org>
- Chambers, T. (2003). Structural changes in small media markets. *The Journal of Media Economics*, 16(1), 41-59.
- Chermak, S. (1995). Image control: How police affect the presentation of crime news. *American Journal of Police*, XIV(2), 21-43.

- Chyi, H.I., & McCombs, M. (2004). Media salience and the process of framing: Coverage of the Columbine school shootings. *Journalism and Mass Communication Quarterly*, 81(1), 22-35.
- Clark, F., & Illman, D.L. (2003). Content analysis of *New York Times* coverage of space issues for the year 2000. *Science Communication*, 25(1), 14-38.
- Clarke, B. (2003). Report: Farmers and scientists. *Science Communication*, 25(2), 198-203.
- Craft, S., & Wanta, W. (2004). Women in the newsroom: Influences of female editors and reporters on the news agenda. *Journalism and Mass Communication Quarterly*, 81(1), 124-138.
- Day, T.L. (2003). A rose by any other name might be more noticed: Attracting journalists' attention in the Digital Age. *Journal of Applied Communications*, 87(2), 7-13.
- Dearing, J.W., & Rogers, E.M. (1996). *Agenda-setting*. Thousand Oaks, CA: Sage Publications.
- DeFleur, M.L., & Ball-Rokeach, S. (1989). *Theories of mass communication*. (5th Ed.). London: Longman.
- Demers, D.K. (1998). Structural pluralism, corporate newspaper structure, and news source perceptions: Another test of the editorial vigor hypothesis. *Journalism and Mass Communication Quarterly*, 75(3), 572-592.
- DeSilva, M., Muskavitch, M.A.T., & Roche, J.P. (2004). Print media coverage of antibiotic resistance. *Science Communication*, 26(1), 31-43.

- Dimmick, J., & Coit, P. (1982). Levels of analysis in mass media decision making: A taxonomy, research strategy, and illustrative data analysis. *Communication Research*, 9(1), 3-32.
- Donohue, G.A., Olien, C.N., & Tichenor, P.J. (1985). Reporting conflict by pluralism, newspaper type and ownership. *Journalism Quarterly*, 62(3), 489-499.
- Donohue, G.A., Olien, C.N., & Tichenor, P.J. (1989). Structure and constraints on community newspaper gatekeepers. *Journalism Quarterly*, 66(4), 807-845.
- Donsbach, W. (2004). Psychology of news decisions. *Journalism*, 5(2), 131-157.
- Dunwoody, S. (1978). From a journalist's perspective: Putting content into mass media science writing. *The English Journal*, 67(4), 44-47.
- Dunwoody, S. (1979). News-gathering behaviors of specialty reporters: A two-level comparison of mass media decision-making. *Newspaper Research Journal*, 1(1), 29-41.
- Dunwoody, S. (1980). The science writing inner club: A communication link between science and the lay public. *Science, Technology, & Human Values*, 5, 14-22.
- Dunwoody, S., & Shields, S. (1984). Accounting for patterns of topic selection in statehouse reporting. ERIC (abstract). Retrieved September 12, 2006 from http://eric.ed.gov/ERICWebPortal/Home.portal?_nfpb=true&_pageLa
- Dyer, S.C. (1996). Descriptive modeling for public relations environmental scanning: A practitioner's perspective. *Journal of Public Relations Research*, 8(3), 137-150.
- Dyer, S.C., Miller, M.M., & Boone, J. (1991). Wire service coverage of the Exxon Valdez crisis. *Public Relations Review*, 17(1), 27-36.

- Ericson, R., Baranek, P. & Chan, J. (1993). Negotiating control: A study of news sources. *Canadian Journal of Communication* [Online], 18(1). Retrieved July 27, 2005, from <http://www.cjc-online/viewstory.pho?id=156>.
- Fett, J., & Mundy, P. (1995). Disseminating crop variety trial results via agricultural newspaper supplements. *Journal of Applied Communications*, 79(2), 15-23.
- Fett, J., Shinnars-Gray, T., Duffy, K., & Doyle, C. (1995). Evaluation of a county Extension office's use of mass media: A user perspective. *Journal of Applied Communications*, 79(1), 34-44.
- Field, A. (2000). *Discovering statistics using SPSS for Windows: Advanced techniques for the beginner*. London: Sage Publications.
- Frick, M.J., Kahler, A.A., & Miller, W.W. (1992). Agricultural literacy: A framework for communicating to the public sector. *Journal of Applied Communications*, 75(2), 42-50.
- Gandy, O.H. Jr. (1982). *Beyond agenda setting: Information subsidies and public policy*. Norwood, NJ: Ablex Publishing Company.
- George, L. (2001). What's fit to print: The effect of ownership concentration on product variety in daily newspaper markets. *Proceedings of the World Media Economics Conference*. Retrieved on July 29, 2005, from <http://arxiv.org/ftp/cs/papers/0108/0108014.pdf>
- Gilens, M., & Hertzman, C. (2000). Corporate ownership and news bias: Newspaper coverage of the 1996 Telecommunications Act. *The Journal of Politics*, 62(2), 369-386.

- Glass, G.V., Peckham, P.D., & Sanders, J.R. (1972). Consequences of failure to meet the assumptions underlying the use of analysis of variance and covariance. *Review of Educational Research*, 42, 237-288.
- Glenn, C.B. (2004). Constructing consumables and consent: A critical analysis of factory farm industry discourse. *Journal of Communication Inquiry*, 28(1), 63-81.
- Goldstein, N. (ed.). (2005). *The Associated Press stylebook and briefing on media law*. New York, NY: The Associated Press.
- Grantham, S., & Irani, T. (2004). Watch your language: Translating science-based research for public consumption. *Journal of Applied Communications*, 88, 43-50.
- Griffin, R.J., & Dunwoody, S. (1995). Impacts of information subsidies and community structure on local press coverage of environmental contamination. *Journalism and Mass Communications Quarterly*, 72(2), 271-284.
- Griffin, R.J., & Dunwoody, S. (1997). Community structure and science framing of news about local environmental risks. *Science Communication*, 18(4), 362-384.
- Gunther, A.C., & Schmitt, K. (2004). Mapping boundaries of the hostile media effect. *Journal of Communication*, 54, 55-70.
- Hansen, K.A., Neuzil, M., & Ward, J. (1998). Newsroom topic teams: Reporters' assessments of effects on news routines and newspaper quality. *Journalism and Mass Communication Quarterly*, 75(4), 803-821.
- Harris, P., & O'Shaughnessy, N. (1997). BSE and marketing communication myopia: Daisy and the death of the sacred cow. *Risk Decision and Policy*, 2(1), 29-39.

- Harry, J.C. (2001). Covering conflict: A structural-pluralist analysis of how a small-town and a big-city newspaper reported an environmental controversy. *Journalism and Mass Communication Quarterly*, 78(3), 419-436.
- Havick, J. (1997). Determinants of national media attention. *Journal of Communication*, 47:(2), 97.
- Haygood, J., Hagins, S., Akers, C., & Keith, L. (2002). Associated Press Wire Service coverage of agricultural issues. *NAERC Proceedings*. Retrieved July 27, 2005, from <http://aaaeonline.ifas.ufl.edu/NAERC/2002/naercfiles/NAERC/Associated%20Press%20Haygood-Hagins-Aker-Keith.pdf>.
- Hays, R.G. (1993). Trends in urban newspaper use of farm news: A qualitative study. *Journal of Applied Communications*, 77(2), 18-30.
- Heinrichs, H., & Peters, H. P. (2004). Media communication on climate change and coastal protection: Reception and interpretations by the audience. *Proceedings of the PCST International Conference*. Retrieved July 25, 2005, from <http://www.pcst2004.org>.
- Hindman, D.B. (1996). Community newspapers, community structural pluralism, and local conflict with nonlocal groups. *Journalism and Mass Communications Quarterly*, 73(3), 708-721.
- Hinkle, D.E., Wiersma, W., & Jurs, S.G. (1979). *Applied statistics for the behavioral sciences*. Chicago: Rand McNally.
- Holsti, O.R. (1969). *Content analysis for the social sciences and humanities*. Reading, MA: Addison-Wesley Publishing Company.

- Jenkins, C.D. (2002). *Gatekeeping in the Black press: A qualitative content analysis of news story selection in black press newspapers during the 2000 U.S. presidential election*. Unpublished doctoral dissertation. Howard University, Washington, D.C.
- Jensen, K. K. (2004). BSE in the UK: Why the risk communication strategy failed. *Journal of Agricultural and Environmental Ethics*, 17, 405-423.
- Jin, H.J., Skripnitchenko, A., & Koo, W.W. (2004). *The effects of the BSE outbreak in the United States on the beef and cattle industry*. Special Report 03-4. Fargo, ND: Center for Agricultural Policy and Trade Studies, North Dakota State University.
- Kelley, R.B. (2000). *An analysis of newspaper coverage of research at a Midwest public research university*. Unpublished doctoral dissertation. University of Missouri–Columbia.
- Kiernan, V. (2003). Embargoes and science news. *Journalism and Mass Communications Quarterly*, 80(4), 903-920.
- King, D. (1991). Is it the sweet siren of technology or just an ill wind? *Journal of Applied Communications*, 75(1), 49-55.
- Kitzinger, J., & Reilly, J. (1997). The rise and fall of risk reporting: Media coverage of human genetics research, “false memory syndrome,” and “Mad Cow Disease.” *European Journal of Communication*, 12(3), 319-350.
- Lacy, S., & Blanchard, A. (2003). The impact of public ownership, profits, and competition on number of newsroom employees and starting salaries in mid-sized daily newspapers. *Journalism and Mass Communication Quarterly*, 80(4), 949-968.

- Larson, B.M.H., Nerlich, B., & Wallis, P. (2005). Metaphors and biorisks. *Science Communication*, 26(3), 243-268.
- Lavie, A., & Lehman-Wilzig, S. (2005). The method is the message: Explaining inconsistent findings in gender and news production research. *Journalism*, 6(1), 66-89.
- Lee, S.T. (2004). Lying to tell the truth: Reporters and the social context of deception. *Mass Communication & Society*, 7(1), 97-120.
- Lehmkuhl, M., & Gopfert, W. (2004). Science reporting in the local press in Germany. *Proceedings of the PCST International Conference*, Retrieved July 25, 2005, from <http://www.pcst2004.org>.
- Logan, R.A. (2001). News' compartmentalization: Implications for food biotechnology coverage. *AgBioForum*, 4(3&4), 194-198.
- Long, M. (1995). Scientific explanation in US newspaper science stories. *Public Understanding of Science*, 4, 119-130.
- Lundy, L.K., & Irani, T.A. (2004). Framing biotechnology: A comparison of U.S. and British national newspapers. *Journal of Applied Communications*, 88(2), 37-49.
- MacDougall, C.D. (1987). *Interpretative reporting*. New York, NY: Macmillan.
- Macnamara, J.R. (2003). Media content analysis: Its uses, benefits and best practice methodology. *Carma International Media White Paper*. Retrieved July 28, 2005, from http://www.masscom.au/book/papers/media_content.html.

- Maguire, M. (2003). Wall Street made me do it: A preliminary analysis of the major institutional investors in U.S. newspaper companies. *The Journal of Media Economics*, 16(4), 253-264.
- Marks, L.A., & Kalaitzandonakes, N. (2001). Mass media communications about agrobiotechnology. *AgBioForum*, 4(3&4), 99-208.
- Marquart, J., O'Keefe, G.J., & Gunther, A.C. (1995). Believing in biotech. *Science Communication*, 16(4), 388-402.
- Martin, C.R. (2003). The 1997 United Parcel Service strike: Framing the story for popular consumption. *Journal of Communication Inquiry*, 27(2), 190-210.
- Martin, S.R. (1988). Proximity of event as factor in selection of news sources. *Journalism Quarterly*, 65(4), 986-989.
- McCombs, M., & Shaw, D. (1976). Structuring the "unseen environment." *Journal of Communication*, 26, 18-23.
- McInerney, C., Bird, N., & Nucci, M. (2004). The flow of scientific knowledge from lab to lay public. *Science Communication*, 26(1), 44-74.
- McQuail, D. (1994). *Mass communication theory*. (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Melgares, P., Rutherford, T., & Alexander, L. (2003). How newspapers in Kansas are using news releases from K-State research and Extension. *Journal of Applied Communications*, 87(3), 15-27.
- Miljan, L., & Howorun, C. (2003). From attack dog to lap dog? Newspaper coverage of liberal scandals. *Fraser Forum*, 33-39.

- Miller, D. (1999). Risk, science and policy: Definitional struggles, information management, the media and BSE. *Social Science & Medicine*, 49, 1239-1255.
- Mormont, M., & Dasnoy, C. (1995). Source strategies and the mediatization of climate change. *Media, Culture & Society*, 17, 49-64.
- Morton, L.P., & Ramsey, S. (1994). A benchmark study of the PR News Wire. *Public Relations Review*, 20(2), 171-182.
- Nisbet, M.C., Brossard, D., & Kroepsch, A. (2003). Framing science: The stem cell controversy in an age of press/politics. *Press/Politics*, 8(2), 36-70.
- Nordstrom, P.A., Wilson, L.L., Richards, M.J., Coe, B.L., Fivek, M.L., & Brown, M.B. (1999). Student attitudes toward animal-derived products and services and how they affect society and the environment. *Journal of Agricultural Education*, 40(4), 10-19.
- Oliver, J.D., & Hinkle, D.E. (1982). Occupational education research: Selecting statistical procedures. *Journal of Studies in Technical Careers*, 9, 199-207.
- Oskam, J.B. (1992). Fields of danger: Communicating agricultural safety and health information. *Journal of Applied Communications*, 76(2), 1-8.
- Oskam, J.B. (1995). Diffusion of agricultural health and safety information: A two part study of Oklahoma farmers and Extension agricultural engineers. *Journal of Applied Communications*, 79(1), 13-25.
- Ott, R.L., & Longnecker, M. (2001). *An introduction to statistical methods and data analysis*. Pacific Grove, CA: Duxbury-Thomson Learning.

- Powell, D., & Leiss, W. (1997). *Mad cows and mother's milk: The perils of poor risk communication*. Montreal: McGill-Queen's University Press.
- Ramsey, S. (1999). A benchmark study of elaboration and sourcing in science stories for eight American newspapers. *Journalism & Mass Communication Quarterly*, 76(1), 87-98.
- Ratzan, S.C. (1997). Editorial. *Journal of Health Communication*, 2(2), v-viii.
- Raude, J., Fischler, C., Lukasiewicz, E., Setbon, M., & Flahault, A. (2004). GPs and the social amplification of BSE-related risk: An empirical study. *Health, Risk & Society*, 6(3), 173-185.
- Reber, B.H., & Berger, B.K. (2005). Framing analysis of activist rhetoric: How the Sierra Club succeeds or fails at creating salient messages. *Public Relations Review*, 31, 185-195.
- Reisenberg, L.E., & Gor, C.O. (1989). Farmers' preferences for methods of receiving information on new or innovative farming practices. *Journal of Agricultural Education*, 29, 44-51.
- Reisner, A.E. (1991). Comparing ethical concerns of agricultural and general journalists. *Journal of Applied Communications*, 74(1), 42-48.
- Riffe, D., Lacy, S., & Fico, F.G. (1998). *Analyzing media messages: Using quantitative content analysis in research*. Mahwah, NJ: Lawrence Baum Associates, Publishers.

- Roche, J.P., & Muskavitch, M.A.T. (2003). Limited precision in print media communication of West Nile virus risks. *Science Communication*, 24(3), 353-365.
- Rodriguez, L., & Peterson, J.W. (1996). Sludge under suspicion: Explaining perceptions of risks from a relatively “unknown” technology. *Journal of Applied Communications*, 80(2), 12-24.
- Rollings, T.J., Bruening, T.B., & Radhakrisha, R.B. (1991). Identifying Extension information delivery methods for environmental issues. *Journal of Applied Communications*, 75(2), 1-9.
- Rost, B., Savonen, C., & Duncan, A. (1993). Survey on use of quotes by agricultural communicators. *Journal of Applied Communications*, 77(2), 12-17.
- Ruth, A., & Lundy, L. (2004). Reaching Florida urban opinion leaders: Uncovering preferred communication channels. *Journal of Applied Communications*, 88(4), 7-21.
- Ruth, A.M., & Eubanks, E.E. (2005). *Reporting mad news: Framing of the mad cow media coverage*. Unpublished paper. Retrieved July 28, 2005, from <http://rtelg.ufl.edu/aceresearch/madcow.pdf>.
- Sachsman, D.B. (1993). Communication between scientists and the media: Introducing the concepts of risk, risk analysis, and risk communication for reporters. *Proceedings of the Hazardous Waste Conference*. Retrieved July 28, 2005, from <http://www.atsdr.cdc.gov/cx12c.html>

- Salwen, M.B. (1995). News of Hurricane Andrew: The agenda of sources and the sources' agendas. *Journalism and Mass Communication Quarterly*, 72(4), 826-838.
- Scheufele, D.A. (1999). Framing as a theory of media effects. *Journal of Communication*, 49(1), 103-122.
- Schmierbach, M. (2005). Method matters. *Science Communication*, 26(3), 269-287.
- Schupp, A., Gillespie, J., O'Neil, C.E., & Prinyawiwatkul, W. (2004). Impacts of selected, media-reported, beef safety problems on consumer beef purchases. *Southwestern Economic Review*, 31(1), 13-30.
- Shafer, J. (2003). The Jayson Blair project: How did he bamboozle the *New York Times*? *Slate*. Retrieved April 22, 2005, from <http://slate.msn.com/id/2082741>.
- Shelton, A.M., & Sears, M.K. (2001). The monarch butterfly controversy: Scientific interpretations of a phenomenon. *The Plant Journal*, 27(6), 483-488.
- Shoemaker, P.J., Eichholz, M., Kim, E., & Wrigley, B. (2001). Individual and routine forces in gatekeeping. *Journalism & Mass Communication Quarterly*, 78, 233-246.
- Shoemaker, P.J., & Reese, S.D., (1991). *Mediating the message: Theories of influences on mass media content*. White Plains, NY: Longman.
- Simonson, P. (1999). Mediated sources of public confidence: Lazarsfeld and Merton revisited. *Journal of Communication*, 49(2), 109-122.

- Sitton, S., Terry, R. Jr., Cartmell, D.D. II, & Keys, J.P. (2004). Newspaper coverage of swine production issues: A closer look at reporters and their objectivity. *Journal of Applied Communications*, 88(2), 21-35.
- Skillman, L., & Miller, H. (2003). A low cost analysis of the effectiveness of College of Agriculture press releases. *Journal of Applied Communications*, 87(3), 7-14.
- Sperbeck, J.M. (1997). Some media relations success stories. *Journal of Applied Communications*, 81(3), 24-39.
- Steinke, J. (1995). Reaching readers: Assessing readers' impressions of science news. *Science Communication*, 16(4), 432-453.
- Stemler, S. (2001). An overview of content analysis. *Practical Assessment, Research & Evaluation*, 7(17). Retrieved July 19, 2005 from <http://PAREonline.net/getvn.asp?v=7&n=17>.
- Stempel, G. III, & Culbertson, H. (1984). The prominence and dominance of news sources in newspaper medical coverage. *Journalism Quarterly*, 61, 671-676.
- Stringer, S.B. (1999). *An evaluation of agricultural news sources*. Unpublished doctoral dissertation, The Pennsylvania State University, State College, PA.
- Sturloni, G. (2003). Food for thought – Communicating food-related risks. *Journal of Communication*, 2(1), 1-19.
- Sumpter, R.S., & Braddock, M.A. (2002). Source use in a “news disaster” accounting: A content analysis of voter news service stories. *Journalism & Mass Communication Quarterly*, 79(3), 539-558.

- Sumpter, R.S., & Lukaszewski, Y. (2001). Covering the “Y2K” bug: A content analysis of source use in “continuing news.” *Southwestern Mass Communication Journal*, 17(1), 29-39.
- Sweeney, S., & Hollifield, C.A. (2000). Influence of agricultural trade publications on the news agendas of national newspapers and news magazines. *Journal of Applied Communications*, 84(1), 23-45.
- Taylor, C.E., Lee, J-S., & Davie, W.R. (2000). Local press coverage of environmental conflict. *Journalism and Mass Communication Quarterly*, 77(1), 175-191.
- Telg, R., & Dufresne, M.G. (2001). Agriculture communications efforts during Florida’s medfly infestations of 1997 and 1998. *Journal of Applied Communications*, 85(1), 7-23.
- Telg, R., & Raulerson, B. (1999). Firefighter public information officers’ communication effectiveness with the media during the 1998 Florida wildfires. *Journal of Applied Communications*, 83(2), 7-21.
- Ten Eyck, T.A. (2000). The marginalization of food safety issues: An interpretative approach to mass media coverage. *Journal of Applied Communications*, 84(2), 29-46.
- Tewksbury, D., Jones, J., Peske, M.W., Raymond, A., & Vig, W. (2000). The interaction of news and advocate frames: Manipulating audience perceptions of a local public policy issue. *Journalism and Mass Communication Quarterly*, 77(4), 804-829.
- Thomsen, M.R., Longstreth, M., & Miller, J.D. (2003). Media coverage of food irradiation. *Food Protection Trends*, 23(3), 243-251.

- Thomson, J.S., Abel, J.L., & Maretzki, A.N. (2001). Edible Connections: A model for citizen dialogue used to discuss local food, farm, and community issues. *Journal of Applied Communications*, 85(1), 25-42.
- Thomson, J.S., & Kelvin, R.E. (1996). Suburbanites' perceptions about agriculture: The challenge for media. *Journal of Applied Communications*, 80(3), 11-20.
- Van Crowder, L. (1991). Is there a communication media bias in development projects? *Journal of Applied Communications*, 75(2), 15-20.
- Vestal, T.A., & Briers, G.E. (1999). Metro news journalists critique food biotechnology. *Journal of Applied Communications*, 83(2), 22-34.
- Weigold, M.E. (2001). Communicating science. *Science Communication*, 23(2), 164-193.
- Wells, J., Marshall, P., Crawley, B., & Dickersin, K. (2001). Newspaper reporting of screening mammography. *Annals of Internal Medicine*, 135, 1029-1037.
- Whaley, S.R., & Tucker, M. (2004). The influence of perceived food risk and source trust on media system dependency. *Journal of Applied Communications*, 88(1), 9-27.
- Whitaker, B.K., & Dyer, J.E. (2000). Identifying sources of bias in agricultural news reporting. *Journal of Agricultural Education*, 41(4), 125-133.
- Whitney, D.C., Fritzler, M., Jones, S., Mazzarella, S., & Rakow, L. (1989). Geographic and source biases in network television news 1982-1984. *Journal of Broadcasting & Electronic Media*, 33(2), 159-174.

- Wilkie, T. (1996). Sources in science: Who can we trust? *Lancet*, 347(9011), 1308-1311.
- Wilson, K., Code, C., Dornan, C., Ahmad, N., Hebert, P., & Graham, I. (2004). The reporting of theoretical health risks by the media: Canadian newspaper reporting of potential blood transmission of Creutzfeldt-Jakob disease. *BMC Public Health*, 4(1). Retrieved July 29, 2005, from <http://www.biomedcentral.com/1471-2458/4/1>.
- Wingenbach, G.J., & Kahler, A.A. (1997). Self-perceived youth leadership and life skills of Iowa FFA members. *Journal of Agricultural Education*, 38(3), 18-27.
- Wingenbach, G.J., Rutherford, T.A., & Dunsford, D.W. (2003). Agricultural communications' students' awareness and perception of biotechnology issues. *Journal of Agricultural Communication*, 44(4), 80-93.
- Yates, A.J., & Stroup, R.L. (2000). Media coverage and EPA pesticide decisions. *Public Choice*, 102, 297-312.
- Zoch, L.M., & Turk, J.V. (1998). Women making news: Gender as a variable in source selection and use. *Journalism and Mass Communications Quarterly*, 75(4), 762-775.

Works consulted

- Allgaier, J. (2004). Representing science education in the media: Newspaper coverage of evolutionary theory and creationist explanations. *PCST International Conference*. Retrieved July 27, 2005, from <http://www.pcst2004.org>.
- American Psychological Association. (2001). *Publication manual of the American Psychological Association*. Washington, DC: American Psychological Association.

- Anderson, W.B. (2001). The media battle between Celebrex and Vioxx: Influencing media coverage but not content. *Public Relations Review*, 27, 449-460.
- Andsager, J., & Smiley, L. (1998). Evaluating the public information: Shaping news coverage of the silicone implant controversy. *Public Relations Review*, 24(2), 183-201.
- Babbie, E. (1998). *The practice of social research*. Belmont, CA: Wadsworth Publishing Company.
- Bartlett, B. (2005). Perfect mother or artist of obscenity? Narrative and myth in a qualitative analysis of press coverage of the Andrea Yates murders. *Journal of Communication Inquiry*, 29(1), 9-29.
- Beam, R.A. (2003). Content differences between daily newspapers with strong and weak market organizations. *Journalism & Mass Communication Quarterly*, 80(2), 368-390.
- Benedict, J., Baker, P., Brennand, C., Deer, H., Dodds, M., Krysl, L., et al. (1995). News reporters as a target audience for Extension food safety programs. *Journal of Extension*, 33(6). Retrieved September 13, 2004, from <http://www.joe.org/joe/1995december/a2.html>.
- Berkowitz, D., & TerKeurst, J.V. (1999). Community as interpretive community: Rethinking the journalist-source relationship. *Journal of Communication*, 49(3), 125.

- Boehlje, M.D., & King, D.A. (1998). Extension on the brink – meeting the private sector challenge in the information marketplace. *Journal of Applied Communications*, 82(3), 21-35.
- Campbell, M., & Martin, R. (1992). Qualitative research as a tool for agricultural and Extension education. *Journal of Agricultural Education*, 32(1), 55-60.
- Cash, D.W. (2001). In order to aid in diffusing useful and practical information: Agricultural Extension and boundary organizations. *Science, Technology, & Human Values*, 26(4), 431-453.
- Catchings, C.L. (2004). *Relationship of organizational communication methods and leaders' perceptions of the 2002 farm bill: A study of selected commodity-specific, general agricultural, and national resources organizations*. Unpublished doctoral dissertation. Texas A&M University.
- Chi, M.T.H. (1997). Quantifying qualitative analyses of verbal data: A practical guide. *The Journal of the Learning Sciences*, 6(3), 271-315.
- Cole, P.M. (1994). Finding a path through the research maze. *The Qualitative Report*, 2(1). Retrieved July 29, 2005, from <http://www.nova.edu/ssss/R/BackIssues/QR2-1/cole.html>.
- Craig, D.A. (2000). Ethical language and themes in news coverage of genetic testing. *Journalism & Mass Communication*, 77(2), 160-174.
- Curtin, P.A., & Maier, S.R. (2001). Numbers in the newsroom: A qualitative examination of a quantitative challenge. *Journalism & Mass Communication Quarterly*, 78(4), 720-738.

- Curtin, P.A., & Rhodenbaugh, E. (2001). Building the news media agenda on the environment: A comparison of public relations and journalistic sources. *Public Relations Review*, 27, 179-195.
- Curtis, S., Gesler, W., Smith, G., & Washburn, S. (2000). Approaches to sampling and case selection in qualitative research: Examples in the geography of health. *Social Science & Medicine*, 50, 1001-1014.
- deSemir, V., Ribas, C., & Revuelta, G. (1998). Press releases of science journal stories and subsequent newspaper stories on the same topic. *Journal of the American Medical Association*, 280(3), 294-295.
- Dillman, D.A. (2000). *Mail and internet surveys: The tailored design method*. New York, NY: John Wiley & Sons, Inc.
- Elefson, J.O. (1992). How do agricultural journalists write? Social and cognitive behaviors of a specialized writing process. *Journal of Applied Communications*, 76(1), 31-39.
- Elefson, J.O. (1992). Methods of observing agricultural journalists. *Journal of Applied Communications*, 76(2), 50-58.
- Erlandson, D.A., Harris, E.L., Skipper, B.L., & Allen, S.D. (1993). *Doing naturalistic inquiry: A guide to methods*. London: Sage Publications.
- Fisher, A., King, R., Epp, D.J., Brown, J.L., & Maretzki, A.N. (1994). Evaluating alternatives of communicating about food risk. *Journal of Applied Communications*, 78(2), 1-11.

- Glascocock, J. (2000). The role of AT&T's public relations campaign in press coverage of the 1982 breakup. *Public Relations Review*, 26(1), 67-83.
- Glaser, B.G., & Strauss, A.L. (1967). *The discovery of grounded theory*. Hawthorne, NJ: Aldine.
- Grabe, M.E., Zhou, S., & Barnett, B. (1999). Sourcing and reporting in news magazine programs: *60 Minutes* versus *Hard Copy*. *Journalism and Mass Communications Quarterly*, 76(2), 293-311.
- Hall, A.L., & Rist, R.C. (1999). Integrating multiple qualitative research methods (or avoiding the precariousness of a one-legged stool). *Psychology & Marketing*, 16(4), 291-304.
- Heong, K.L., & Escalada, M.M. (1997). Perception change in rice pest management: A case study of farmers' evaluation of conflict information. *Journal of Applied Communications*, 81(2), 3-17.
- Herrera, Y.M., & Braumoeller, B.F. (2004). Symposium: Discourse and content analysis. *Qualitative Methods*, 1, 15-39.
- Houtman, N. (1991). Information transfer materials for interested publics: A survey of water resources research institutes. *Journal of Applied Communications*, 75(2), 10-14.
- Irani, T., & Sinclair, J. (2004). The effect of labeling genetically modified food on perceptions of accountability. *Journal of Applied Communications*, 88(1), 29-42.

- Kensicki, L.J. (2004). No cure for what ails us: The media-constructed disconnect between societal problems and possible solutions. *Journalism & Mass Communication Quarterly*, 81(1), 53-73.
- Kim, Y. (2000). Measuring the bottom-line impact of corporate public relations. *Journalism and Mass Communication Quarterly*, 77(2), 273-291.
- Kiousis, S. (2004). Explicating media salience: A factor analysis of *New York Times* issue coverage during the 2000 U.S. presidential election. *Journal of Communication*, 54(1), 71-87.
- Lee, S., & Roth, W-M. (2003). Science and the “Good Citizen”: Community-based scientific literacy. *Science, Technology, & Human Values*, 28(3), 302-424.
- Lincoln, Y.S. (2002). *On the nature of qualitative evidence*. Paper presented at the Annual Meeting of the Association for the Study of Higher Education. Sacramento, CA.
- Lindlof, T.R. (1995). *Qualitative communication research methods*. Thousand Oaks, CA: Sage Publications.
- Mahmud, M., & Kurniawan, S.H. (2005). Involving psychometric tests for input device evaluation with older people. *Proceedings of OZCHI 2005*. Retrieved July 26, 2005, from http://personalpages.manchester.ac.uk/staff/S.Kurniawan/files/2005_ozchi.pdf.
- Malthouse, E.C., & Calder, B.J. (2002). Measuring newspaper readership: A qualitative variable approach. *The International Journal on Media Management*, 4(4), 248-260.

- Mayring, P. (2000). Qualitative content analysis. *Forum: Qualitative Social Research*, 1(2). Retrieved July 28, 2005, from <http://www.qualitative-research.net/fqs-texte/2-00/2-00mayring-e.htm>.
- McCloud, S. (2004). *Making the American religious fringe: Exotics, subversives, and reporters*. Chapel Hill, NC: University of North Carolina Press.
- McCombs, M. (1974). *A comparison of intra-personal and inter-personal agendas of public issues*. Paper presented to the International Communication Association, New Orleans.
- Menashe, C.L., & Siegel, M. (1998). The power of a frame: An analysis of newspaper coverage of tobacco issues — United States, 1985-1996. *Journal of Health Communication*, 3, 307-325.
- Menifield, C.E., Rose, W.H., Homa, J., & Cunningham, A.B. (2000). The media's portrayal of urban and rural school violence: A preliminary analysis. *Deviant Behavior: An Interdisciplinary Journal*, 22, 447-464.
- Miller, J.D., & Kimmel, L.D. (2001). *Biomedical communication: Purposes, audiences, and strategies*. San Diego, CA: Academic Press.
- Miller, L.E. (1998). Appropriate analysis. *Journal of Agricultural Education*, 39(2), 1-10.
- Mumford, M.D., O'Connor, J., Clifton, T.C., Connelly, M.S., & Zaccaro, S.J. (1993). Background data constructs as predictors of leadership behavior. *Human Performance*, 6(2), 151-195.

- Murphy-Berman, V., Cross, T., & Fondacaro, M. (1999). Fairness and health care decision making: Testing the group value model of procedural justice. *Social Justice Research*, 12(2), 117-129.
- Nothstine, W.L., Blair, C., & Copeland, G.A. (1994). *Critical questions: Invention, creativity, and the criticism of discourse and media*. New York, NY: St. Martin's Press.
- Palgi, M. (2002). Organizational change and ideology: The case of the kibbutz. *International Review of Sociology*, 12(3), 389-402.
- Perkins, S.C. (2004). Un-presidented: A qualitative framing analysis of the NAACP's public relations response to the 2000 presidential election. *Public Relations Review*, 31, 63-71.
- Pincus, J.D., Rimmer, T., Rayfield, R.E., & Cropp, F. (1993). Newspaper editors' perceptions of public relations: How business, news, and sports editors differ. *Journal of Public Relations Research*, 5(1), 27-45.
- Pollock, J.C., & Yulis, S.G. (2004). Nationwide newspaper coverage of physician-assisted suicide: A community structure approach. *Journal of Health Communication*, 9, 281-307.
- Rampton, S., & Staubner, J. (2001). *Trust us, we're experts! How industry manipulates science and gambles with your future*. New York, NY: Jeremy P. Tarcher/Putnam.
- Rodriguez, L., Farnall, O., Geske, J., & Peterson, J.W. (1998). Opinion formation on environmental protection: Understanding the origins of attitudes toward resource

- enhancement and protection in Iowa. *Journal of Applied Communications*, 82(2), 27-45.
- Rothstein, H., Irwin, A., Yearley, S., & McCarthy, E. (1999). Regulatory science, Europeanization, and the control of agrochemicals. *Science, Technology, & Human Values*, 24(2), 241-264.
- Sandelowski, M. (2000). Focus on research methods: Whatever happened to qualitative description? *Research in Nursing & Health*, 23, 334-340.
- Shin, J.H., & Cameron, G.T. (2004). Conflict measurements: Analysis of simultaneous inclusion in roles, values, independence, attitudes, and dyadic adjustment. *Public Relations Review*, 30, 401-410.
- Sigal, L.V. (1973). *Reporters and officials: The organization and politics of newsmaking*. Lexington, MA: D.C. Heath and Co.
- Soileau, R.J., & Kotrlik, J.W. (2004). Louisiana mass media perceptions of the LSU AgCenter communications effort. *Journal of Agricultural Education*, 45(2), 14-27.
- Trumbo, C.W. (2004, Summer). Research methods in mass communication research: A census of eight journals 1990-2000. *Journalism & Mass Communication Quarterly*, 81(2), 417-436.
- Tucker, M., Ernst, S., & Henry, C.E. (2004). Demystifying the puzzle of applied communications research. *Journal of Applied Communications*, 88(4), 39-52.
- Yioutas, J., & Segvic, I. (2003). Revisiting the Clinton/Lewinsky scandal: The convergence of agenda setting and framing. *Journalism and Mass Communication Quarterly*, 80(30), 567-582.

Whiting, L.R., Rucker, M., & Whaley, S.R. (2004). Level of preparedness for managing crisis communication on land-grant campuses. *Journal of Applied Communications*, 88(3), 7-21.

APPENDIX
CODING INSTRUMENT

VARIABLES & CODES

| CODE | VARIABLE NAME | CODE VALUES |
|---------|---|---|
| | Story number | 1 through 30 (in sequence, number on story in red) |
| No code | # of stories | No code |
| | Story length | # of words, on each story |
| | # of sources | Count (integer) |
| | Types of sources | See Table B below (list actual affiliations here) _____ _____ _____ _____ _____ _____ _____ |
| | Science writer (use byline or see masthead) | 0 = No 1 = Yes (list actual job title here) _____ |
| | NP LOCATION | See Table A |
| | NP ID | See Table A |
| | NP CIRC | See Table A |
| | NP OWNERSHIP | See Table C |

CODING INSTRUCTIONS

1. First pass, highlight all sources - first mention of each source - do not include summary statements by the reporter himself/herself
2. Second pass, fill out code sheet, one per story

| VARIABLE NAME | CODE VALUES |
|--|---|
| Story number | 1 through 30 (in sequence) |
| # of stories | No code |
| Story length | # of words, on each story |
| # of sources | Count (integer) |
| Type of source | (see list) (list actual affiliations) |
| Newspaper location | 1 through 9 (see list) |
| Newspaper ID | 1 through 25 (see list) |
| Newspaper circulation | Actual circulation figures (2004, weekday) |
| Newspaper type of ownership | (see list of actual owners by name) |
| Science writer (either as given in byline or as listed in masthead; include science writer, environment writer, health writer, agriculture writer) | 0 = No 1 = Yes (list actual job titles) |

TABLE A: Newspaper Characteristics

| REGION OF UNITED STATES | NEWSPAPER ID/CIRCULATION |
|--------------------------------------|--|
| Northeast (New England) CODE = 1 | Boston Globe CODE = 1 |
| Northeast (Middle Atlantic) CODE = 2 | Buffalo News CODE = 2 |
| East North Central CODE = 3 | Chicago Sun Times CODE = 3 |
| | Cleveland Plain Dealer CODE = 4 |
| | Columbus Dispatch CODE = 5 |
| West North Central CODE = 4 | Milwaukee Journal-Sentinel CODE = 6 |
| | Omaha World Herald CODE = 7 |
| | St. Louis Post-Dispatch CODE = 8 |
| | Star Tribune [Minneapolis] CODE = 9 |
| West South Central CODE = 5 | Houston Chronicle CODE = 10 |
| | New Orleans Times-Picayune CODE = 11 |
| | San Antonio News-Express CODE = 12 |
| South Atlantic CODE = 6 | Atlanta Journal Constitution CODE = 13 |
| | St. Petersburg Times [Florida] CODE = 14 |
| Mountain West CODE = 7 | Denver Post CODE = 15 |
| | Rocky Mountain News [Denver] CODE = 16 |
| Pacific West CODE = 8 | Oregonian [Portland] CODE = 17 |
| | Sacramento Bee CODE = 18 |
| | San Diego Union-Tribune CODE = 19 |
| | San Francisco Chronicle CODE = 20 |
| | Seattle Times CODE = 21 |
| National CODE = 9 | Christian Science Monitor CODE = 22 |
| | New York Times CODE = 23 |
| | USA Today CODE = 24 |
| | The Washington Post CODE = 25 |

TABLE B: Source Types

| SOURCE TYPE | CODE |
|--|-------------|
| Government officials (not scientists) | 1 |
| Government scientists | 2 |
| Business reps (not scientists) | 3 |
| Corporate scientists | 4 |
| Ag producers (farmers, ranchers) | 5 |
| University official sources (not agriculture) | 6 |
| University agriculturalists | 7 |
| University scientists (not specifically agriculture) | 8 |
| Extension scientists | 9 |
| | |
| Extension other | 10 |
| Trade association protagonists | 11 |
| Activists (not linked to trade organizations) | 12 |
| Media | 13 |
| Consumers/general public | 14 |
| Undefined/unspecified (includes anonymous) | 15 |
| Other | 16 |

TABLE C: Ownership

| OWNER TYPE | CODE |
|-------------------------|------|
| Chain | 1 |
| Independent | 2 |
| Educational Institution | 3 |
| Religious Organization | 4 |

| OWNER | OWNER CODE | OWNER TYPE CODE |
|-------------------------------------|------------|-----------------|
| New York Times Company | 1 | 1 |
| Berkshire Hathaway, Inc. | 2 | 2 |
| Hollinger International | 3 | 1 |
| Newhouse Newspapers | 4 | 1 |
| The Dispatch Printing Co. | 5 | 2 |
| Journal Communications | 6 | 2 |
| Media News Group | 7 | 1 |
| Pulitzer Newspapers | 8 | 1 |
| McClatchy Newspapers | 9 | 1 |
| Hearst Newspapers | 10 | 1 |
| Cox Newspapers | 11 | 1 |
| Poynter Institute for Media Studies | 12 | 3 |
| E. W. Scripps | 13 | 1 |
| Copley Press | 14 | 1 |
| Seattle Times Co. | 15 | 2 |
| First Church of Christ Scientist | 16 | 4 |
| Gannett Newspapers | 17 | 1 |
| Washington Post Co. | 18 | 2 |
| P.G. Publishing Co. | 19 | 2 |

VITA

Name: Judith McIntosh White

Address: Texas A&M University, MS 2116, College Station, TX 77843

Email Address: judith-white@tamu.edu

Education: B.S.J., Journalism, Northwestern University, 1981
M.S., Science/Technology Journalism, Texas A&M University, 2001

Experience: 15+ years, journalism/public relations; 6+ years, college teaching

Publications: White, J.M. (2005, Fall). Influence of Involvement, Institutional Affiliation, and Geographic Location on Membership Retention in Voluntary Professional Organizations. *Journal of Applied Communications*.

Wingenbach, G., White, J., Degenhart, S., Smith, J. and Pannkuk, T. (2006, in press) Relationship of Student Teachers' Knowledge and Teaching Comfort Levels with Agricultural Science and Technology Objectives. *Journal of Agricultural Education*.

Presentations: Influence of Involvement, Institutional Affiliation, and Geographic Location on Membership Retention in Voluntary Professional Organizations, Part II: An Online Survey, Achieving Communications Excellence Conference, Quebec City, Quebec, Canada (June 2006)

Influence of Involvement, Institutional Affiliation, and Geographic Location on Membership Retention in Voluntary Professional Organizations, Achieving Communications Excellence Conference San Antonio, TX (June 2005)