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SARS Wars: An Examination of the Quantity and Construction of Health Information in the News Media

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The media have the power to sway public perception of health issues by choosing what to publish and the context in which to present information. The media may influence an individual's tendency to overestimate the risk of some health issues while underestimating the risk of others, ultimately influencing health choices. Although some research has been conducted to examine the number of articles on selected health topics, little research has examined how the messages are constructed. The purpose of this article is to describe an examination of the construction of news reports on health topics using aspects of the social amplification of risk model and the elaboration likelihood model of persuasion for theoretical direction. One hundred news media reports (print, radio, television, and Internet) were analyzed in terms of message repetition, context, source, and grammar. Results showed that health topics were more often discussed in terms of risk, by credible sources using strong language. This content analysis provides an empirical starting point for future research into how such health news may influence consumer's perceptions of health topics.

The news media have the power to choose which health topics reach the public and, as such, have been said to have significant influences on public perceptions of the most pressing issues of the day. More than 20 years ago, Rogers and Kincaid (1981) sought to understand the agenda-setting process of mass media institutions. They argued that a convergence model and communication network analysis would advance knowledge of how mass media obtain, define, and transmit information. Since that time, there has been compelling experimental research to support the idea that the media have agenda-setting capability; that is, the news media are crucial in how we construct our notion

of reality (Bryant & Zillmann, 2002), and media effects are related to the interpersonal communications that stem from interest generated by the news media (Rogers, 2002). Media coverage and resultant discussion can result in some risks being overestimated while others are underestimated (Ropeik & Slovic, 2003; Slovic, 1987). Ropeik and Slovic discussed (2003) how the media are an important factor in this: "We live in a time of unprecedented media availability and information immediacy. Whenever something is discovered that may even *possibly* be perilous, we learn of it, worldwide, within days" (p. 2).

The news media can play either a positive or negative role in the dissemination of health information by promoting public health and influencing public debate regarding health issues (Wallack, Dorfman, Jernigan, & Themba, 1993), or by sensationalizing health issues and causing unnecessary

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fear (Signorielli, 1993). However, it is problematic that the news media are ultimately driven by what sells, and what sells is *health hype*, a phenomenon described by Signorielli (1993) as health news that exaggerates and entertains. This results in major discrepancies between actual causes of death and the amount of coverage of these by the news media. For example, some researchers have found that tobacco use and cardiovascular disease (CVD) are underrepresented in the news media compared with their actual mortality cause (Frost, Frank, & Maibach, 1997). Other researchers have shown that the health risks from dreaded causes of death, such as cancer, are often overestimated, whereas health risks from less dreaded, controllable diseases, such as heart disease, are underestimated (Covello & Peters, 2002). Covello and Peters (2002) found that 80% of women relied on the general media for health information, and only 25% received health information from doctors or nurses. Concurrent with their survey, Covello and Peters analyzed health reports in the news media and found that there were far more on breast cancer than on other significant women's health issues such as heart disease, lung cancer, osteoporosis, or Alzheimer's disease. It has also been found that breast cancer received disproportionately more coverage than lung cancer in surveyed Canadian women's magazines, although lung cancer is the most common cancer in women (Gerlach, Marino, & Hoffman-Goetz, 1997). Research must expand beyond calculating the amount of coverage the news media gives selected health topics to an examination of how health messages are constructed. As Finlay and Faulkner (2005) suggested, media are "meaning-making institutions" (p. 127), not merely conduits for information. A content analysis of health news in the media is a useful starting point for future research examining the influence such news may have on consumers' understanding and perception of health. As Kolbe and Burnett (1991) wrote, "Content analysis provides an empirical starting point for generating new research evidence about the nature and effect of specific communications" (p. 244).

Theories that can guide a content analysis of health messages in the news media include the *social amplification of risk model* and the *elaboration likelihood model (ELM)*. The social amplification of risk model examines the impact of risk from the time of the event itself through the information flow, interpretation and response, and the spread and type of impact of the risk (Kasperson et al., 2000). Aspects of the information flow component of this model can be used to examine message construction. The theory posits that when there is no direct personal experience of risk, information can reach individuals through either the news media or personal networks and that public response is influenced by the volume, dramatization, and symbolic connotations of the information (Kasperson et al., 2000). Independent of accuracy, large volumes of information can amplify the perception of risk and distract individuals from

other sources of risk. Furthermore, Kasperson et al. (2000) claimed that even if the coverage is balanced, it has been shown that reassuring claims may not counter the effects of fear or risk messages.

In addition to how the message is dramatized or symbolically represented, other aspects of message construction that could affect the power of a message include the source of the message and grammatical elements used to construct the message. These are variables that have been incorporated into the ELM (Petty & Cacioppo, 1986), which focuses on the processes through which messages interact with individuals. The ELM posits central and peripheral routes for message processing (Petty, Priester, & Brinol, 2002), which exist on a continuum and influence the likelihood that a message will be elaborated on. If an individual is actively thinking about a message, then processing of the message occurs through a central route, the message is further elaborated on, and a long-lasting change regarding the message is likely. Conversely, peripheral processing, in which the individual is not actively engaged in the message, may result in attitude change, but as a result of less thoughtful processing, and the change will less likely be based on the merit of the argument (Booth-Butterfield & Welbourne, 2002). For example, similar to the social amplification of risk hypothesis that a large volume of information can amplify the perception of risk, in peripheral processing an individual may be persuaded simply by the sheer number of arguments presented.

At higher levels of involvement with a message, argument strength is an important influence on persuasion, and strong arguments are those that are significant, plausible, and novel (Booth-Butterfield & Welbourne, 2002). Furthermore, Areni (2003) argued that the characteristic of language can have an effect on argument strength; other researchers have also referred to how powerless or powerful language can influence message credibility (Blankenship & Holtgraves, 2005). Areni outlined how some elements of language, under certain conditions, can weaken arguments; however, like all ELM variables, the influence of language elements are dependent on how relevant the message is to the receiver. He argued that when a topic is personally relevant and the argument is cogent, rhetorical questions (e.g., "Isn't it obvious that physical activity is good for you?") can be distracting and more likely to result in counterarguments, thereby weakening the message. There is some empirical evidence to support these ideas. For example, Blankenship and Holtgraves (2005) found that in highly relevant situations, tag questions distracted the message recipient, thereby weakening the message. Other researchers have found that for both strong and weak message arguments, the presence of rhetorical questions resulted in reduced recall, thereby limiting the processing of the messages (Munch & Swasy, 1988). These results are similar to the findings of Petty, Cacioppo, and Heesacker (1981), who reported that under conditions of high relevance rhetorical questions

disrupted thinking and made otherwise strong arguments less persuasive.

Although Blankenship and Holtgraves (2005) stated that powerful language is that which simply does not include characteristics such as tag questions or disclaimers, Areni (2003) made the case that the presence of language elements such as warrants, connectives, and qualifiers strengthen arguments. *Warrants* are statements that establish the relationship between data and claims (e.g., "Physical activity reduces blood pressure [data] and is therefore an excellent way to reduce your risk of cardiovascular disease [claim]"). Connectives include words and phrases such as *because* or "due to the fact that" and often serve as warrants. The power behind a connective such as *because* is that it implies a contingent relationship between the statements. Messages that include warrants or connectives are stronger, easier to comprehend, and more likely to be processed. Areni made his argument on the basis of the consumer research of Munch, Boller, and Swasy (1993), who found that advertisements that included warrants were more believable and persuasive than those that did not. Similarly, qualifications that indicate the conditions under which the claim is true can make a message more persuasive because they limit the recipient's ability to produce a counterargument. It should be noted that much of the supporting work for these arguments is laboratory based, and real world examinations of the impact of such grammatical elements are necessary. Furthermore, Areni presented his arguments in terms of product advertising, and the assumption is made that because other aspects of the ELM can and have been applied to news media research, the grammatical elements he outlined are also applicable for this research.

A final aspect that should be considered when conducting a content analysis of health news is the source of the message and the perceived trustworthiness of the source, as they too can influence argument strength and subsequent persuasiveness, particularly under high elaboration conditions (Petty et al., 2002). Factors that contribute to source credibility include expertise, competence, and objectivity; in general, highly credible sources, such as experts, are more persuasive than less credible sources. This is particularly true when the message is congruent with the recipient's self-interests, the message is complex, or the recipient has a negative attitude toward the message (Pornpitakpan, 2004). Although Pornpitakpan's (2004) discussion on the influence of source credibility relates to advertising, he claimed that source credibility applies across various contexts of persuasion, including public policy. Related to message source, there is evidence that messages including a case history or "human interest" aspect are more likely to be attended to than stories that contain scientific or medical information (Petty & Cacioppo, 1986). It is also of interest that credibility of source and powerful language may interact: Blankenship and Holtgraves (2005) cited work indicating

that individuals who use powerful language are deemed more credible than individuals who use powerless language.

As discussed, one of the key aspects of the ELM is that whether a variable takes on a central or peripheral role in persuasion is dependent on the context in which the variable is encountered, and a general conclusion from the ELM is that under conditions of high elaboration, strong arguments lead to attitude change (Booth-Butterfield & Welbourne, 2002). Covello and Peters (2002) found that the media are an important source of health information for a majority of the people they surveyed, and it is therefore possible that health information is consumed under conditions of high elaboration, because it is likely that people who are reading or watching a news piece are doing so out of interest. However, this supposition requires examination, and to fully understand the potential impact of health news reporting on consumers an essential starting point is to understand the construction of health messages in the news media before the message-receiver interaction can be examined.

The purpose of this research was to examine the quantity and construction of health messages in the news media. Using aspects of both social amplification and ELM theory as guides, health news stories were examined in terms of context, message source, and language characteristics. By combining the two theories, an in-depth examination of the construction of messages can be conducted. Guided by previous research and the theoretical models, this research addressed the following questions:

- 1) Is the frequency with which some health topics are mentioned disproportionate to the risk that the health topic has to the general public?
- 2) Are health topics discussed more in terms of risk or prevention?
- 3) What are the main sources of information used in the articles?
- 4) Is the language used that which has been theorized to result in further elaboration of a message?

METHOD

The pool of media reports included all newspaper, radio, television, and Internet news reports on health-related topics available in one western Canadian city from January 1999 through December 2003. Specifically, the media included 98 print, 8 television, 5 radio, and 2 wire sources representing national, provincial, regional, and ethnic media reports. The reports consist of full newspaper and Internet articles and all spoken text from radio and television pieces on health that appear in national, provincial, and local media. It is important to note that these reports did not include feature stories typically included in the "Lifestyle" or "Health" sections of print or electronic media, where

much more coverage of health and wellness-related stories can often be found (Harraban, Coote, & Allen, 2003).

Out of this pool, 100 media reports were randomly selected for analysis. We used a constructed week scheme and randomly sampled from each day of the week (Monday through Friday) to construct a representative “week” each quarter (every 3 months). One week per quarter of the year was randomly selected for every year of the database. This equals 5 days \times 4 quarters \times 5 years = 100 days of media analysis.

NVivo software was used to code the media reports. This software allows for coding and organization of text, searching and assessing the relationships of text, and searching for themes in the text. Consistent with previous research and predictions of social amplification theory and the ELM of persuasion, the selected reports were reviewed in terms of six attributes or codes, and it is possible that a single article could have several or no mentions of any of the codes or its subcodes (e.g., mention both risk and prevention in a single article). The six attributes were as follows:

1. Frequency of mention of health-related topics (e.g., CVD; breast, lung, prostate, and other cancers; communicable diseases, mental health). It should be noted that some infectious diseases, such as sudden acute respiratory syndrome (SARS) were counted separately, but all others (e.g., meningitis, influenza) were counted under one “other infectious diseases” heading.
2. Context of the story, including whether the health topic was discussed in terms of risk, prevention, or treatment.

Examples taken from the media reports include the following.

Risk: *A common combination of hormones taken by millions of postmenopausal women may increase their risk of breast cancer, according to a new study.*

Prevention: *Because the disease appears to be spread through close contact, the best way to prevent infection is through thorough, frequent hand-washing.*

Treatment: *A new approach to help addicts through withdrawal, by using acupuncture, is being tried out on the downtown eastside.*

3. Whether the source of information was expert or nonexpert. On the basis of criteria outlined by Pornpitakorn (2004), sources were identified as expert when they were deemed to have expertise and/or competence in their given area. As such, health professionals (e.g., physicians, nurses), researchers, and medical health officers (government employees who are also physicians) were considered expert. Nonexpert sources included the general public

(“person on the street” comments) and opinion pieces (e.g., letters to the editor by a layperson).

Examples of sources taken from the media reports include the following

Health professional: *A Vancouver cardiologist said she hopes family doctors follow the message in the study that with certain patients, cholesterol (lipid) lowering medication can be extremely beneficial. “I am already reformed, already a convert to this approach,” she said.*

Research: *Parents who complain about a child’s cigarette smoking might have a good chance of stopping the habit before it starts, a report says. Researchers at Dartmouth Medical School said they reached that conclusion after looking at children in the 4th through 11th grades in three rural Vermont schools.*

Medical health officer: *“Meningococcus travels from one person to another by sharing saliva,” said the Fraser Valley Health Authority (FVHR) medical health officer in a press release. “So everyone everywhere can protect themselves against getting meningococcus moving into their throats by not sharing things with fresh saliva, such as cigarettes, toothbrushes, straws, water bottles or lipsticks.”*

General public: *[One man] says he experienced a general malaise most of his life, something he believes was caused by being exposed to high levels of lead as a child in Ottawa, growing up in a house with lead water pipes. Since the [chelation] treatments, he says his quality of life has improved dramatically.*

Opinion piece (excerpt from a letter to the editor): *I agree with the study that showed electroconvulsive therapy [ECT] is useless in treating depression Out of desperation two years ago, I voluntarily had ECT. It gave me temporary relief by wiping out my memory. I simply forgot I was depressed. ... Getting off antidepressants and out from under the mental health care system, which is paternalistic at best and abusive at worst, cured my depression.*

4. Strong argument elements of grammar, such as warrants, connectives, and qualifiers as outlined by Areni (2003). It should be noted that Areni outlined other language characteristics that may influence argument strength, but some of these were more specific to advertising and not easily identifiable in the media reports and so were not used in this analysis. A *warrant* was defined as any statement that established the relationship between data and claims, and a *connective* was defined as any sentence that included words or phrases such as *because* or “due to the fact that.” A *qualifier* was defined as any statement that indicated the conditions under which the claim is true.

Examples of grammar taken from the media reports include the following.

Warrant: *It has been 10 years since the researchers discovered that substances in such vegetables as broccoli, kale, cabbage, and cauliflower raise levels of these clean-up enzymes, which is one of the reasons doctors consider them an important part of a healthy diet.*

Connective: *In fact, there is some evidence that these treatments are superior to antidepressant medications because relapse is less likely to occur when depression is treated with psychotherapy compared to drugs.*

Qualifier: *"These risk factors are trivial in the context of other risk factors," Dr. Reid said. "If you don't exercise regularly, if you drink [alcohol] and if you are overweight, you increase your risk much more than if you use hormone-replacement therapy."*

5. Grammar that can potentially weaken an argument, such as rhetorical questions.

Example of a rhetorical question: *Would you want your child sitting beside someone who's been to Hong Kong in the last couple of weeks?*

6. Whether there is a human interest aspect to the story.

Example of human interest (excerpt from an entire article): *A trim, fit-looking 44 years, Hanna has terminal cancer. It will take him, the only question is when. "It's one of the worst nightmares people have. I lived that nightmare when the doctor told me."*

On the basis of the six topics just listed, a priori codes were established to begin categorization of the data. The key themes within each of these initial categories (media, health topic, context, source, and grammar) evolved on the basis of a combination of the topics listed and the actual content of the media reports (e.g., themes or topics that appeared on a regular basis). The initial training session introduced the research assistant to NVivo 7.0 software. In addition, word and theme ambiguities were discussed and resolved, and definitions were established through negotiated consensus between the main researcher and the assistant. Both of these individuals coded the media reports to determine interrater reliability. The process of negotiated consensus was ongoing between the two researchers throughout the coding; necessary adjustments were made, and a final reliability check was done at the end of all the coding. If it was decided to add new nodes, then all previously coded media summaries were recoded according to the updated system. Each researcher coded the reports by type of media first (e.g., newspaper, television), then by health topic (e.g., CVD, cancer). Then each report was carefully read, and each context, source, and grammar representation was coded. The procedure and the final nodes used are outlined in Figure 1.

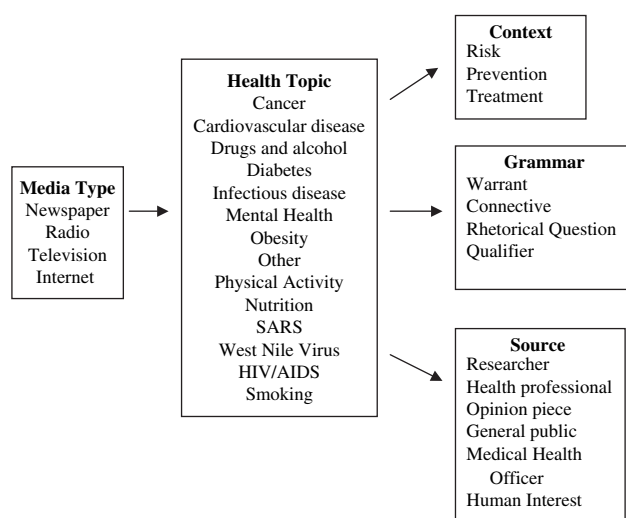


FIGURE 1 Coding procedure and nodes used. SARS = sudden acute respiratory syndrome.

Analyses

For analysis purposes, health topics were further classified as either a disease (e.g., cancer) or as a risk factor (e.g., smoking). Articles coded as "other" all had to do with a disease (e.g., osteoporosis, asthma, multiple sclerosis). Because of the large differences in number of articles represented by different media and in the number of articles on each health topic, context, source, and grammar results were examined in terms of proportions to the total number of articles. For example, there was a total of 37 articles about CVD, and 44 expert sources were cited, to give a proportion of 1.19, or an average of almost 1.2 expert sources cited in each article. Independent-samples *t* tests were used to compare grammar usage by expert and nonexpert sources.

RESULTS

Overall reliability for the coding of media and health topics was calculated using Cohen's kappa because these data were nominal level. The reliability for coding of media was $t(24)=7.36$, $p < .001$, and for health topics was $t(24)=14.08$, $p < .001$. Reliability for context, grammar, and source was calculated using Scott's pi. Values for this index can range from -1.0 to $+1.0$, and values around zero indicate that chance is resulting in any agreement (Riffe, Lacy, & Fico, 1998). Reliability for context, when averaged across risk, prevention, and treatment, was calculated as .48 (percentage agreement = .70), for grammar was .51 (percentage agreement = .85), and for source was .55 (percentage agreement = .81). Because of the low reliabilities for context, source, and grammar, and because the first coder had more expertise than the second coder (who was a research assistant), the first investigator recoded 10% of the sample as a test of intrarater reliability about

1 year after the initial coding. The sample for recoding was selected using SPSS 11.5 random selection at the media and health topic level (e.g., newspaper cancer stories or radio SARS stories were recoded for context, grammar, and source). The intrarater reliability for context was .80 (percentage agreement=.89), for grammar was .81 (percentage agreement=.89), and for source was .83 (percentage agreement=.91). Therefore, in the case of disagreement the final counts are based on the coding of the first coder.

The volume of health coverage was highest in the print media. There were 849 health articles in newspapers, compared to 137 on the radio, 165 on television, and 75 accessible via the Internet. The total number of articles on cancer is 96; however, by specific cancers, 44 had to do with breast cancer, 6 with prostate cancer, 5 with lung cancer, 4 with skin cancer, and the remainder (36) were a mix of others (e.g., general cancer treatments, colorectal, childhood cancers, ovarian, etc.). There were 2.6 times more press dedicated to cancer than there was to CVD. Furthermore, 19% of cancer stories wove a human interest element throughout, whereas this aspect was lacking in CVD reports. The number of articles devoted to diseases or specific conditions outweighed the number of articles devoted to risk factors by a ratio of 2.30:1. The majority of risk factors were about smoking (297 articles out of a total 375 risk factor articles). It should be noted that although there were 297 total articles that had to do with smoking, 278 of these articles were related to legislation (e.g., banning smoking in public places, lawsuits against tobacco companies), and 19 were related to the immediate effects of smoking (e.g., research on the negative effects of second-hand smoking, tips on trying to quit). Additionally, although SARS surfaced only in 2003, there was an enormous amount of press devoted to that topic in 1 year (164 articles).

Context

Overall, we found that, across all media and health topics, there were proportionally almost two and a half times as many mentions of risk ($N=392$, proportion=.32) as there were mentions of prevention ($N=165$, proportion=.13) and four times as many as treatment ($N=102$, proportion=.08). Table 1 shows the number of mentions of risk, prevention, and treatment and the proportion of these to the total number of articles per health topic. It should be noted that treatment was not a possible context for most risk factor topics, except obesity and drugs and alcohol. Both of these topics could be considered diseases or conditions given the context, but for the purposes of this research it was decided that they were a better fit with the risk factor category.

In a comparison of expert sources to nonexpert sources, it was found that expert sources discussed the risk of health topics significantly more than did nonexpert sources,

$t(217)=4.09$, $p < .001$. Similarly, expert sources talked in terms of prevention more than nonexpert sources, $t(212)=2.98$, $p < .005$. The only context in which nonexperts were cited somewhat proportionally as often as experts was treatment, $t(217)=1.38$, $p=.18$. An example of a nonexpert discussing treatment was the following:

Like many older women entering psychiatric wards in Canada, Ueberschar, now 69, was offered electroconvulsive shock therapy, or ECT. She refused, and fought a legal battle with the institution to prevent it from administering the treatment. "I said I don't want my brains fried, thank you very much," says Ueberschar, who was discharged five months later without having been hooked up to electrodes to induce a seizure. ("Seniors More Likely," 2002).

Source

Overall, we found that expert sources (proportion $M=.64$) were used to a greater extent than nonexpert sources (proportion $M=.14$), with the exception of nutrition and mad cow disease, which generated more opinion pieces and letters to the editor and so had an approximately equal amount of citations from expert and nonexpert sources. Human interest stories were few; however, cancer and mental health had the bulk of human interest stories with, seven and nine articles, respectively. The numbers of expert, nonexpert, and human interest sources cited by health topic are shown in Table 2.

Grammar

Across all health topics, strong grammar (proportion $M=.25$) was used proportionally more than weak grammar (proportion $M=.04$). However, it has been found that when strong arguments are used, highly credible sources are more persuasive, but source credibility has no effect when arguments are weak (Moore, Hausknecht, & Thamodaran, 1986, cited in Pornpitakpan, 2004); therefore, a secondary analysis examined the grammar used by expert and nonexpert sources. Expert sources used stronger grammar (proportion $M=.90$) significantly more, $t(223)=2.22$, $p < .05$, than nonexpert sources (proportion $M=.25$). Similarly, nonexpert sources used weaker language (proportion $M=.32$) significantly more, $t(216)=4.43$, $p < .001$, than expert sources (proportion $M=.04$). The proportional usage of strong and weak language by health topic is shown in Table 3.

DISCUSSION

This research supports the results of previous work in answering the question of whether the frequency with which

TABLE 1
Number of Times a Context is Mentioned (Proportion to Total Number of Articles) By Health Topic

Health Topic	Total no.Articles	Risk		Prevention		Treatment	
		M	SD	M	SD	M	SD
Disease or condition							
Cancer	96	57	0.59	28	0.29	16	0.17
CVD	37	13	0.35	9	0.24	9	0.24
Diabetes	26	5	0.19	3	0.11	8	0.31
HIV/AIDS	86	26	0.30	3	0.04	4	0.05
Mental health	61	19	0.31	5	0.08	21	0.34
Mad cow	26	3	0.12	0	0.00	0	0.00
Other	177	86	0.48	11	0.06	27	0.15
Other infectious diseases	148	69	0.47	57	0.39	4	0.03
SARS	164	25	0.15	18	0.11	1	0.01
West Nile Virus	43	18	0.42	15	0.35	0	0.00
Total (mean proportion)	864	321	0.34	149	0.17	90	0.13
Risk factor							
Drugs and alcohol	28	17	0.62	1	0.04	4	0.14
Nutrition	14	5	0.36	0	0.00	0	0.00
Obesity	16	8	0.57	3	0.21	2	0.14
Physical activity	20	8	0.40	2	0.10	0	0.00
Smoking (health)	19	10	0.42	2	0.08	0	0.00
Smoking (legislation)	278	23	0.08	10	0.04	3	0.01
Total (mean proportion)	375	71	0.41	18	0.08	9	0.05

Note. CVD = cardiovascular disease; SARS = sudden acute respiratory syndrome.

TABLE 2
Number of Sources Cited by Health Topic

Health Topic	Expert		Nonexpert		Human interest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Disease or condition						
Cancer	69	0.72	11	0.12	7	0.07
CVD	44	1.17	4	0.08	0	0.00
Diabetes	18	0.69	1	0.04	1	0.04
HIV/AIDS	35	0.19	6	0.07	1	0.01
Mad cow	4	0.15	3	0.12	0	0.00
Mental health	48	0.78	14	0.23	9	0.15
Other	155	0.88	39	0.22	10	0.06
Other infectious diseases	117	0.79	12	0.08	2	0.01
SARS	143	0.87	22	0.13	0	0.00
West Nile Virus	29	0.67	19	0.07	0	0.00
Total (mean proportion)	662	0.69	131	0.12	30	0.03
Risk factor						
Drugs	23	0.82	5	0.18	0	0.00
Nutrition	8	0.57	6	0.43	0	0.00
Obesity	10	0.63	1	0.07	2	0.13
Physical activity	4	0.20	2	0.10	0	0.00
Smoking (health)	16	0.84	1	0.05	1	0.05
Smoking (legislation)	60	0.22	38	0.14	1	0.003
Total (mean proportion)	121	0.55	89	0.11	4	0.03

Note. CVD = cardiovascular disease; SARS = sudden acute respiratory syndrome.

some health topics are mentioned is disproportionate to the risk posed to the general public. The results of this content analysis showed that in 2003, there was far more information available in the news media on SARS and West Nile Virus than on other health topics with greater population

prevalence, such as obesity or heart disease. The number of articles about SARS in 1 year was greater than for any other individual topic across all 5 years, with the exception of smoking (which in 2003 had only 36 articles, compared to SARS, which had 164) and "other" topics. Furthermore, the

TABLE 3
Proportional Usage of Strong and Weak Grammar Elements by Health Topic

<i>Health Topic</i>	<i>Strong</i>		<i>Weak</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Disease or condition				
Cancer	40	0.42	6	0.06
CVD	12	0.32	1	0.03
Diabetes	5	0.21	2	0.08
HIV/AIDS	10	0.12	0	0.00
Mad cow	2	0.08	1	0.04
Mental health	16	0.26	6	0.10
Other	61	0.34	4	0.02
Other infectious diseases	32	0.22	3	0.02
SARS	56	0.34	2	0.01
West Nile	8	0.19	0	0.00
Total (mean proportion)	242	0.25	22	0.04
Risk factor				
Drugs	9	0.31	2	0.07
Nutrition	4	0.29	2	0.14
Obesity	5	0.31	0	0.00
Physical activity	5	0.25	1	0.05
Smoking (health)	7	0.29	0	0.00
Smoking (legislation)	32	0.12	18	0.08
Total (mean proportion)	62	0.26	23	0.06

Note. CVD = cardiovascular disease; SARS = sudden acute respiratory syndrome.

symbolic connotation of SARS was that it was “mysterious” (described as such 30 times) and “deadly” (described as such 17 times). The representation of SARS in the present study mirrors how SARS was discussed in British newspapers as “the next plague” with accompanying actual and predicted death tallies (Washer, 2004). Washer (2004) pointed out the phenomenon of the SARS panic, “where the saturation and speed of the world news media’s coverage” (p. 2570) of the disease put fear in the hearts and minds of citizens. These results correlate with the findings of a poll of 1,450 Canadians that indicated that 97% reported being aware of SARS by April 2003, and 28% were worried that either they or someone close to them would contract the disease (Leger Marketing, 2003b).

Similarly, there were almost as many articles on mad cow disease as there were on CVD. Although CVD is the leading killer in Canada, the number of deaths attributed to the mad cow variant of Creutzfeldt-Jakob disease in Canada, from 1979 to 2001, is 1 (Ramage-Morin, 2003). Despite the relative risk of SARS and mad cow disease, a disproportionate number of Canadians are still concerned about these infectious diseases. A poll conducted in July 2003 indicated that respondents were ‘most scared’ of AIDS (25%), SARS (22%), West Nile Virus (20%), and mad cow disease (4%; Leger Marketing, 2003a). Although these findings are of interest, it is premature to draw conclusions and the relationship between news coverage of health topics and perceptions of risk requires further investigation to fully understand the relationship.

We also found that 45% of cancer articles were about breast cancer and, only 5% were related to lung cancer, despite the reverse relative risk of the two diseases for Canadian women.¹ There were also many more articles about cancer than CVD. Other researchers have compared heart disease with cancers and found that the amount of press devoted to breast cancer far outweighed the amount given to heart disease (Covello & Peters, 2002; Gerlach et al., 1997). Although health articles tended to quote experts and not focus on “stories from victims,” there was one exception in that cancer stories were likely to have a human interest aspect, whereas there were no articles about CVD with a human interest story. This is relevant because it has been found that people are more likely to attend to human interest stories than to stories that present scientific data (Petty & Cacioppo, 1986), and so future research should examine the persuasiveness of media reports depicting the risk of cancer using human interest stories.

In general, health topics were discussed in terms of risk almost three times as often as they were discussed in terms of prevention. This is important when considered in light of the work of Kasperson et al. (2000), who argued that, independent of accuracy, large volumes of information can amplify the perception of risk and that even if the coverage is balanced, it has been shown that reassuring claims may not counter the effects of fear or risk messages. In conditions of high involvement this may result in greater

¹In 1997, the rate of lung cancer in Canadian women was 33 per 100,000, whereas the rate for breast cancer was 28 per 100,000; the rate for heart disease was 130 per 100,000 (Statistics Canada, 2003).

persuasiveness of the risk involved in some topics over others, and this is a rich area for future research. The amount of discussion of risk versus prevention also relates to what Kasperson et al. referred to as the *social attenuation of risk*. These authors identified smoking as a topic that has many well-publicized risks but still generates low levels of interest. Such social attenuation of the risk of smoking may result in costs to the individual due to underresponse. Although smoking as a health risk has been in the public consciousness for many years, many individuals still feel that it is their right to smoke, and the main topic of the articles regarding smoking used in the current research was the institution of antismoking legislation in public places. Many of the articles reviewed were opinion pieces and letters to the editor about this issue and medical health officers or health professionals defending the legislation. This was evidenced by a headline for a "Letters to the Editor" section of the *Vancouver Sun* (2000, p. A13): "New restrictions on smoking a hot-button issue for readers," which was followed by eight letters both for and against the smoking ban. The subsequent interpersonal discussion, identified by Rogers (2002) as a factor in the agenda-setting capabilities of the media, may have been about the fairness of the anti-smoking legislation rather than the health risk of smoking itself. This research needs to be expanded to examine the discussion generated by the news media.

In terms of sources of information, we found that expert sources were cited far more often than nonexperts and, furthermore, that experts used stronger language than nonexpert sources. The implication of expert sources using strong language may be that individuals who are involved with the story are more likely to be persuaded by the articles citing such sources. However, because expert sources also most often discussed risk rather than prevention or treatment, individuals may be persuaded that they are at greater risk than is actually the case. The exceptions were nutrition and mad cow disease, both of which all had a disproportionate number of nonexpert sources cited in the form of letters to the editor, potentially affecting the persuasiveness of communication regarding these topics. It may also be that news about eating well is not new after all, particularly when the consequences are not immediate and perceived as cosmetic rather than health damaging, in addition to requiring entrenched lifestyle change. This point was recognized by one physician when discussing the increase in hand-washing that came with SARS:

The question is, how to get the public's attention. It's not easy. Consider the number of people who still smoke. Or gorge on fast food. This happens in spite of constant warnings of the dangers. But now and then an unexpected event suddenly arouses the public psyche. When fear is involved, people react en masse. (Gifford-Jones, 2003, p. A10)

It may be that the fear instilled by SARS, a more rapidly paced and invisible epidemic, effectively captured

the public's interest and efforts to curb its spread simply because fear-based messages work best when the solution can be easily implemented as a precautionary action (Andreasen, 1995). This also speaks to the novelty of SARS; as Booth-Butterfield and Welbourne (2002) pointed out, at higher levels of involvement with a message, strong arguments are those that are significant, plausible, and novel. The SARS phenomenon may be a case that contains all three of these, thereby influencing individuals to take preventive measures.

Limitations and Conclusion

There are several limitations to this research. First, we analyzed only text, so the impact of images and voice tone cannot be assessed. It has been found that television is considered the most credible media among polled Canadian adults (Leger Marketing, 2002), and so the images associated with health topics should be further analyzed. Another limitation is the relatively low reliability for grammar and source counts. Further research is necessary to fully operationalize the definitions of grammar aspects, such as warrants as they appear in news text instead of advertising. It is also important to note that Areni (2003) outlined aspects of grammar that can influence argument persuasion within advertising, and this analysis extrapolated his definitions to news media, selecting only those arguments that were clearly present within that media. Like all aspects of the ELM, how these characteristics are perceived affects their contribution to argument strength. Numerous sources have highlighted that the variables that influence persuasion depend on the nature of the recipient (Moskowitz, Skurnik, & Galinsky, 1999; Petty & Cacioppo, 1986; Pornpitakpan, 2004). This research was intended as a preliminary examination of the characteristics of the messages themselves and not how they might interact with consumers. It would be of interest to determine whether an individual who consumes health stories because of personal involvement in the topic is more likely to be persuaded by the content than an individual who is just casually watching or reading a health news item. It is likely that those who are already in ill health, or who know someone who suffers from an illness, will pay more attention to news media regarding the health concern, but this possibility requires examination in light of the findings of this content analysis.

This research highlights how health topics are presented in the media. We know that the media can play a positive role in promoting public health and influencing debate regarding health issues (Wallack et al., 1993); however, some issues seem to generate a stronger response in the public, and this may be related to how the media construct messages. Most often, health messages are framed in terms of risk, by expert sources using strong language. This correlates with heightened risk perception of hot health topics that receive much press, such as SARS and mad cow disease.

This analysis can provide a guide for further research, which should examine the characteristics of health messages in the news media in conjunction with the nature of individuals who consume it. How this interaction influences risk perception and adoption of preventative health behaviors is a rich area for future study.

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