TALKING AND DOING: THEORY-BASED STRATEGIES AS REFLECTED IN THE REPORTING PRACTICES OF JOURNALISTS WHO COVER NUTRITION SCIENCE TOPICS IN A COMPLICATED MEDIA ENVIRONMENT

A Thesis

by

GWENDOLYN C. INOCENCIO

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

MASTER OF SCIENCE

Chair of Committee,	Barbara Gastel
Committee Members,	Yasha Hartberg
	Valerie Balester
Head of Department,	Todd M. O'Hara

August 2020

Major Subject: Science and Technology Journalism

ABSTRACT

Journalists who cover nutrition science are central figures in a crowded media environment that competes to deliver health information to consumers with limited attention. With seemingly equal validity, both expert and nonexpert voices broadcast from multiple platforms, which can complicate the environment for consumers and can contribute to health misinformation. Scholars have recommended theory-based strategies applicable to the challenges associated with communicating nutrition science messages in this environment. However, no writings seem to indicate the extent to which journalists' reporting experiences inform the proposed solutions. To address this apparent gap in perspective, I conducted in-depth semi-structured interviews with eight journalists who have covered nutrition science to obtain their descriptions of their reporting practices. When I then combined an interpretive phenomenological approach and a thematic mapping process using Toulmin's theory of argumentation, four global themes emerged. The themes represented the journalists' perceived roles in the nutrition science reporting process, how these journalists navigate the constraints of the environment, how media type and format affect their rhetorical choices, and how they manage the accelerated pace of an increasingly digitalized landscape. Overall, scholars' suppositions about the challenges journalists face in the modern media environment and the recommended theory-based strategies were largely, but not fully, reflected in these journalists' practices. Findings showed that the journalists acknowledged their pivotal role as key translators of nutrition science for the lay public, which confirms the

importance of choosing appropriate message frames, assessing audience needs, including essential context, and maintaining standards of content quality when communicating science. Additionally, findings showed the ways in which the journalists coped with professional demands resembled management practices of successful classroom teachers.

DEDICATION

`a mon mari, Daniel

ACKNOWLEDGEMENTS

Beyond her role as chair and advisor to this research project, I must acknowledge Dr. Barbara Gastel as the coordinator for the science and technology journalism program (STJR). Her appreciation for the depth and richness that diverse perspectives bring to science communication makes this program a gem within the Veterinary Integrative Biosciences Department. The people I have met and learned from in this program, Dr. Gastel included, contributed to my academic and personal growth immeasurably. My writing will never match Dr. Gastel's clarity and preciseness, but through her instructive feedback, I have found a clearer voice.

I owe much gratitude to my other committee members as well, Dr. Yasha Hartberg, professor of Veterinary Biosciences, and Dr. Valerie Balester, professor of English. They have also contributed to my personal and professional growth. I relished my weekly meetings with Dr. Hartberg to not only discuss my research but to learn from him as I prepare for my future teaching career. His frequent reminder that "perfection is the enemy of good" is an aphorism I will carry with me.

Likewise, working with Dr. Balester and her staff at the University Writing Center (UWC) for four years has shaped my entire writing process and teaching philosophy. Her feedback on my writing was so instrumental that I regard my thesis in two parts: "pre-Valerie feedback" and "post-Valerie feedback." Simply put, Valerie just speaks my language, and I am thrilled to begin my English Ph.D. program this fall thanks to her guidance.

Numerous others gave not only technical support but emotional support during this arduous and rewarding process. To anyone who had to live or work with me during the intense period of writing a thesis in an intense time frame, I appreciate you and I apologize. Six of those people must be thanked by name.

Dr. Candace Hastings, the former director of the UWC, receives all the credit in guiding me toward my choice of methodology. Thank you, Candace, for freeing me from my analysis paralysis. Our discussions made the research process fun.

Douglas Fletcher, my statistician friend, I thank you for your endless patience while I discussed, ad nauseum, the importance of qualitative research, fretted over major life decisions, and debated word choices in far too many coffee dates, phone calls, texts, and zoom meetings to count.

Ashli Villarreal, my STJR cohort, UWC coworker, and most importantly, my friend, your emotional cheerleading and professional editing grounded me during my most anxious moments.

Thadeous K. Bowerman, my UWC administrator, personal writing consultant, and fellow Nietzsche admirer, thank you for neutralizing my frenetic energy with your calming advice and clear, logical approach.

Jen Rosenberg, I had no idea that I would leave OGAPS and gain such a friend as you. Your expertise in thesis formatting allowed me to focus on writing instead of margins and spacing. Only you can truly understand how many vegan snacks I stress ate throughout this writing process.

I dedicate this thesis in its entirety to my biggest supporter, my husband of nearly thirty years, Daniel. Thank you for handling my stress better than even I. If our marriage survived earning my M.S., I am betting our union can last through the impending Ph.D. process. Je t'aime pour toujours.

CONTRIBUTORS AND FUNDING SOURCES

Contributors

This work was supervised by a thesis committee consisting of Dr. Barbara Gastel as chair and Dr. Yasha Hartberg, both from the Department of Veterinary Integrative Biosciences. Dr. Valerie Balester from the Department of English served as the outside department member.

All work for this thesis was completed independently by the student.

Funding

There was no outside funding for this thesis.

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CHAPTER I

INTRODUCTION

"In theory, theory and practice are the same thing. In practice, they are not."

—Albert Einstein

Background

It is vitally important to the public that journalists who communicate nutrition science do so effectively. To a great extent, America's health depends on effective, accurate, and high-quality health messages based on sound science. Chronic disease, often related to unhealthy lifestyle choices, is an epidemic and leading cause of mortality and disability in the United States.[1] Healthy lifestyles are known to mitigate disease risk, so health conscious individuals embrace healthy lifestyles to avoid disease and seek better health.

The media are the number one source of public health information for these health-conscious individuals and the public in general.[2-6] Yet, the modern information age is paradoxical. Modern media readily offer both sound and unsound health information. Both expert and nonexpert voices speak from varied platforms to compete for media consumers' limited attention. As a result, consumers' ability to discern valid science in health messages is tested.[7] At best, these diverse sources of health information are beneficial to those seeking a wide range of health information over varied topics. At worst, the resulting noise from a multitude of sources pollutes the media environment with conflicting, confusing headlines.

To further complicate the issue, the inherent methodological complexities within the field of nutrition science can contribute to conflicting health messages.[8-10] Therefore, biased, inaccurate, and poorly constructed media health messages can be presented alongside well-balanced, accurate, and carefully constructed media health messages.[7] Consumers who base their health choices on the wrong media message can experience negative unintended consequences from this noisy media environment, such as negative health effects[11-13] or diminished public trust in science.[8,14-22]

Journalists who cover nutrition science are central figures in this complicated media environment. To combat misinformation, journalists must deliver the appropriate nutrition information to the appropriate audience in the appropriate context when communicating science. This task is difficult to impossible in the modern information age given that the average consumer cannot always appropriately evaluate message quality.[7] Theorists put forth theories of science communication, and scholars who study science communication recommend multiple theory-based strategies applicable to the issues associated with communicating nutrition science media messages in this environment. Yet the writings that propose theory-based strategies for addressing communication issues in the modern media environment do not seem to indicate the extent, if any, to which journalists' reporting experiences informed the proposed solutions. To address this apparent gap, I solicited a small subset of journalists who cover nutrition science to describe their reporting practices. Assessing their practices showed the extent to which scholars' suppositions about the challenges journalists face in the modern media environment and the recommended theory-based strategies were

applicable as reflected in these journalists' practices. I determined whether journalists' practices reflected four strategies based on various communication theories: 1) the "new rules" for authenticating reporting through such practices as sharing source links and listing consensus authorities, [13] 2) a multi-systems approach that considers the political and emotional characteristics of consumers as well as their personal values and beliefs,[15] 3) bias management tools that examine communicators' personal points of view and demonstrates full transparency,[23] and 4) heuristics, or cognitive shortcuts, which prioritizes interpretive message frames over expert frames for knowledge.[15] I used these four strategies to identify the extent to which the practices reported by this small group of journalists reflected theory-based strategies.

To do so, I interviewed journalists about their roles as participants in the news-making process regarding nutrition science topics. I asked these journalists to describe their rhetorical choices when constructing nutrition science messages, and I asked how the complex nutrition science and media environments affected their reporting processes. From their descriptions of their rhetorical practices when reporting nutrition science topics, I analyzed several aspects of journalists' reporting processes:

- their description of the constraints and pressures exerted on them,
- their description of how they navigate the complex nutrition science and modern media environments, and
- their description of how they intuitively practiced recommended theory-based strategies applicable to science communication problems.

My analysis of these factors provides some journalist perspective missing from the description of the challenges faced by those covering nutrition science topics in the modern media environment. Moreover, assessing the practices of this small subset of journalists showed the extent to which they used theory-based strategies in their practices. This analysis might be useful to inform both communication theory and journalistic practices to better communicate nutrition science.

Literature Review

Context is needed to understand how the high prevalence of chronic disease, the media-seeking behaviors of health-conscious individuals, nutrition science as a discrete rhetorical topic, and the role of journalists who cover nutrition science in a complicated media environment converge to become an important point of study. The following sections give a brief overview of relevant aspects of chronic disease, health consciousness, nutrition science and its controversies, journalists' challenges in covering nutrition science, and the research objectives of this study.

Chronic Disease

A great irony of the modern information age is that while the media provide so much health information, the population is sick and getting sicker.[24-26] Chronic diseases affect most of the current population. Common examples include heart, liver, and lung disease; cancer; diabetes; and Alzheimer's disease. These diseases commonly limit activity, require ongoing care, and affect quality of life. Poor nutrition, insufficient sleep, and an inadequate amount of exercise are major contributing factors. The Centers for Disease Control and Prevention (CDC) states that six in ten adults have one chronic

disease, that four in ten have multiple, and that chronic disease causes seven of every ten deaths in the United States.[1] This high rate of chronic disease is poised to bankrupt the United States' health care system.[27,28]

Health Consciousness

Meanwhile, health consciousness correlates highly with disease prevention. Health-conscious individuals also exert a positive impact on others through their social influences.[2-6] This growing demographic is concerned with nutrition, physical fitness, and stress management.[2] To improve their health and prevent disease, they use predominantly health information sourced from the media.[2,5]

As the media continue to be the main source of nutrition information for both health-conscious individuals and the general public, journalists continue to be the chief presenters of nutrition science, surpassing even medical doctors.[8,24,29-33] Much like scientists who create scientific knowledge, journalists create and disseminate their stories from a privileged position.[23,34] When journalists can choose which research to cover, they can choose which perspective to adopt, promote, or ignore. Their choices impact public understanding, personal choices, and public policy.[23] Thus, journalists can act as agenda setters, strongly influencing which aspects of nutrition the public focuses on.[35-37] As a result, those who write about science communication, such as Sylvia Rowe and physician academic Ben Goodacre, have heavily scrutinized journalists' nutrition science reporting. These journalists' reporting practices warrant study because journalists produce nutrition science messages in a complicated media landscape that is rife with misinformation, which can directly impact public health.[21,35]

Nutrition Science Findings

From a rhetorical perspective, a nutrition science finding can be a newsworthy event.[38] Science funded by the public produces findings the public has a right to know. Therefore, a new finding creates a rhetorical *exigency*, an urgency journalist should respond to. Although the process is not always linear, one popular model shows that a nutrition science finding travels via a communication chain—from science lab, to press release, to a journalist's news story, to the public.[21,37,39,40] Situated near the end of the invisible communication chain, journalists are media's "visible deliverer" of nutrition science health messages.[40] Feature stories that integrate findings from multiple studies tend to be much better suited for this purpose. They allow enough content space to include appropriate field context and consensus knowledge for findings. However, journalists typically have limited opportunity to produce such labor-intensive stories. As a result, much nutrition science reporting prioritizes shorter pieces with quick reader engagement and simplified headlines. Therefore, space and time constraints often limit journalists' ability to report much of the critical context consumers need to make informed health choices.[20,22,30,39,41,42]

Nutrition Science Controversies

Nutrition science is a relatively new field that is prone to controversy.[43-46] One source of controversy relates to funding sources because many nutrition studies are funded by entities such as food producers, which may have conflicts of interest. Another source of controversy stems from inherent methodologic limitations.[44] For example, many nutrition studies are done in small groups of volunteers, and so the results may not

be generalizable to the population as a whole. Ideally, nutritional hypotheses would be tested by randomized double-blinded controlled trials, which are considered the gold standard for evaluating the effects of interventions on humans.[44,45] However, it is infeasible to randomize humans to different diets, conceal the nature of the diets, ensure adherence to the diets, and follow the subjects for the many years often needed to show whether the dietary differences affect health.[44,45] Therefore, nutrition scientists are largely limited to using other research methods, such as epidemiologic studies, short-term trials, and animal experiments. Although such methods can yield valuable insights, especially when findings from multiple studies are considered together, rarely does a single nutrition-related study have conclusive implications for human health.[43,46,47-49] In addition, even carefully worded media headlines can imply a cause where only a correlation was found.[50]

Covering Nutrition Science

To produce nutrition health messages, journalists must manage the scientific, professional, and ethical constraints inherent in reporting nutrition science.[51-53] Science communication scholars call for varied approaches applicable to these issues. Rowe, a former journalist and current science to communications to policy scholar, writes extensively about theoretical recommendations that attempt to deal with the evolving media landscape. Rowe was a past general reporter, but she covered little to no health topics, and her reporting experience predates the media challenges she frequently discusses concerning nutrition, global health, food safety and other issues. In her writing, Rowe highlights theoretical recommendations for communicating beyond

addressing only science comprehension concerns, including transparency in reporting and for increased confidence in the public to make their own decisions. Such recommendations include the following theory-based strategies:

- "New rules"—suggests that a new format with new rules for reporting is needed to report nutrition science in the evolved, highly digitalized "new media" environment. To minimize misunderstanding arising from a proliferation of media sources, journalists should authenticate their reporting. In other words, they should state their science communication credentials and include source links and lists of experts who validate statements. They should also explicitly caution readers against trusting rival sources that do not follow these practices.[13]
- Multi-systems approach—goes beyond addressing science comprehension. Factors influencing readers' reception of nutrition information include their perceptions of science, their political and emotional characteristics, and their personal values and beliefs. Journalists should take such factors into account when deciding how to present nutrition content. [15,22]
- Bias management tools—promotes transparency by acknowledging the inevitable communicator biases and potential conflicts of interest present in most science communication. Journalists and scientists are prone to biases and conflicts of interests. Journalists should acknowledge potential bias in both the reporting and the science by examining personal points of

views, adhering to a rigorous reporting process, and practicing full disclosure.[23]

- Heuristics—recasts issues in a way that facilitates an audience's use of cognitive shortcuts to make decisions for themselves. Journalists should engage readers through emotion, collaborative communication, and human life themes, such as love, personal value, power, justice, truth, and freedom, rather than relying on information framed by expert science opinion. Readers can then decide for themselves what to believe and do rather than being told what to do.[15]

These strategies ask journalists to rethink the view that science communication is primarily a function of translating scientific facts to a lay audience. Instead, Rowe and other scholars say that the individual processes that construct the message, the audience's preconceptions to the message, and its impact on the audience are equally important components of science communication.[15,22] For these recommendations to work, journalists might need to reconsider aspects of their current rhetorical choices. However, before suggesting journalists need to modify their practices based on theory, one must consider that "*doing* journalism and *talking* about journalism are typically considered two different things."[54] In my current research, I wanted to determine whether theory-based strategies were borne out in the hard reality of journalism practice. [54] The answers to this question, and to the more specific question of how journalists go about reporting nutrition news, have received little research attention. Therefore, my

research analyzed how journalists created media health messages about nutrition science topics in the complicated modern media environment.

Research Objectives

My research assessed the extent to which scholars' suppositions about the challenges journalists face in the modern media environment and the recommended theory-based strategies were applicable as reflected in journalists' practices. To make these assessments, I analyzed a small subset of journalists' individual responses to in-depth semi-structured interviews guided by the following research questions (RQs):

I. What do some journalists who cover nutrition science view as constraints to communicating this subject?

II. What rhetorical choices do these journalists prioritize when presenting nutrition science?

III. To what extent are recommended theory-based strategies reflected in these journalists' practices?

CHAPTER II

METHODS

I chose an interpretive phenomenological analysis (IPA) to answer my research questions because it typically considers two broad questions to guide analysis: "What was experienced in terms of the phenomenon?" and "What contexts or situations typically influenced or affected experiences of the phenomenon?"[55] These two broad considerations used as a structural guide made IPA the best approach to understand how the complicated nutrition science environment (i.e., the context) affected journalists' individual rhetorical processes (i.e., the phenomenon).

For my study, I recruited journalists who report or have reported on nutrition science topics. I used my three RQs to develop an interview script (Appendix B). These three RQs also produced four categories of interview questions: A) background, B) media landscape, C) writing processes, and D) science communication. Questions in Category A were meant to elicit responses describing reporting experiences, influences and motivations, and perceived challenges and rewards. Those in Category B were meant to elicit responses describing comparison of past and present media environments, challenges to journalism today, role and purpose of the media, journalism's place in democracy, and ethics in journalism. Those in Category C were meant to elicit responses describing the choice of story topics, defining the audience, defining the writing processes, naming the story priorities, describing the internal and external pressures, deciding the headlines, and finishing a piece. Those in Category D were meant to elicit

responses describing levels of ease or difficulty in communicating science, the public's science literacy level, risk communication, single-study findings, levels of skepticism for findings, ability to analyze statistical findings, process for locating story ideas, levels of trust in the scientific process, and attitudes toward press releases.

I attempted to construct questions that reduced the opportunity for participant biases and encouraged honest answers. For example, to avoid friendliness bias, which is a tendency to adopt the interviewer's attitude, I avoided any yes-or-no questions and opted for open-ended questions. Additionally, to attempt to avoid social desirability bias where the participant answers in a way that anticipates pleasing the interviewer, I used indirect questions.[56] For example, "Could you describe any challenges you see for journalism as a profession today?" is an example of an indirect question. Additionally, mixing indirect questions with direct question and using a variety of ways to ask questions addresses habituation bias where participants become accustomed to a repeated structure and tend to provide similar answers to similarly worded questions.

I then further developed my study design and submitted it to the Human Research Protection Program at Texas A&M University for approval. Upon approval from the Institutional Review Board (Study ID: IRB2018—1147), I solicited my sample group and individually interviewed the group members. I asked questions about their rhetorical choices, which included identifying a story topic, choosing a story approach, and making language choices for the story. I also asked them to describe their backgrounds, the media landscape (past and present), and their experiences communicating science. The interviews were recorded, transcribed, coded, and analyzed

to seek global themes among sample responses. Global themes represent the result of the final interpretive analysis of core elements found in the data. The term global refers to themes found within this small research universe and does not necessarily apply to the larger population of professional journalists. Through this process, I understood 1) how a small subset of journalists covered the complex topic of nutrition science in a complicated media environment and 2) the extent to which journalists' practices reflected theory-based strategies, thus confirming or challenging the strategies recommended by theorists.

Defining the Sample

Individuals were eligible to interview if they met one or more of the following criteria: 1) membership in the Society of Professional Journalists (SPJ) and identification in its freelance directory as reporting on health, wellness, and/or nutrition; 2) membership in the Association of Health Care Journalists (AHCJ) and identification in its freelance directory as reporting on health, wellness, and/or nutrition science; 3) possession of a byline on health, wellness, and/or nutrition science reporting on the aggregator Apple News. Journalists reporting on health and wellness topics were considered along with those who covered nutrition because health and wellness topics commonly incorporate nutrition science. This approach allowed me to identify potential interviewees who report or have reported on nutrition science for various media, in various settings, and at various career stages.

In studies analogous to this one, two to ten research subjects were sufficient to reach saturation.[55,57-63] Therefore, I expected to enroll about six to ten participants. When

successive interviews yielded no new ideas, saturation was reached, and no additional subjects were interviewed.[55,57-63]

Participant Recruitment

To prepare for participant selection**,** I conducted an interview on October 5, 2018 with Sylvia Rowe, a former journalist and current science communication scholar, who has written extensively about the complexity of reporting nutrition science in the modern digital age. Her publications present some of the recommended theory-based strategies that I would seek in journalists' description of their rhetorical practices. I asked her advice about whether to interview only journalists professionally trained in science communication or whether to include general media journalists without professional science communication or journalism training who periodically cover nutrition science. Her advice was to "interview both the trained and the trained-in-the-field journalist." She said that field-trained journalists outnumber professionally trained journalists, so the likelihood that only the latter are reporting on nutrition science is low. I followed her advice and did not limit my participants to professionally trained in journalism.

Using purposive sampling from the two target organizations and the Apple News aggregator, I sent email invitations to about 20 journalists who cover health, wellness, and/or nutrition topics. For the journalists solicited from the target organizations, email addresses were procured from lists of journalists soliciting freelance work, which showed their contact information and what topics they covered. For the journalists solicited via the news aggregator, I located and contacted them through their personal websites. The recruitment email stated the background and rationale of the study and

requested an audio-recorded phone interview. An informed consent document accompanied the email (Appendix A). If a subject agreed to participate, they received an email requesting their preferred days and times to be interviewed.

Interview Process

I conducted an in-depth telephone interview with each subject. The interview was semi-structured with open-ended questions. The interviews were kept within one hour in duration. Once the interview was completed, I requested permission to contact the subject, if needed, for an approximately 15-30 minute follow up interview once the data analysis process was begun.

Audio recording was conducted via a professional transcription service, Rev.com. The company employed a non-disclosure agreement that promised no disclosure of any participant information. To further ensure privacy, I assigned the interviewee a numbered code that replaced their name. The numbered code sheet identifying the interviewees' names was kept on a password-protected computer, and a printed code sheet was kept in a locked cabinet in a Texas A&M University office. Once I received the transcript for each audio interview, any identifying information was redacted. The audio version of the interview was then deleted. Only the transcribed interviews and code sheet remain. All email correspondence prior to the interview was permanently deleted unless the participants gave permission to maintain correspondence. During the research process, the transcripts and code sheet were kept in a locked safe in my home office. In accordance with Texas A&M University's three-year post-research minimum requirement for data storage, the transcripts will be kept for three years before

being destroyed. At no time will interviewee identity be revealed by name or other identifying information.

The interview questions addressed subjects' views on journalism as a profession, the past and present media environments, aspects of science communication, reporting on nutrition science, and their individual writing processes. All interviews followed the prepared interview script (Appendix B).

Data Analysis

To authenticate the data, I verified each professional transcript immediately following the completed interview by comparing my written interview notes to the transcribed text. The transcription process was completed within 12 hours post-interview, so memory of the interview remained fresh enough to note any discrepancies found in the transcribed text. Another attempt at authenticity was to use verbatim extracts in the salient comments reduced from the text that preserved each participant's informal language, individual tone, syntactic structure, and idiographic expressions.

To ensure validity and reliability, method experts advocate for multiple steps of analysis in qualitative research.[55,57-63] Accordingly, to prepare to extract global themes from the data, the first step was to reduce the text to salient comments pulled directly from journalists' responses in the transcribed interviews. Comments were considered salient if they fell into one or more of three response categories: 1) indicates a relationship to key words, phrases, or concepts present in the research questions, 2) shares repeated words, phrases, or concepts with other journalists, or 3) represents an illustrative example of applied practice.[64,65] The salient comments were extracted using

individual hermeneutic circles, which is a cyclical process of reading, interpreting, and reflectively writing about each text multiple times.[62] Additionally, recursive engagement with the material during the analysis process is recommended for this methodology, so I routinely met with project advisors, a peer researcher, a peer editor, and a professional editor to discuss the research process, the analysis of data, and the presentation of findings.

The second step to prepare for data analysis was to achieve the so-called phenomenological attitude prior to and throughout the analysis process.[61] The phenomenological attitude is also known as bracketing, and its goal is to eliminate subjective biases and judgements while immersed in the data. Rather than overthinking or judging, I tried to directly process the initial connection to the material. The aim for such concentrated effort is to operate with what method experts call "disciplined naivete,"[61] a state of constant vigilance against personal views clouding fresh perspective. If done correctly, this step is a preventive measure that reduces researcher bias, such as confirmation bias, where the researcher interprets only data that support the researcher's personal views.

Data Coding

After authenticating the texts and addressing validity, reliability, and researcher biases, the next step was to code the texts. Coding is pattern-seeking textual annotation.[63] I coded text in three stages: 1) reduction of text, 2) exploration of text, and 3) integration of exploration.

First, I reduced the text by extracting salient comments. I then explored the text by seeking patterns in the text using the hermeneutic cycle. Using this cycle, codes emerged. In contrast to applying pre-determined codes, I generated emergent codes by pulling data directly from the text. Such codes are also called open or latent codes. For example, the following excerpt from participant #4 shows how I developed "unintended consequences" as a code that emerged from the journalist's response:

> Let's take the Flint water pollution as an example. If the reporters are not getting their story right, and the people don't understand the quality of their water, and the steps they need to be taking, then their health is affected.

I interpreted the code "unintended consequences" to represent the implied adverse health effects that could result from news stories that were either unintentionally inadequate, wrong, or poorly constructed. By repeating the process of pulling salient comments and interpreting their codes, the interview data produced 53 emerging codes.

After coding the text, I used Toulmin's theory of argumentation as the analysis framework whereby explicit statements are mined for their implicit meaning.[66] This theory provided a structured method for analysis, which functioned as the illustrative logic for my thematic choices. In short, central claims are made. However, to reach the claims, the data is moved through a progressive analysis framework. Claims are backed by data, or grounds, that warrant the claims.

While Toulmin's theory of argumentation was the framework for showing the logic, a thematic network used a mapping system of basic themes as the grounds for the argument (which are expansion of the codes from the salient comments into themes), organizational themes as the warrants (consolidation of the basic themes), and the global

themes, or central claims (consolidation of the organizational themes). The following example shows how the grounds for the argument contribute to the warrants, which then contribute to the interpretive claim within the thematic mapping system:

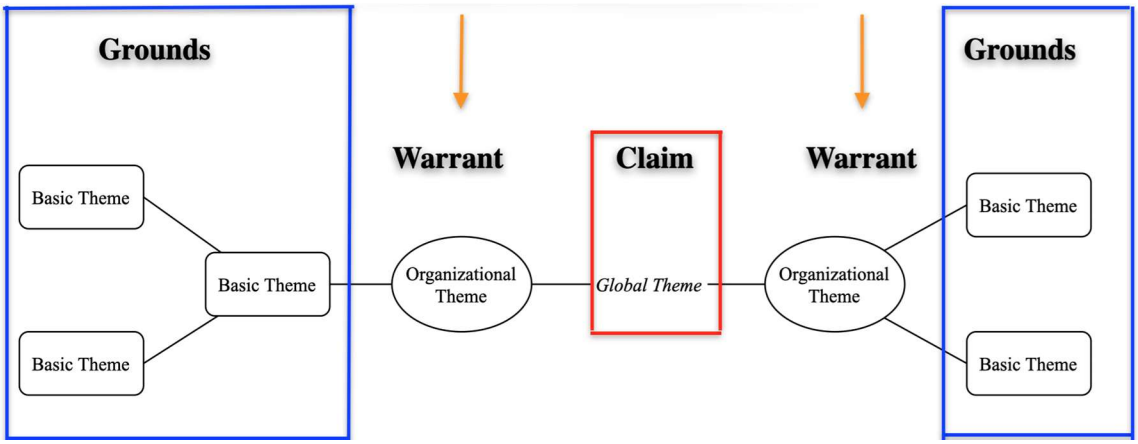

Figure 1 Example of relationship of grounds to warrants to a claim within a thematic mapping system.

The next step was to create the basic themes, which I did by consolidating the 53 emerging codes into 25 central concepts. Basic themes are implied meanings tied closely to the textual data through the emergent codes, so they are the grounds, the steps before the warrants. In argumentation theory, the warrants (organizational themes) are the statements that support the claim. The claim is the "conclusion to an argument," or the global theme.[67] The basic themes are classified as the support, or grounds, for the warrants. The 25 basic themes led to organizational themes (warrants) that eventually revealed global themes (claims). I created 25 basic themes by summarizing the 53 emergent codes into central concepts from the implied code meanings.

Next, I explored the coded text by collapsing the basic themes into organizational themes. The organizational themes are the warrants that support any central claims (global themes). This process, from basic theme to organizational theme, was done by isolating clusters of similar issues or representations of shared approaches, constraints, practices, or applied concepts found in the 25 basic themes. Those clusters were then consolidated into nine organizational themes. As an example, Figure 1 shows how six emergent codes yielded four basic themes, which in turn generated one organizational theme:

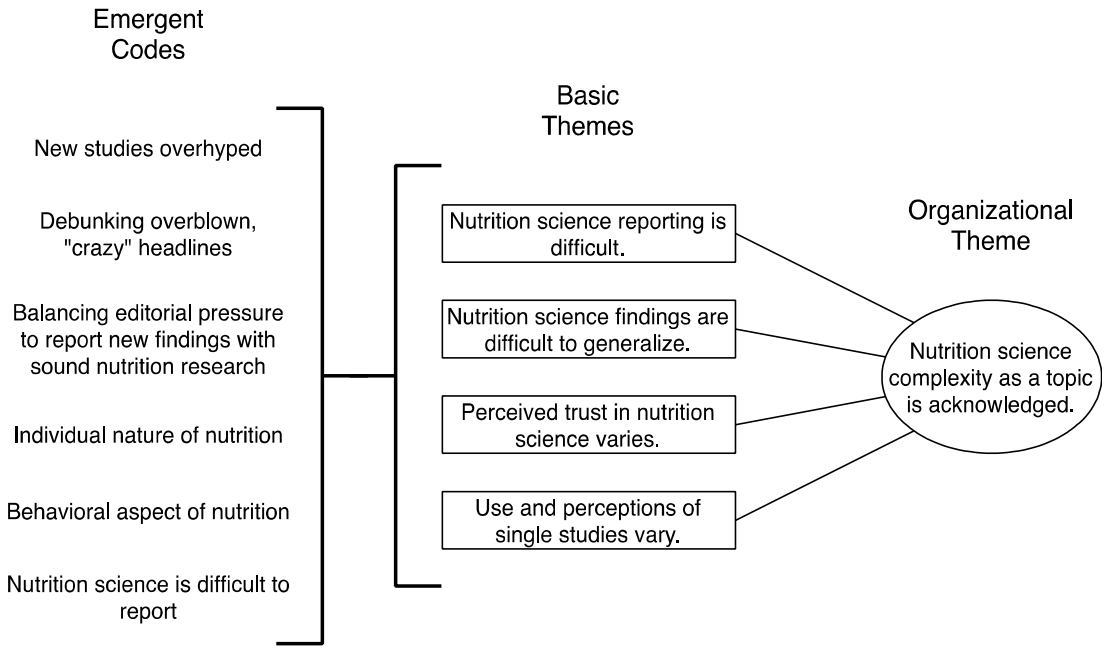

Figure 2 Example of emergent codes in relation to basic themes and organizational themes.

In the final stage, integrating the exploration, the same process that consolidated basic themes into organizational themes was applied to the organizational themes to achieve the global themes, the central claims. Thus, summarizing 25 lower-order (basic) themes into 9 macro (organizational) themes produced four global themes that revealed the principal metaphors or central claims represented in the texts. All themes (basic, organizational, and global) were organized into thematic clusters and presented along with a discussion of the findings. The following diagram illustrates the three-stage coding process for a hypothetical thematic cluster:

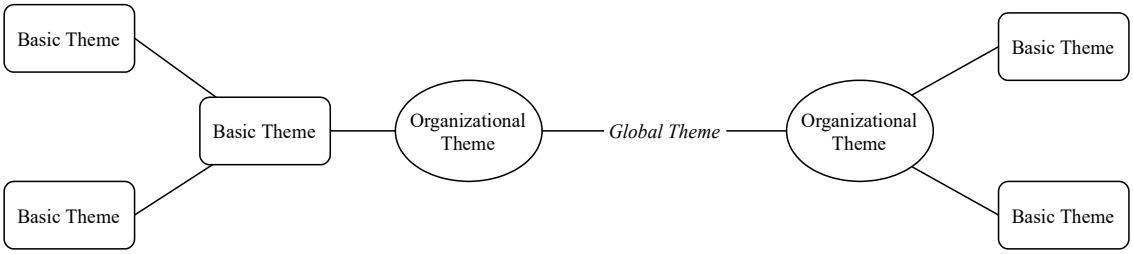

Figure 3 The three-stage coding process in which basic themes were consolidated into organizational themes, which were then combined into one or more global themes.

Pilot Testing

To practice the interview process, to test whether the interview questions would produce suitable data for coding, and to help determine whether any interview questions would benefit from revision, I interviewed a journalist with three years' experience in nutrition science reporting on June 15, 2019. I followed the prepared interview script. To test the coding and analysis process, I extracted salient statements to find codes that generated basic themes. I found four basic themes:

1) journalist identifies as a conduit for a researcher's findings;

2) journalist identifies as a member of the fourth estate, which denotes the press' role as a political observer, advocate, and influencer;

3) journalist sees nutrition finding as "something that happened" (i.e. a rhetorical exigency to respond to); and

4) journalist feels pressure to be "first and accurate."

I then consolidated the basic themes into organizational themes. Two organizational themes emerged:

1) self-actualization and

2) external pressures

As a final step, I extrapolated one global theme. The following thematic cluster shows the results:

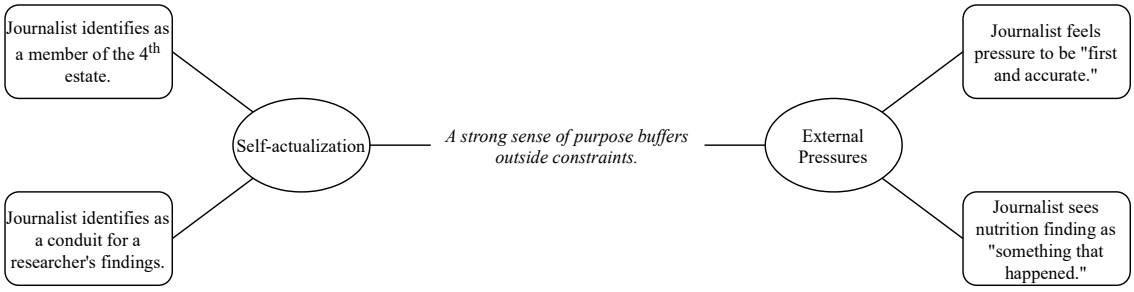

Figure 4 The thematic cluster representing basic, organizational, and the global theme for *A strong sense of purpose buffers outside constraints*, which was developed from the pilot test interview.

After the interview, I solicited the journalist's feedback. For example, I asked whether the questions were clear and easy to answer and whether any of them were

leading. As a result of the feedback, I modified, combined, or eliminated some questions.

To further revise the interview questions, I conducted a second pilot test. I interviewed a statistician on July 9, 2019 with the revised interview script from the pilot test interview. The statistician is a peer reviewer for a top-tier nutrition journal. The statistician stated a hope that journalists would entertain a healthy level of skepticism for nutrition science findings because 80% of scientific claims, in general, are likely to be wrong or irreproducible. The statistician suggested that I ask whether each journalist possesses the analytical skills necessary to critically evaluate a scientific claim. Therefore, I followed the recommendation to include a question that asks journalists whether they have experience analyzing scientific papers and whether they are familiar with basic statistics.

I considered all solicited input from the subject experts and the pilot test interview when revising the interview script. Once I implemented the input from the pilot interviews, the interview questions and the coding process appeared to be a valid approach for the study sample.

CHAPTER III

RESULTS

To assess the extent to which scholars' suppositions about the challenges journalists face in the modern media environment and the recommended theory-based strategies were applicable as reflected in journalists' practices, I analyzed a small subset of eight journalists' individual responses to in-depth semi-structured interviews. Journalists' responses to interview questions generated the following four global themes:

- *Bridging the Gap* (Figure 5),
- *Ethics as Guideposts* (Figure 6),
- *Media Form the Message* (Figure 7), and
- *With-it-ness as a Skill* (Figure 8)

The following paragraphs describe the study participants, and the global themes are explained in the summary of findings.

Study Participants

A total of nine journalists participated in the interview process. Six journalists responded to contact through the Society of Professional Journalists (SPJ), two through the Association of Health Care Journalists (AHCJ), and one from direct contact via a personal website. I reached saturation by the eighth and ninth participants' interviews, so I did not conduct a tentatively scheduled interview with a 10^{th} participant. While the ability to generalize findings to a larger population typically requires a large sample size, generalization is not a specific aim of an interpretive phenomenological analysis.

Therefore, the small sample size of this study allowed for depth of examination in keeping with the phenomenological concept that each interviewee represents their own world and is not fungible.

All nine participants had produced digital and/or print content on nutrition science or on health and wellness topics that included nutrition science in the American media environment. All were college educated, and six held advanced degrees. Their journalism experience ranged from five to 25 years, averaging 13.5 years. Three had formal science education (See Table 1). Additionally, participants #2 and #3 worked in a science laboratory while receiving their formal science education. Race, ethnicity, and gender were not considered when interpreting the data. During the interview process, I discovered that participant #9 taught and wrote extensively on the same issue that I research, the reporting complexities of nutrition science. Therefore, I deemed this participant's interview a source of expert information rather than data to be interpreted into findings. Thus, I excluded the ninth interview from the coding process and narrowed my focus to extracting data from the first eight interviews.

Table 1 Backgrounds of journalists interviewed.

Participant	Education	Topics Covered	Length of Journalism Experience	Formal Science Education
1	B.A. in journalism with specialization in business and economics	Worker health, specifically how nutrition affects workers' performance	5 years	No
2	B.S. in neurobiology, B.A. in philosophy of science, and M.S. in science and environmental health journalism	Nutrition, cancer, and other biology topics	3 years	Yes
3	M.S. in science education	Nutrition	10 years	Yes
4	B.A. in History, B.A. in Communications, M.A. in History, and M.A. in science communication	Nutrition	25 years	No
5	B.A. in journalism, A.D.N., and B.S.N.	Nutrition, health and wellness in aging populations and nurse advocacy	25 years	Yes
6	B.A. in English	Nutrition and wellness	10 years	No
7	B.A. in journalism and M.F.A. in dance and movement education	Nutrition, exercise, and weight loss	15 years	No
8	B.A. in journalism and M.A. in marriage and family therapy	Nutrition, weight loss, and mental wellbeing	15 years	No

Of the journalists interviewed, participant #4 was the only one who did not currently cover nutrition science. This participant had covered nutrition science for about two years, near the beginning of a long journalism career that began in 1994. The other seven currently covered health, wellness, and nutrition science topics in both print and digital formats on both assigned and pitched topics. Participant #7 was the only journalist who writes 100% digital content from 100% assigned topics (Table 2).

Table 2 Current reporting statuses of journalists interviewed.

Participant	Nutrition Reporting Status	Media Types	Story Choices
1	Active	Digital and Print	Mostly decided by editorial calendar that has monthly foci
2	Active	Digital and Print	Mostly pitched based on popular public interest and latest science findings
3	Active	Digital and Print	80% assigned and 20% pitched
4	Inactive	Print only	Not applicable; currently writing a book
5	Active	Digital and Print	Mostly assigned
6	Active	Digital and Print	65% assigned and 35% pitched
7	Active	Digital only	100% assigned
8	Active	Digital and Print	A mix of assigned, reader submissions, and suggestions from public relation representatives

Summary of Findings

The goal of an IPA approach is to discover any themes present in individual experiences that describe a group's experiences as a whole.[68] Combining this approach with a thematic mapping process, I generated 53 codes (Appendix C), 25 basic themes, nine organizational themes, and four global themes from four categories of interview questions. In the next subsections, I present and discuss the four global themes. To maintain authenticity, all quotes are presented in the language verbatim, including any grammatical or syntactic idiosyncrasies of the speaker. Any emphasis of quoted material was added by me to highlight the point being made.

Global Theme I: Bridging the Gap

The first global theme *Bridging the Gap* represents how the journalists expressed their perceived roles as science communicators for a lay public with low science literacy levels (Fig. 5). The journalists saw nutrition science as a complex topic that was difficult for the public to understand and a challenge to report. Among several other constraints, one challenge to communication and public understanding was the individual nature of nutrition, which refers to the highly individualized and varying nutritional needs and preferences of consumers. A nutritional finding that benefits one person could be detrimental to another because of different physiological make ups and nutritional requirements. Therefore, the journalists prioritized proper scientific context for findings above over-hyping individual findings. As a motivating factor, they also saw the public's right to know the latest science findings in order to inform health choices. Despite

mentioning the challenges involved, the journalists found the process of reporting on nutrition science rewarding.

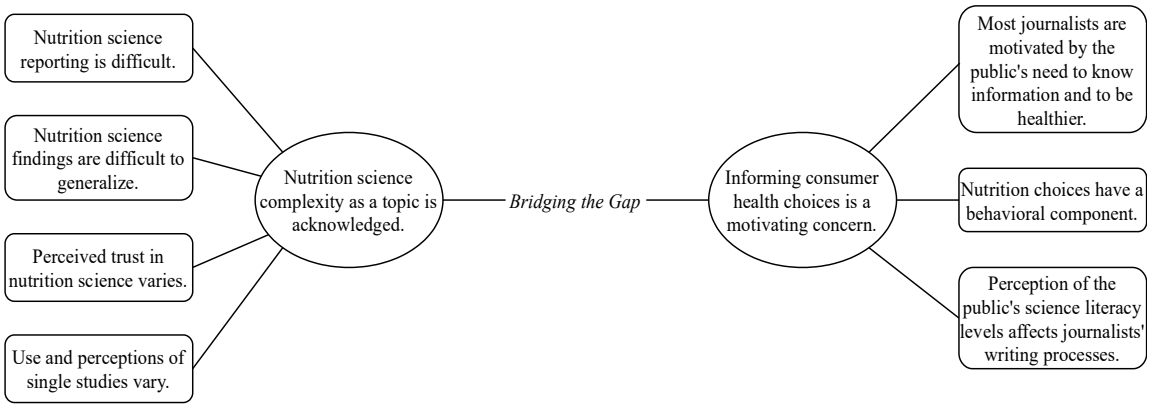

Figure 5 Thematic cluster representing basic, organizational, and the global theme for Bridging the Gap.

A complex topic

The label *Bridging the Gap* also highlights what the journalists saw as constraints to communicating nutrition science to their lay audience. The journalists acknowledged that nutrition science is a complex topic to report for a host of reasons. Namely, it requires multiple considerations that go beyond effectively communicating complex science. For example, the journalists mentioned the specific challenge of editorial pressures exerted on them to fill a 24-hour news cycle. The need for a massive amount of content increases the newsworthiness of a new science study, its rhetorical exigency, but it also contributes to the tendency to over-hype findings by giving them more emphasis than deserved in relation to the larger context of the nutrition science field. The journalists mentioned balancing the editorial pressures to report new findings with the

need to communicate sound science to a lay audience. Participant #2 said the challenge was to resist the inevitable hype surrounding new findings:

> I think the most challenging thing is presenting new studies without over-hyping them. I think there's a tendency for people to see new studies and assume that that's the way things are, but with nutrition it's a little more complicated than that. A lot of the research is another piece of the puzzle that we haven't quite figured out. I think the biggest challenge is presenting the research and putting it in context … Science is always about coming to a consensus, and that requires a lot of individual studies, and no individual research bit is going to give you the final answer.

Over-hyped findings can lead to broad generalizations despite the highly individualized nature of consumers' nutritional needs. As participant #1 stated, "It's really different for every individual, and I think that's the most challenging part …They all have different needs." Participant #3 described how over-hyped findings can negatively impact consumer choices:

> I think that's the big thing with nutrition studies … the danger of over-hyping single studies …The danger is that people will think that this one approach to nutrition, or this one nutrient, is the only way to go. I think that that can lead to people over emphasizing that in their diet. They may switch to a no-carb diet, even if that's not the best thing for them. The other danger is that they'll think that this one thing that worked for 30 people, who were all white Americans, would also work for them, and they're not white Americans. The generalization is also a danger because they think that all these things benefit everyone.

The individual nature of consumers' nutritional needs and preferences

As mentioned, these broad generalizations and over-hyped findings can ignore the individual nature of consumers' nutritional needs and preferences and adds to the

challenge of covering nutrition science. The journalists communicated how nutrition science can intersect with other aspects of consumers' lives. For example, participant #3 touched on how diet and health consciousness can affect eating patterns and relationships with food:

> The more severe danger is that some of these things may lead people to disordered eating, and that's another thing that I write about…eating disorders. When I write about nutrition, that is always in my mind. Can I convey this without encouraging someone to stop eating gluten even though there's no evidence that they're actually allergic to gluten? I think a lot of the nutrition hype leads to that kind of stuff, where you're cutting out entire food groups or entire nutrients in your diet, and there's no reason for you to do that. I think that's probably the worst thing that can happen with this hyping. The other thing is that people are swinging from one fad to the next. Every time a story comes out, everyone goes, 'Oh, I'm going to do that this week.' Like throw aside your balanced diet, and this week you're just eating grapefruit. Next week, you're eating lots of carbs. Then the next week, you're just eating avocados or something.

As participant #3 conveyed, nutrition science is complicated. Furthermore, participant #3 pointed out that this complexity should be considered to place nutritional findings in proper context to avoid negative consumer health consequences.

The importance of proper context

Another challenge to reporting complex science is that some journalists must match complex science to the general public's 8th-grade science literacy level. The journalists were careful to say they do not equate lower science literacy to a lack of intelligence but rather to a lack of time to spend trying to understand it. In fact, participant #7 found sifting through the science, so the public does not have to, a rewarding process:

> I find it rewarding working with physicians, sometimes nutritionists, but it tends to be people that are more in the academic/scientific world, in

> taking concepts that are complicated and bringing them to an audience, not in a way that dumbs it down, but in a way that makes it understandable to people that maybe don't have hours and hours and hours to read tons of nutritional literature. I also find it rewarding to sift through a lot of the nutritional junk that's out there right now that tends to be very headline driven when there's one study that comes out that says something completely overblown or something… Sometimes debunking the headlines, that is satisfying to me, and I do get feedback sometimes from readers that tell me that it's calming to them sometimes to read my information because they feel like their chains are yanked all over the place with headlines and even products that make claims and things like that. I think that is the part that is most satisfying.

Participant #2 described a personal background relevant to translating health information to the public and a desire to "hold up a candle to what they should know." This background inspired participant #2's career choice:

> I had a strong sort of biology/health background in general. When I decided to go to graduate school to get a master's degree … the health stuff just always drew me because *I think something people are woefully under-informed about is their own bodies and their own health*, and I know that having a good understanding, both from my own studies, and [having a family member as a] physician, I know that really helps me to take care of myself, and even simple things like knowing what questions to ask my doctor, knowing basic medications to take, like what kinds of medication are going to be helpful to the problem that I'm having. I think that's really valuable information, but it's something that people don't get taught. So, I wanted to work at a publication…that talks to laypeople about things that are relevant to their life.

The public's right to know

All the journalists were motivated by the public's right to know the latest science along with consumers' needs to make informed health choices. Participant #3 found the chance to positively influence consumer health choices rewarding:

> I think probably one of the most rewarding things is as we gain a better understanding of how nutrition affects us, I think it kind of empowers people to eat healthier and kind of change their habits so that they can live healthier lives overall.

Most of the journalists viewed nutrition science as too complex and time consuming for the average person to fully understand, yet they found it a topic of vital importance that affects consumers' quality of life. Despite the constraints and challenges, they felt compelled to bridge the gap between the science and the lay person and saw the process as rewarding. In their interviews, they depicted the lay public from a compassionate, respectful perspective and saw their role of conveying complex nutrition science as their primary duty.

Global Theme II: Ethics as Guideposts

I interpreted the second global theme, *Ethics as Guideposts,* from the strong sense of personal morals and professional ethics that drove all aspects of reporting practices among the journalists interviewed (Fig. 6). In a general sense, ethics is a larger code of conduct established by an external source, such as journalistic standards established by professional organizations. Ethics are flexible and subject to change in different environments and cultures. [69] During the interviews, I asked the participants what role, if any, ethics has in journalism? However, I did not define ethics because I wanted responses that reflected the journalists' individual perspectives. Participants #1, #2, #3, #4, #5, and #6 responded, respectively, that the role of ethics in journalism is "huge," "a massive role," "a big part of journalism, especially now," "absolutely critical," "extraordinarily important," and "a big role." Participants identified the following areas where journalism ethics are important:

- avoiding plagiarism
- dealing with sources

- avoiding conflicts of interest
- managing personal biases
- asking the right questions
- communicating the appropriate risks
- clearly differentiating between fact and opinion
- reporting accurate information

In contrast with ethics as a larger, sometimes more flexible, community mindset, morals are personal principles regarding right and wrong. They tend to be fixed and rarely change. [69] All the journalists communicated strong personal morals that formed a personal sense of self. The journalists also saw themselves as playing a critical role in upholding professional ethical standards. Additionally, journalists communicated their place in upholding the tenets of a strong democracy through the media, which requires personal morals and professional standards. They identified morals and ethics as guides through the challenges of reporting nutrition science.

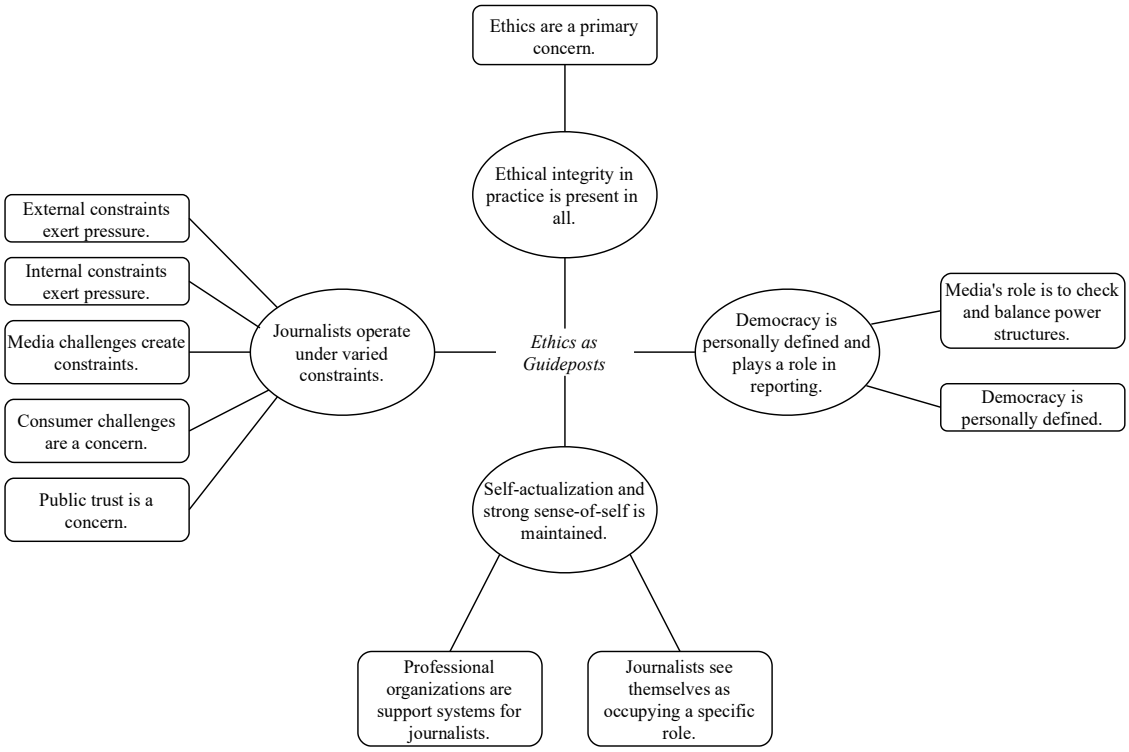

Figure 6 Thematic cluster representing basic, organizational, and the global theme for Ethics as Guideposts.

A strong sense of self

The journalists maintained a strong sense of self that reinforced personal morals and professional ethical standards. The combination of personal and professional standards served as ethical guideposts during the reporting process. Some described the internal voice that guided them, and some described operating within self-imposed categories that designated clear behavioral boundaries. Participant #8 said that "I very much always have in my mind, when I'm writing, when I'm gathering the story, that it's my ... I have a duty to inform and that information that I'm sharing, it really needs to be as accurate as possible." Participant #4 self-identified as a hard news reporter, a journalist who reports facts quickly, which affected the story's content and the angle: "I

am a hard news reporter first, last, and always. I'm not really a features person. So, it's got to be 'Here's what you need to know today, here's what's new about the topic, and here's why it's important.'" Participant #5, however, approached content construction with journalism concerns as secondary: "I think you have a pretty good picture of who I am. I'm a nurse first, a journalist second. Clinical credibility means everything to me." Such professional identities and personal lodestars can affect content priorities and rhetorical choices.

Personal morals

Several of the journalists shared personal anecdotes that illustrated their strong sense of personal morals and adherence to a professional code of ethics. The most descriptive example came from participant #7 whose job required a practice the participant identified as ghostwriting. The participant described this practice as tasking journalists with updating previously written articles, even MD-authored articles, on topics they sometimes lack the credentials to discuss. The participant said that websites need ghostwriters to compete for viewers, that being at the top of Google searches helps them garner views, and that to compete in this manner, websites require updates on articles every six months to a year "to keep content relevant." The updating that participant #7 described is a cut/paste activity. It can include up to 200 assigned articles and the participant said that two to three must be completed every hour to meet the quota in a timely fashion. As participant #7 explained, most websites do not want articles older than five years posted on their site, which means so-called fact checkers update the articles by typing specific phrases into a Google search to find specific facts. Yet, even if

no recent sources are found to match the outdated information, the fact checker/ghostwriter still marks the article as updated, despite no changes being made. Furthermore, participant #7 said that updating articles with this method creates two problems. First, it gives the reader a false impression that the article contains the latest health information. Second, searching for sources and information in this manner is a recipe for confirmation bias because it confirms what is already known rather than challenging it in any way.

After participant #7 described these processes, I asked what role, if any, ethics play in journalism. Participant #7 responded:

> That's really, really interesting because this issue that I'm talking to you about…a person who's being paid to change other people's content ... *this is such an ethical dilemma for me, it really is. It drives me insane because it's wrong. It's just wrong. It goes against everything that I'm in this for.* But, I am also [age redacted] years old and I don't feel like changing careers, so I'm doing my best to white knuckle it and stay with it for maybe another year or two, but I'm looking at my calendar thinking I don't know if I can do this much longer because it's not worth it anymore. *It's a big ethical problem, huge… The ethical issues with that are mind blowing, mind blowing, at least in my opinion…* I find that troubling, but I know it's a broad problem.

Practices such as those described by participant #7 can contribute to questionable accuracy in health messages. As one participant (who requested complete anonymity for this statement) further explained, "In digital media, because things stay on the internet forever…if you're looking at an article that has my byline on it…there is a snowball's chance in hell that one word of that content is mine anymore," and the same is true if "the person who originally may have wrote the article may have credentials such as an RD or MS in Nutrition, or an MD."

Types of constraints

The journalists operated under various constraints, both external and internal, that tested their personal morals and professional standards of ethics. External pressures, such as the changing media landscape, from print to digital, contributed to an accelerated work pace. Participant #1 said, “Print’s going away. People are adapting to more digital reporting, and the ones who aren’t adapting are suffering as well…that’s probably the biggest challenges that you’re seeing in journalism today.” To cope financially, some journalists sought supplemental freelance positions. Participant #5 worried that this type of professional environment constraint puts a financial burden on the journalists:

> Unless you're working maybe for the *New York Times*, or the *Washington Post*, or just really fast at getting this done, *I don't know how you could make a living.* I don't know how you could support yourself, and you have a house and food on the table. I just don't see that happening.

Participant #6 pointed out that this fast-paced reporting environment coupled with low pay can affect journalists’ rhetorical processes and final products: "Speed combined with sort of low rates are sort of the main challenge that can sort of motivate a writer to maybe do work that's not quite as thorough as it ought to be.” Participant #7 validated that the draw to digital work is financial: “Initially, I was writing both print and digital, and now I'm doing digital only, just because *that's, quite frankly, where the money is*.”

Participant #6 explained further how this type of financially motivated work can conflict with personal morals. Co-branding, which merges journalism with advertising, was described as an example of a questionable practice. For example, a freelancer could contribute a written piece to an editor who might later, with or without the author’s

knowledge, place a product for sale alongside the freelancer's piece. This type of placement could imply that the author endorsed the product. Participant #6 candidly admitted that once a story is submitted to an editor, the freelance journalist's choices end:

> When a story leaves my hands and goes back to the editor, I don't know if the brand is sort of reviewing the article and making suggestions or tweaking the language. That's something I've always been kind of curious about and not totally sure how it sort of works once it leaves my hands. But it's something I've sort of just chosen to, I guess, turn a blind eye to because the articles do tend to pay well, and it sort of makes it a little bit easier, I guess, almost to sort of pursue other work that pays less but that maybe that you're more interested in.

Yet, when I asked participant #6 the purpose of the media, whether it was to influence, inform, explain, or a combination of each, the participant's answer seemingly contrasted with complying with the practice of co-branding: "I don't think that the goal of media should be to influence people. Just give them the information and sort of help them make the right conclusion for them."

Journalists' critical role

Journalists can profoundly impact the public through their rhetorical choices.[70] When they can choose which research to cover and which perspective to adopt, promote, or ignore, these choices can affect public understanding on many levels, including public policy and personal choices.[23] The power journalists have to shape public discourse makes ethics an important part of upholding professional journalism standards. Participant #2 conveys how an ethical responsibility comes with knowledge production:

> I think a big part of the media is that *we get to decide what people know about*, and what you decide to cover as a paper or as an individual is what people have access to. It is what people will learn about, and that's a massive responsibility that probably not a lot of people take seriously enough.

The ability to create and disseminate knowledge is a privileged position. Participant #8 explained further how knowledge is power and that accurate reporting is an ethical responsibility to be taken seriously:

> I feel like the landscape has really changed in that regard, and I see a lot of stuff out there that isn't really journalism, but then I also wonder is it even being written by trained journalists? I think the ethics of journalism are what first created… free press in this country, and I think that it's really important to adhere to those principles or we lose credibility. We lose trust of our readers. *I take that very seriously*, that I am here to share knowledge and knowledge is power and that knowledge needs to be accurate. It needs to be gathered appropriately.

Democracy's role

The journalists communicated that democracy and the media are critically linked, which directly ties into the public's right to know found in global theme I, *Bridging the gap*. To the journalists, empowering the public with accurate information was the ethical imperative that linked the two. I asked the journalists what place journalism occupies in a democratic society, if any. Participant #5 responded with "Oh, my. It's critical. I don't think you can have democracy without journalism, period, paragraph." Participant #1 echoed this belief: "As they say, there's no democracy if there's no journalism and no media." Most of the journalists reiterated the tenet taught in journalism school that the media functions as the fourth estate. They said they are what participant #4 calls "watchdogs of our political landscape," and participant #4 noted being "a firm believer in the fourth estate." Participant #2 put it most succinctly stating

that, as watchdogs, “Journalists punch up.” As participant #2 said journalists’ unique societal task is to bring “light to what is behind the curtain” of those with power and influence.

Professional standards

Participant #6 mentioned that reporting practices that lack strong professional standards of ethics have consequences. One consequence is the frequent juxtaposing of vacillating and contradictory media information of both high- and low-quality. Message quality standards are often differentiated as high or low and are measured by specific attributes.[71] The units of measurement for quality attributes vary greatly, and no standardized scale exists for attributes of quality when evaluating media messages. Nonetheless, accuracy, accessibility, and audience engagement are consistently included in most measures. [71] A direct effect of mixing high- and low-quality messages across various media outlets is the public’s inability to differentiate between the two. Additionally, consumers cannot always differentiate between credentialed and non-credentialed reporting or carefully crafted scientific messages placed within proper context from more careless science reporting.[7] Participant #6 described the resulting public confusion and the potential loss of public trust, adding that lost trust is difficult to regain and can ultimately affect professional journalists’ credibility:

> There is so much information out there. There's so many articles out there about nutrition, diet, and weight loss that a lot of readers have come to be kind of skeptical. They might see an article about a new diet, or something related to nutrition, and they might not even trust it as much because they're like, ‘Well, I saw something last month that said the exact opposite.’ So how do you sort of regain the trust or keep the trust of … readers. I think that can be a little challenging especially when you're competing with bloggers, people on social media who kind of just write

> whatever is on their mind. If a reader can't really equate the difference between even an article that's posted on some random blog versus an article that's published by sort of a major news outlet, I think that probably puts the news outlet at a disadvantage.

Participant #8 mentioned seeing careless reporting practices reflected in low quality content. Moreover, this participant said that media constraints, such as the pressure to produce enough content for round-the-clock reporting, contributes to "a lot more entertainment, hype, salacious sort of journalism that gets reported on, but that's going to come with the territory when you're trying to fill a 24-hour news cycle." Participant #2 noted seeing a proliferation of sources, often driven by algorithms based on preference bias, contributing to the public's inability to discern valid science:

> The biggest problem is just the proliferation of places you can get your news and the ability to filter all of your sources …. You get a curated selection of things that various algorithms think that you're already going to be interested in ... That's terrible for individual people's outlooks …. It works business-wise …. *But it's not making for a very good media landscape*.

Participants indicated that the state of flux in the media environment and reporting standards created reporting challenges that tested some of their personal morals and professional ethics. Participant #8 said, "I wonder sometimes would I still pursue a journalism degree if I were 18 right now…*It's a completely different landscape*." Yet, this participant ultimately expressed optimism that maintaining high ethical standards is the best approach to the challenges of reporting in the modern media environment:

> If I just keep honing my craft and sticking to those ethics and standards ... maybe it's naïve … or idealism, I just think there will always be a place for that. There's certainly going to be things that are trendy, that catch the world by storm, and there's going to be writers that fill that niche, but I think at the core, we still are going to need, especially in a democratic society, *we still need good journalism*.

Global Theme III: Media Form the Message

I interpreted the third global theme *Media Form the Message* from the many ways that media type influenced the journalists' message production. Media type influenced the time to gather background for a story. Media type influenced the ability to audience concerns, and it influenced the questions the journalists asked themselves during their writing processes (Fig. 7). Additionally, the journalists described their methods to manage personal, professional, and ethical constraints as they deal with the media. I found that the journalists managed constraints using a technique the field of rhetoric calls stored representations.[31] As rhetorical tools, stored representations are cognitive templates that help to quickly produce structured content. A simple example is journalism's inverted pyramid, which is standard form in news articles and thoroughly inculcated into journalists' memories. The journalist plugged relevant information into these templates to produce consistent structure for message content.

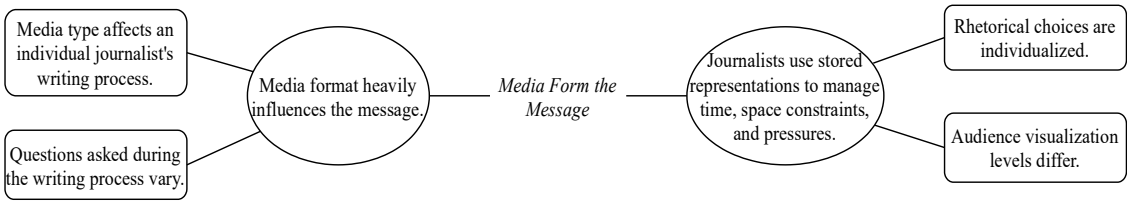

Figure 7 Thematic cluster representing basic, organizational, and the global theme for Media Form the Message.

Media types

Media format and type determined time and space constraints for the journalists, which can profoundly affect their message. Participant #7 noted this point by explaining

that moving the industry from primarily print to predominantly digital has affected every aspect of reporting:

> Google a specific phrase and that phrase drives the decision that every website is making about what [the website is] going to write about in terms of nutrition. That has gotten that process, the process of using different types of technology, not only desktop computers but laptops, and iPads and phones, has driven the way content is formed and it drives editorial decisions. *It really drives everything about the way content is written, the way it's formatted, about what we're writing about, and about how much information we can include.*

Participant #1 said that a goal of digital content is to pull audiences to specific websites: "Well, there's always pressure to get page views. *That's the biggest thing is page views, page views, page views.* What's going to keep people coming to the web site?" This point was also made by participant #2, who said that page views drive content. The demand for page views was said to produce an internal pressure to make the story engaging and an external pressure that editors exerted on the journalists:

> I don't necessarily know this from personal experience, but many of my friends who work in journalism have felt a lot of external pressure in a lot of really negative ways as far as *writing stories that they didn't think were worthwhile* or having a hot take on something *that doesn't really deserve it* just because it will be controversial, and it will get clicks. I think I'm pretty lucky to have not had that, but it certainly exists…. you end up, as a journalist, feeling like you have to cater to the search engine optimization gods to get clicks.

Participant #7 said that nutrition science topics are particularly popular in web searches because the internet is the main source for nutrition information.:

> It has now become the main player, at least that's my perception of it, especially for things related to nutrition because when people want to know how many carbs are in my breakfast cereal, or something like that, they don't pick up a magazine. They pick up their phone, or they pick up a laptop…

Some participants indicated that consumer desire drives the market, so health information must be more readily available and quicker and easier to find. The faster pace dictated by such internet searches affects not only content, but the rhetorical choices the journalists made to produce the content. Participant #3 said there is less time to prepare, less time to check the accuracy of press releases, and less time to arrange interviews with high-quality sources:

> Even just in those 10 years, I think that the speed at which we're presenting this information is going faster. Ten years ago, I would probably take a week to write a story. Now it's either two days, or sometimes just the next day, I have to turn the story around, which means ingesting the information and getting experts to comment on it. People want information quickly, and they also want it in a more succinct form. You have to be able to present the key points at the very beginning of the story, knowing that a lot of people are not actually going to read past the first hundred words.

Additionally, participant #4 said content choices were affected by word limits: "That's the other thing…word count…I have to turn it to a certain size and it still make sense." Participant #8 also said that limited print space restricts the opportunity to explain complex science concepts in detail:

> The unusual stories sometimes need more explanation and the column length is very short, so it's the limitation of space… The space is really, I think the biggest challenge I face because I have to very concisely explain the unusual things. For example, there was [a researcher from a prominent university] who was helping people through [an innovative and highly specialized] technique ... This woman had this procedure done and went on to lose 40 pounds, but I felt like I owed it to my readers to really explain this because it was rather technical, and that's a challenge I really enjoy. I love to essentially nerd out on that stuff. I was very limited in giving much information about it, a sidebar would have been wonderful, but we just don't have the space for that. I had to really explain it very concisely in about a sentence or two and then just include some links for people that wanted more information.

Stored representations

To manage time and space constraints and internal and external pressures, the journalists used the rhetorical tool called stored representations, which are forms stored in writers' memories that they can quickly access. Stored representations facilitate the writing process because they are a kind of prefabricated mental story structure—like a memorized template—that is cognitively available. Seen as a "kind of mental efficiency,"[35] they provide a coping mechanism to survive under demanding reporting pressures. Stored representations are also considered "content blind frameworks," [72] which means they are a form that can accommodate any type of information. Participant #2 mentioned a checklist of crucial story elements that acted as a type of stored representation:

> I have a little bit of a mental checklist of things I know I need to get into the story and everything else is kind of frosting from there ... once the mental checklist is done, I know that I can be finished.

Participant #8 presented a variation on a stored representation by using a streamlined interview process that comes from years of writing a column and practicing format repetition. Years ago, as a novice journalist, participant #8 mentioned that much more thought and concrete structure were needed to prepare for interviews: "I used to, when I was first a journalist, I would sit down and come up with at least 10 questions to ask, and I was probably much more organized and methodical." Participant #8 described an interview process that now allows for "having a conversation" with the interviewee rather than pre-planning questions:

> Now, whether it's a doctor or whether it's that average reader who submitted their success story, I really focused on just having a

> conversation with them because in the experience of having that conversation and making connections, my own curiosity is going lead me to the answers I need for the column. Usually I can follow up at the end of that conversation with the nuts and bolts that maybe I didn't collect, but it flows so much more naturally if I just try to have a conversation with them…So, as I'm writing, that begins to kind of set the structure for the writing itself.

The "curiosity" participant #8 used to guide the interviews could be a stored interview sequence that evolved and was refined over time. Participant #8's adeptness at accommodating organically produced interview content into a well-practiced format demonstrated the ability to plan less and a preference for a more fluid flow of content intake.

Participant #7, who writes strictly digital content, worked with editor-assigned templates. These digital templates go beyond cognitively stored forms into literal, fixed forms that affect all aspects of content construction, including that of headlines. I asked who writes participant #7's story headlines:

> Generally, I do. It's not completely unusual that a headline will be edited, but right now because so much work is in template format ... I know that's across the board on a lot of sites right now, not just the one that I write for, there is no reason to write a headline. You fill in the blank on pros and cons of the Dash diet, pros and cons of the Keto diet, pros and cons of the Jenny Craig diet, pros and cons of the whatever. You're not even writing a headline anymore, you are just inserting a term into a template.

I attempted to clarify participant #7's response by stating, "You're saying the template gives you your form, your function and—" but before I finished my statement, participant #7 replied, "Yep." I then further clarified by asking whether the template dictates content, and the response was, again, "Yes…I usually have the topic and either the editor will assign a template, or I will create a template." I asked participant #7 how

this template writing compares to a process that includes more flexibility and less dictated content structure:

> I'll be really honest, *it's been a while since I've written an article that I've really, really liked*. Back when I chose my own article topics, I would take anywhere from a few days to a week to think about the topic and just think about different angles. That, I don't do anymore, which is really a bummer. But now if I'm writing an article that I'm more proud of, the whole process generally takes, max, five to six hours, that's max. Usually, the turnover is maybe two to four hours. That is not my preference. Really my preference is to spend a good week on an article, at least, thinking about it, thinking about really great people to interview, both from the scientific standpoint and then maybe someone could provide anecdotal information or a personal experience, or something like that. All that is done, that just doesn't happen anymore.

The experiences of the journalists showed that rhetorical processes can become rote from repetition and stored as mental representations to be drawn from quickly. These stored forms can even become fixed to the point of dictated templates. However the journalists coped with the internal and external constraints, their responses reinforced the ways the media heavily influenced the journalists' rhetorical choices, writing processes, and media messages.

Global Theme IV: With-it-ness as a Skill

A theme emerged when I interpreted journalists' use of recommended theory-based strategies. I noticed a certain "with-it-ness" as a skill among the journalists. "With-it-ness" is a term I adapted from the education field (Fig. 8). This term was first coined in 1977 by education theorist Jacob Kounin to describe the way successful classroom teachers maintain a disciplined, welcoming learning environment while teaching a lesson and monitoring the movements, behaviors, and body language of up to thirty-plus students. [73] Teachers with the skill to manage simultaneous constraints while

still effectively conducting a lesson are said to have with-it-ness. The skills that with-it classroom teachers demonstrate, whether carefully cultivated or intuitive, have much in common with the four theory-based strategies I looked for in the journalists' applied practice. For example, a teacher's ability to maintain constant control of a dynamic environment is like a journalist employing practices that address the evolving media landscape ("new rules"). Also, teachers and journalists both must present information to groups of individuals with varied levels of competency and interest (multi-systems approach). When engaging with an audience that can be indifferent, distrustful, teachers, or skeptical, teachers must present information in an open, transparent, and unbiased manner, which is much like journalists' acknowledgment of communication biases and increasing transparency in reporting (bias management tools). Additionally, to empower their students, teachers must act as a guide to learning rather than simply presenting facts as a form of suasion. Likewise, messages constructed in a manner that show confidence in students or the public to make their own decisions and bypass expert frames (heuristics) are believed to be more powerful and actionable in both education and science communication.[15,20] Thus, similar to the way successful teachers intuitively know how to manage stressful situations, I found with-it-ness as a skill in how journalists intuitively employed aspects of the four theory-based strategies into their practices.

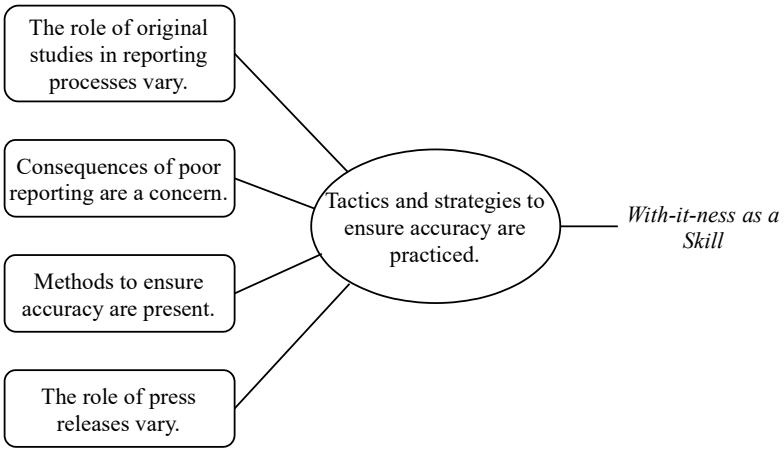

Figure 8 Thematic cluster representing basic, organizational, and the global theme for With-it-ness as a Skill.

Journalistic intuition

I asked the journalists questions that centered on *how* they communicate nutrition science to find out *to what extent* theory-based strategies were reflected in practice. The questions that gleaned relevant data came from the following considerations:

- how, if able, the journalists critically evaluated a scientific claim,
- how much trust the journalists placed in nutrition science findings,
- how much trust the journalists place in the public's ability to understand science, and
- how the journalists viewed press releases and single-study findings as tools to aid their writing processes.

The journalists' responses to questions indicated that each of the four recommended theory-based strategies were used by some of the journalists. Yet, none of the journalists mentioned any awareness of employing theory-based strategies applicable to science communication issues as part of their rhetorical choices. The journalists' incorporation

of these recommended strategies seemed to be an intuitive means to address some of the reporting constraints mentioned in global themes I-III. The extent to which the journalists incorporated each theory-based strategy is explained in the following sections.

New rules

"New Rules" is one recommended theory-based strategy applicable to the challenges of reporting in the highly digitalized new media environment.[13] Rowe and Robert Huesca, a communication scholar who writes about the new media, each suggest that a new format with new rules for reporting is needed.[13,74] Rowe goes further to say that rules such as these can avoid adding to the public misinformation present within the multitude of media health information sources.[13] For example, a new rule of reporting is to authenticate reporting. Authentication can involve such measures as stating science communication credentials and including source links and lists of consensus authorities who are credentialed individuals representing the pervasive expert opinion. Within this new-rules protocol, the journalists should also explicitly caution readers against trusting rival sources who do not follow these practices.

A few of the journalists mentioned some personal practices that show both obvious and subtle use of these new rules. When I asked the participants to describe the challenges they see for journalism today, the responses from participant #2 and participant #8 illustrate situations that the new rules seek to address. Participant #2 agreed that the multitude of media sources creates issues for the journalists: "I think as far as the actual journalists are concerned, the biggest problem is just the proliferation of

places you can get your news, and the ability to filter all of your sources." Participant #8 indicated that this new proliferation of sources calls for changes to journalists' practices: "I think we have to get more out of the box." Participant #5 indicated that an abundance of information can sow confusion but also showed how it can be addressed through rhetorical choices:

> There's just so much more of it. I think it's very difficult for the lay person, the general public, to get credible health education information. So, I try to provide, in my writing, the resources that I use. Always have a reference and resource list for my editors too. They never have to wonder, 'Where did you get this?'

Participant #5 includes resources in writing, which exemplifies the new rules approach, and other participants mentioned including links and citations as well. Participant #6 described the process for a story about whether the nutritional components of certain foods increase lactation for breast-feeding mothers. This participant and the story editor's decisions both show examples of new rules strategies, particularly when including sources:

> It was an online story so she, as often is the case with online stories, she didn't come back to me with questions or edits, it was just kind of taken. I think they put it up shortly after that, after I suppose checking my facts and my citations, which were all included at the end of the story.

The journalist included story sources to ensure accuracy and to check facts. The story editor also judged which consensus authorities were appropriate to consult as expert sources for the story:

> I also considered talking with lactation consultants, board certified lactation consultants, because they're supposed to be the experts on breast feeding. But my editor didn't want me to talk to them. She didn't think that they were sort of as credentialed or as reputable, I guess, as OBGYNs. So, I didn't talk to any of those.

The choice by the editor to not include lactation experts showed the editor perhaps did not deem them authoritative on the issue. This editor's choice was an attempt to maintain a standard of accuracy.

Concerning the last aspect of the new rules approach, none of the journalists mentioned explicitly cautioning readers against trusting rival messages that do not follow these practices. However, participant #7 called for an even stronger approach to address health misinformation than the new rules approach. This call went beyond the journalists and editors managing themselves. Instead, participant #7 advocated for a so-called fifth estate to scrutinize the fourth estate of journalism:

> But my personal wish would be that there would be more watchdog agencies. There was one called *Health News Review* that went under …We do need to have some sort of in-house or in industry agency watchdog agency to start to look at who is giving us our health information and is the person that wrote that article really the person that wrote that article? Who is fact checking it? How do we really know that was updated in 2019 because this is where people are getting their health information?

Multi-systems approach

A second recommended theory-based strategy is the multi-systems approach.[15,22] It calls for journalists to move beyond prioritizing clear communication of science and numerical findings to further consider the audience's predispositions.[15,22] Accordingly, it states that stories should be constructed with a process that considers readers' perceptions of science, political and emotional characteristics, and personal values and beliefs. The journalists considered aspects of these audience predispositions when crafting their stories and deciding their content.

The journalists demonstrated concern with how audiences will interact with their stories. Participant #1, who writes for both specialized and general audiences, described how readers' perception of science influenced communicating interview content:

> So, if I'm freelancing—something that's more consumer-based—I'm trying to simplify things. I'm not going to get as in-depth. I'm going to try and understand it from an interview standpoint, from a journalism standpoint, so that if I'm explaining something, I can simplify it. But I'm not going to say word for word what the person I'm interviewing, what they're going to say because I don't feel like the public is going to necessarily want to get through those details. I believe they just want to make sure that they are *informed enough to make a decision, or to form an opinion*.

Participant #4 expressed the understanding that the modern information age includes readers affected by highly politicized science topics, such as climate change, and stated that communicators must consider this audience by creating actionable messages:

> I think that the science media is more articulate and more focused on getting information and facts to the public. Especially since we've gotten into the climate change era. I think before there was a level of thinking that, 'Okay, if we just get the information out there, maybe somebody will find it.' But now it's, 'Okay, here's our audience, and we need to communicate this to them in this fashion in order *to get them to really understand and change their behavior*.'

I found only nuanced evidence of the third aspect of a multi-systems approach, which is to consider the personal values and beliefs of the audience. A few of the journalists gave the impression of meeting the audience where they are in the understanding of a topic, which could be vaguely related to recognizing the individual natures of audience members' values and beliefs. Participant #5 was the only journalist to offer a concrete statement that showed a sense of caring how readers personally

interact with a story. This participant described the reader's envisioned story reaction: "I like the writer-reader relationship. I want the readers to enjoy the writing."

Bias management tools

Rowe recommends bias management tools as a third theory-based strategy.[23] These tools promote transparency by asking journalists to acknowledge the wide array of inevitable communicator biases and potential conflicts of interest in most science communication. Anyone who communicates science, including both scientist and journalists, is susceptible to these biases and conflicts of interests. Rowe says that to avoid biased reporting, journalists should examine personal points of view, adhere to a rigorous reporting process, and practice full disclosure as a form of transparency. [23]

An important step in this process of realizing how the creator can influence the message, even inadvertently, is to examine personal points of view. The journalists communicated awareness that how a message is fashioned can influence reader behavior, so the ability to influence should be considered in the rhetorical processes that produce health messages. Participant #8 said that "there is an element of influence I think we have to be aware of whether we perceive it that way or not." Participant #5 mentioned being shocked at seeing other's personal beliefs included in medical writing: "I see a lot of medical writers out there that are writing things based on their own personal beliefs, and I'm like, 'Where did you go to school? Did you not take journalism 101?'" Participant #3, who commonly writes about veganism and vegetarianism while practicing a vegetarian lifestyle, shaped content around expert opinion to guard against personal biases for a certain type of diet:

> I write a lot about plant-based diets. I'm also a vegetarian, so personally I've done a lot of research on eating as a vegan or a vegetarian. I think those kinds of diets, the Dean Ornish kind of heart-healthy Mediterranean diets, those things I've done more research, so I think I feel more comfortable writing about those.

Knowing that participant #3 writes about a topic closely aligned with personal practices, I asked how separating a personal view from an opposing view was managed when both views are backed by sound science. For example, I asked how this participant could objectively write on the current trend of the meat-only carnivore diet if research touted it as healthy and an editor assigned it as a story. The participant responded that overcoming personal bias would be possible by relying on expert opinion to drive that and any other piece:

> Right, but I put it in context. Are there other sites that show that eating just meat is bad for you? There's also the experts, so if there's going to be an opinion, it's going to be one of my experts, not my own. Some of my experts have strong opinions, which is good.

Participant #3 further explained how expert opinion decides the story frame, which can override personal biases:

> A lot of my stories are shaped around the answers that I get from experts. It's rare that I write about a study where it's just me writing. I know that does happen. But if I'm getting feedback from other researchers, I usually shape my story based on their comment. So, I'll interview them, transcribe the interviews, and then I pull out the key approach that I want to use, both indirect and direct, then I kind of put them into a sort of outline.

Relying on expert opinions as a form of addressing personal communication biases is one tool used by these journalists. I asked journalists how they rated their trust of nutrition science to see if their trust in the field had limits. The journalists described varied levels of trust in nutrition findings. For example, participant #6 seemed unaware

of the inherent difficulties associated with nutrition science by expressing little skepticism. Participant #6 reported mainly considering a study's funding source when evaluating for study bias. If no obvious conflict existed, then this participant suspended skepticism:

> Unless, I guess, the study is being funded by, for instance, an avocado study funded by the Avocado Board or something like that, then I might be able to be skeptical. But I think overall everyone, the funding is coming from a neutral source. I think that the scientists who conduct the study have good interests at heart. They want to conduct good science. They don't have a vested interest in having a certain result come out or having a certain food or a certain nutrient be sort of highlighted in a certain way. So, I tend to take studies as long as they're not funded by shady sources. On the safe side, I'm not skeptical of the motives of the researchers or anything like that.

Likewise, participant #5 also expressed almost unquestioned confidence in "highly credible" sources, such as the CDC, the American Heart Association, and the Harvard Health Review. Participant #4 added that "we are taught that once you get to that level, people should really stop questioning findings." However, participant #4 also said that this unquestioned confidence does not extend to most nutrition science studies:

> Honestly, I don't know that I have very much trust in the stories or in the studies that come out about nutrition. Because so many times scientists will do a study on, 'Okay, red meat is not really that bad. It could be good for pregnant women who need to keep their iron consumption up. It's good to get your protein. High protein diets are good.' And then the next time you turn on the TV, it's, 'Don't eat red meat. It's bad for the planet. It's bad for your health.' There doesn't seem to be a lot of staying power with some studies.

Participant #7 was the only journalist that voiced the view that scientists, at any level and in any field, are subject to pressures and biases similar to those of journalists. Also, like journalists, these pressures and biases can affect their messages. As a result, this

participant experienced a lower level of trust in the nutrition science field after witnessing the fall of Brian Wansink, a popular, widely published, and oft-quoted nutrition scientist at Cornell University. Wansink was found to have made false claims and used unethical practices to obtain findings. Subsequently, at least 15 of his publications were retracted. When I asked participant #7 what level of trust was placed in nutrition science findings, the Wansink controversy was described as a moment of epiphany:

> Oh, that is such an interesting question in light of this past year. Well, on a scale of 1 to 10, I'd put it on a 7. The reason I said this past year is just because of all the stuff that happened with Brian Wansink at Cornell. I've actually written about Brian Wansink. I've spent time with Brian Wansink. I like Brian Wansink. But I think it underscores the pressure that ... I had mentioned it's hard for me to keep a job and give editors and publishers what they want, but *it's also the people that we're getting the scientific material from, they are under pressure to do the same*. Until I really saw that with Brian Wansink, I didn't realize that really was going on at that level. I hadn't really thought about it because usually what I would do when evaluating a study is, I would look at where the study was conducted and who funded the study. If there were conflicts of interest and things like that. Brian Wansink didn't have those red flags, so I would usually feel pretty comfortable using his research, and I had confidence in his research. Also, because he wasn't saying anything that was flying in the face of other nutritional studies. *But it did drive home the point that they are also under pressure*. There's that issue.

When the other journalists expressed skepticism about nutrition science findings, they were skeptical at the funding or methodological levels. Some also seemed oblivious to controversies in the field. Participant #7 was the only journalist to note the similar pressures and biases shared with scientists.

A rigorous reporting process is another bias management tool. The journalists showed a level of rigor in seeking outside help with topics beyond their knowledge base.

They showed another level of rigor in how careful they were to accurately report the solicited experts' input. For example, participant #1 would "sub out" complex technical content beyond personal knowledge limits, which meant someone with the appropriate expertise either heavily edited the content or helped to write that part: "Well, there's a specific topic that I'm not very…that's really technical that I actually usually sub out to contributors." Participant #1 could then focus on the interviewing process and quote heavily to help ensure accuracy: "I can interview somebody, but I always make sure to use direct quotes, just to make sure that I'm accurate if I don't understand something."

Participant #6, an English major with no background in science, also noted the limits of personal science knowledge and acknowledged that sources are important for that reason: "I'm not very familiar. Yeah, that's why I think it's so important to make sure that you're talking with sources who are." Participant #8 also mentioned taking the extra step of soliciting help to critically analyze a nutrition finding:

> To be very honest with you, my [personal relationship redacted] has been a [profession redacted] for years and a big part of [their] training was really knowing how to delve into a study, so when I want to know how accurate it is or what the statistical representation is, I will always [ask for assistance and] say, 'Is this really a good sampling size, is this study legitimate?' I will look into them myself and the conclusions were usually, they will say things like, 'We recommend further study with a larger sample size used.' I look at stuff like that to quantify how accurate it might be or might not.

Some journalists, under the duress of time constraints, skip the important step of reading the journal article reporting the original study that produced the finding. Instead, they rely on the press release that announces the finding, a controversial practice in journalism. Press releases, which are one type of "information subsidies," highlight key

components of the science finding.[17] Press releases are widely used by research institutions, journals that publish research, and commercial industries. They function to announce a finding, build interest, and draw media attention. When done well, they are useful, convenient tools that can save time for journalists who are not able to sift through hundreds of scientific articles. When constructed poorly, their language can exaggerate the novelty or importance of a finding.[75] The journalists, faced with an imminent assignment deadline, use these announcements as starting points or, in worst-case scenarios, as the main source for stories. The journalists gave widely varied responses that reflect their different attitudes towards press releases as a rhetorical tool. Some of the journalists said they found them, within limits, both trustworthy and useful:

- Participant #5 Said

  Well, they're great. If you can use something from a press release, you can attribute to it, but it's also there to be used, and actually copied if you want to ... But I read them, and *some of them are worthwhile, and some of them are just advertisements* really for somebody, so you have to be very careful who's paying for this press release, who's paying for the study? Where's the money coming from? What are they trying to prove?"

- Participant #6 Said

  They start story ideas … More often than not you see the press release and that ends up sparking a larger idea. As someone with a non-science background sometimes also reading the press release especially if it's on a study can give me a pretty good gist of the study from a reputable source. So when I do go to a study author, I can feel like I know what I'm talking about. Or if the study is going to get a very slow mention in a story, I don't actually need to go to the author. I can sort of verify what I think I'm reading in the study from the press release to make sure that the facts or certain numbers are right or that I interpreted them correctly.

Some of the journalists found them somewhat trustworthy and used them somewhat reluctantly:

- Participant #1 Said

  A lot of the press that I get for these single studies are done ... they're small ... a small pool of survey takers. And I want to make sure that it's not just something that can't be extrapolated and generalized …

- Participant #2 Said

  They play a huge role ... *I think all journalists would prefer not to ever write from a press release or not to write because a press release told me this thing was interesting*, but it ends up playing a huge role because everyone gets them. At the beginning of the week, I have to look at what will be coming out in the journals because it tells me roughly what will be covered that week. If there is a particularly great or interesting or terrible study, I need to know what other outlets will be covering, and the press release is how I do that.

- Participant #3 Said

  I think they're kind of idea generating. Those are the ones that grab your attention. I don't think it's helpful to write from a press release, but it's easier to skim 30 or so press releases than it is to skim 30 or so papers. In terms of finding stories, I think press releases are very useful. *I think press releases are mostly for coming up with ideas for stories.*

- Participant #8 Said

  Sometimes in doing research on a specific story, so doing more context gathering based on what someone has said is part of their story, I definitely kind of come in contact with them at that point.

Other of the journalists said they found them completely untrustworthy and useless:

- Participant #4 Said

  The way I described it to the ad director of the new of the newspaper where I worked, I said, '*This is like a free ad*.' I would take it with a major grain of salt as a writer. If all I've got as a starting point for a story that I'm working on is a press release from an external party, I would say, 'Okay, why should I take this seriously?'

- Participant #7 Said

> And regarding press releases, it's a simple response. They don't play a role. *I ignore them*. I get dozens every day. There are very few situations when a press release catches my attention, but if it does, I find the original research and it rarely matches the hype. So, I ignore them.

The last aspect of bias-management tools considered among the journalists' responses was full disclosure of relative facts as a form of transparency. An example of this type of transparency is the disclaimer participant #8 added at the end of stories to avoid any misrepresentation of information or unintended persuasive effects:

> We have added a disclaimer in recent years at the bottom that say things like, 'We are not endorsing a specific program, this column focuses on an individual's experience and links are included for readers who want more information,' because I was getting some reader feedback that made me concerned. An individual's experience is very different than scientific facts. *I really wanted to make that distinction as much as I possibly could*.

This type of transparency statement can be likened to those routinely included in scientific articles that disclose any funding sources for the research. A second form of transparency that participant #8 mentioned is allowing readers to suggest story and content ideas. Participant #8 said this type of story gathering helped direct the needs of that community to ensure they were being addressed. In that sense, the content had aspects of being consumer-driven:

> I have contact information at the bottom of the columns, so I do get readers' submissions. That's really my favorite way to get it because *I feel like it's the most unbiased* coming into the column format.

The journalists shared examples of authenticating health messages, such as sharing links, citing sources, and adding disclaimers. They also shared how they centered message construction on expert frames to avoid bias as well as considering audience

predispositions to chosen content. Thus, they showed that the recommend strategies for managing biases and conflicts of interest in science communication are present in their practices.

Heuristics

The final theory-based strategy recommended by scholars like Rowe is to incorporate heuristics into health messages.[15] The stored representations mentioned in global theme III, *Media Form the Message*, are examples of representational heuristics, or mental templates, that journalists use to present information. Stored representations are content blind, which means they are forms that can accommodate any type of content. However, this type of heuristic is different than content-blind templates. As a theory-based strategy for effective communication, it is an interpretive framework that facilitates audience members' ability to make decisions for themselves. Journalists can add these heuristics by constructing messages accordingly. Rather than continually framing information from expert science opinion, they can frame issues in a way that engages readers through emotion, collaborative communication, and human life themes, such as love, personal value, power, justice, truth, and freedom. Readers can then decide for themselves what to believe over being told what to do. [15] Several of the journalists reported incorporating this strategy into their reporting practices.

The power of engaging a reader through emotion or pathos is a rhetorical technique that at least one of the journalists' editor called for. For example, participant #5 mentioned typically choosing to form a story backed by statistics from highly

credible sources, which is an example of expert framing. However, this participant said one of their editors always wants an actual patient's story as the opening paragraph:

> And then, my editors also have certain things they like. For example, [publication name redacted], if there's any way I can get a patient and a release, he wants a patient, a name, and what's happening to them as the first paragraph. It's sometimes very difficult to do that, but that's how he likes it, and I try to give him what he wants…He wants a personal introduction to the topic through someone that's experiencing it.

Participant #8 used positive emotion to inspire the audience. Participant #8 stated, content is "very much based on individuals' unique experience and story and journey, so people can read that story and identify maybe, "Oh, I'm a lot like that." Participant #8 noted using this rhetorically persuasive angle to address the perceived needs of the audience:

> I'm in an arena or a beat, I guess as we say in journalism, of very positive news. I'm strictly reporting on people who have made lifestyle changes, behavioral changes, and I find that very fulfilling because generally they're talking about their struggles, *which is something I probably evoke from them because I'm thinking a lot about my readership* and many of them are either struggling themselves or they're trying to stay on task with their goals and those kinds of things are the feedback I get that they like hearing.

The strength of personally connecting to content was reinforced by participant #4. This participant's response spoke to the motivation driving the move away from strictly using an expert frame:

> In the reporting classes that I've taken, there has been *a little bit of weariness about hearing from experts only*, so there is some desire to hear from people, citizens, and members of the public who are affected by the problem, as well as the experts. So, you try to do both and make sure you have a good blend, and then once it's all polished and clear, hit send.

Another aspect of a heuristic approach is including modes of collaborative communication, which are ways the reader can engage with the topic. Collaborative communication is considered two-way communication rather than one-way communication.[7] Participant #8 showed aspects of this approach earlier when considering consumer input on content choices. This participant found negative feedback rare but welcomed it as an opportunity to better understand readers' perspectives:

> I've had several people contact me through the years, probably about three or four, that were really angry about my column… The more I delved into that, I always think,…if somebody is angry, they're not being heard. When I get disgruntled readers or feedback, *I always try to seek out more of a conversation with them*, and I would usually subsequently find out they were really struggling with their weight and somebody was shoving this column in their face, which wasn't at all my idea.

Participant #8 expressed concerns for the mixed message readers could take away from the plethora of diet choices for weight loss success. Participant #8 further acknowledged consumer confusion over conflicting headlines and worried that content might reinforce that confusion, so when creating content, participant #8 starts by "making sure the reader gets the additional information they need or a way to get it. My regular readers will often reach out to me for that information." This participant's content reflects the results of years of readers' collaborative input, which is enough to anticipate what they want and like:

> I'm still always trying to go more for the health angle. The writing process to me is really more about gathering their story and then telling it as much like they told it to me as possible. My readers and myself, we tend to appreciate more direct quotes than anything for this type of story.

The final aspect to consider with a heuristic approach is to engage readers by incorporating human life themes into content. Human life themes can be woven into

narrative structure.[76] Including these themes in reporting can resonate powerfully with readers. Participant #3 said that enforcing "why this matters to human lives" enriched the content. Participant #3 told of writing a particularly rewarding story. Normally, this participant shaped stories based on expert frames as a form of bias management, but this story used self-empowerment as a life theme:

> I think one of the ones I did write recently that I was proud of, it was about food prescriptions where doctors give people prescriptions for food that they can use to go get a box of vegetables to help them eat. I think a lot of the study-related stories are kind of, 'Here's the study. Here's what the findings are,' and then we move on. But this one I think was more helpful, more actionable. *It showed people actually making changes*. It showed how these kinds of programs help people eat healthier. A lot of what I've read about is, 'This is why you should eat healthier,' but that only gets you so far. It's nice to write about initiatives or programs that are actually helping people eat better, and this was one of those where it's something that people can do to get more fruits and vegetables in their diet and live better. But it also included other components of the whole system. It included doctors, community organizations. It's more inclusive as a whole healthcare system and the food system. So, it kind of ties it all together. I think it was actionable and it was definitely helping people eat healthier and included multiple components of the food and healthcare system. I think those things together, I think are more useful in terms of nutrition studies than just one-off, 'This is why you should eat more vegetables,' kind of thing.

Participant #3 favored writing stories that are feature-like and combine different perspectives to show multiple processes or systems at play, but this participant said that time did not always allow for this type writing. Participant #3's description shows what resisting the traditional expert frame of knowledge in reporting could look like.

Summary

The objective of this study was to assess the extent to which scholars' suppositions about the challenges journalists face in the modern media environment and

the recommended theory-based strategies were applicable as reflected in journalists' practices. The journalists' interview responses contributed rich descriptions of their reporting processes and challenges, the complexity of nutrition science as a topic, and the complicated new media environment. Drawing from the journalists' descriptions, four global themes were interpreted to represent their collective experiences. The themes presented in this chapter answered the three research questions derived from interview question categories A-D:

IV. What do some journalists who cover nutrition science view as constraints to communicating this subject?

V. What rhetorical choices do these journalists prioritize when presenting nutrition science?

VI. To what extent are recommended theory-based strategies reflected in these journalists' practices?

The journalists' responses to interview questions from categories A (Background) and B (Media Landscape) generated the content for global themes I (*Bridging the Gap*) and II (*Ethics as Guideposts*) and answered RQI. Responses to interview questions from category C (Writing Processes) generated the content for global theme III (*Media form the Message*) and answered RQII. Responses to the interview questions from category D (Science Communication) generated the content for global theme IV (*With-it-ness as a Skill*) and answered RQIII.

CHAPTER IV

DISCUSSION

This research study was inspired by two concerns of some who study the science of science communication: 1) how the proliferation of online media sources complicates the reporting of nutrition science and produces potentially harmful consequences for the media consumer and 2) how to best address the complicating factors for reporting in the modern digital age. Some science communication scholars, such as Rowe, recommend theory-based strategies applicable to the reporting challenges of the modern media environment based on their understanding of the challenges' causes and their consequences.[14,15,17,31,77] However, it appeared no theory-based strategies indicated the extent to which the journalists' reporting experiences informed the proposed solutions. Therefore, I wondered whether the theoretical solutions scholars are *talking* about would be reflected in the applied practices of the journalists *doing* the reporting. I sought to assess 1) how a small subset of journalists covered the complex topic of nutrition science in a complicated media environment and 2) the extent to which the journalists' practices reflected theory-based strategies, thus confirming or challenging the strategies recommended by theorists. To attempt to answer these two broad questions, I developed specific research questions and conducted and analyzed eight semi-structured interviews with journalists who report or have reported on nutrition science for various media, in various settings, and at various stages in their careers. They revealed how reporting on nutrition science in the modern media environment influenced their rhetorical choices. In

the paragraphs below, I identify and discuss the extent to which scholars' suppositions about the challenges these journalists face in the modern media environment and the recommended theory-based strategies were applicable as reflected in these journalists' practices.

How These Journalists Covered the Complex Topic of Nutrition Science in a Complicated Media Environment

In many ways, the journalists' practices reflected the theoretical position that nutrition science reporting in the modern media environment is a highly complicated landscape for communicators.[9,11,15,78,79,80] They attributed such challenges to the quick pace of digital media and the importance of context for scientific findings required to deal with the necessary uncertainty built into nutrition science.[81] This evolving modern media environment adds constraints journalists must manage. In communicating their perceived constraints for covering nutrition science topics, the journalists said format heavily influenced and, in some circumstances, dictated their rhetorical choices. As motivation for dealing with these constraints, the journalists mentioned their self-described role as public liaisons for science in the reporting process. The journalists indicated it was their strong sense of personal morals and adherence to a professional code of ethics that guided them through reporting challenges.

Constraints to Reporting

The journalists described the complexity of nutrition science and communicating the individual nature of consumers' nutritional needs and preferences as primary constraints to reporting. They also expressed concern that over-hyped messages could

have negative health repercussions for consumers, and this concern influenced their choice of content and angles when reporting. These findings reinforce the theoretical understanding that most nutrition science communicators find the topic complex.[11,13,75] The journalists understood that, as Rowe states, "[N]utrition science is not about a set of static truths, but an evolving body of knowledge that constantly changes and adds perspective to our understanding of health."[75] The journalists showed this understanding when they labeled the changing nature of nutrition science as an external constraint. From participants' descriptions, the changing nature of nutrition science seemed to contribute to the potentially harmful unintended consequences of poor reporting practices, namely the lack of context that some scholars see as an ethical component of reporting.[12,18,34,82] As Schwitzer et al. have stated, "In health reporting, context is critical,"[31] and these journalists acknowledged that truth and its ethical implications.

Findings from interviews showed the journalists agreed that careless reporting practices can have negative consequences for certain audiences. The journalists acknowledged their concern that readers could misconstrue health messages, expressing that concern as an internal constraint (a personally derived pressure) to their reporting. As Barbara Gastel, a physician who specializes in biomedical writing says, it is not possible to fully measure the impact of health writing, but "readers with health conditions are often vulnerable." [12] The implication is consumers could make decisions deleterious to their health using poorly designed health messages. Such consequences contribute to the ethical necessity for accurate and systematic reporting practices for nutrition science. While not speaking directly to poor message design, Carlo Petrini, a

food ethics scholar, attributes some of the non-individualized effects of health messages to a utilitarian approach that dominates public health ethics and affects reporting attitudes. Petrini says public health's nature and core function "dictate a population perspective" from the field, which often neglects the individual among the many.[83] This utilitarian approach and population perspective could be misguided for vulnerable consumers who need individualized nutrition context. The journalists I interviewed did say they felt editorial pressure to report single-study findings, which could contribute to over-hyping, but none communicated a dictated population perspective as an external constraint. In contrast, they emphasized the need to communicate nutrition science in a way that highlights the individual nature of consumers' nutritional needs and preferences.

One finding from the journalists' description of their reporting practices challenged another perceived cause for poor nutrition science reporting, which is the lack of wider scientific context for the information being reported.[12,15,30,31,33] For example, Rowe says that reporting in the modern media environment often omits valuable "context, perspective, and balance" of the "synergy between nutrients and food."[42] However, even though the journalists admitted to finding the topic complex and challenging to report, all communicated that putting nutrition findings into proper context was a high priority. At least for this small sample, this finding challenges the statements of scholars like Rowe who say that such context about the nutrition of food is "chronically missing" from health reporting because journalists are "overcommitted and underprepared to cover the increasingly complex nutrition and other science research

being undertaken."[84] Yet, most of the journalists discussed not only the changing nature of science but the importance of placing findings into scientific context. The journalists also mentioned understanding the limit of personal knowledge and consulting outside sources to decipher complex science. These actions showed a willingness to include additional steps in their reporting processes to fully and properly address the topic regarding accuracy and proper context.

Self-described Roles

Jeanne Fahnestock, a rhetorician who writes about the rhetoric of science, describes science communicators' role as "[bridging] the enormous gap between the public's right to know and the public's ability to understand."[85] Likewise, most of the journalists saw themselves as important liaisons between the science community and the public, so they took care to craft messages at the appropriate level of understanding. The journalists also saw the public's right to know the latest science to make informed health choices as a primary motivator for reporting on nutrition science, further indicating that the journalists saw themselves as directly reporting, from a democratic perspective, to the people for the people. Accordingly, the global theme, *Bridging the Gap,* emerged from the journalists' described accountability for meeting audience needs in the reporting process and confirmed Fahnestock's characterization of journalists' role as translators of science for the lay public.

The rhetorical choices participants said they used to carefully craft their messages was another way they fulfilled their self-described roles. The journalist's descriptions of their concerns as they write showed what they prioritize. Audience was a

primary concern for the participants, which is the theoretical hallmark of any good writer. However, these journalists went beyond simple audience concerns into managing multiple rhetorical concerns in a complicated environment with a demanding production pace. The journalists said they not only envisioned their audience as they constructed stories, they considered time constraints, audience's needs, and the potential effects of their health messages while writing under pressure. By communicating "the time they spent thinking about how they wanted to affect a reader,"[35] the journalists met a theoretical standard of good writing taken from rhetoricians Linda Flower and John Hayes. Their seminal writing study differentiated between so-called good and poor writers. [35] The distinction was how thoroughly writers considered all aspects of the rhetorical problem before and as they wrote. By demonstrating that they could "juggle all the constraints imposed by…purpose, audience, and language itself," [35] the journalists' writing processes were also equally an act of problem solving. Problem-solving is a talent, a cognitive skill built by experience through practice, and writers "only solve the problem they give themselves to solve."[31] Additionally, as Flowers and Hayes explain, asking journalists to describe their writing processes "lets us describe what writers actually do as they write, not just what we, as theorists, think they should do." [35] Understanding what journalists say they actually do when covering nutrition science topics in relation to what theorists think they should do was a primary motivator for this research study.

Ethics as a Guide

Scholars such as Patrick Plaisance, who writes about ethics in journalism, and Fahnestock say that poor reporting practices pose ethical problems within journalism. For them, the issue transcends technical boundaries into moral concerns for journalists.[34,83] Accordingly, the journalists in the current study echoed Nick Alexander and his frequent co-author Rowe's belief that nutrition science's direct link to health gives covering it an ethical component.[86] All the journalists strongly advocated for personal morals and professional standards as part of ethical reporting practices. Despite the challenges of both internal and external reporting constraints, it was the journalists' sense of self that played a critical role in maintaining personal and professional standards. The journalist's description of their challenges and how they handled them were evidence that they agreed with the ethical concerns and worked to address these concerns beyond technical boundaries.

The journalists used a strong sense of right and wrong to make decisions when faced with ethical quandaries within the modern reporting environment. The constraints imposed by the rapidly changing media environment meant some of the journalists said they had to act against personally held beliefs at times to survive financially. Such stressors reflect the fluidity of ethics within the rapidly changing media environment, in opposition to the more fixed nature of personal morals. When the ethically flexible digital media environment challenged journalists' fixed personal morals, it created additional challenges for those faced with such quandaries. The emerging quandaries currently facing some of the journalists could indicate an area of weakness in

communication theories that do not accommodate for the rapid change in landscape from print to digital.

Self-monitoring of personal morals and professional ethics was a key component for maintaining quality reporting practices. Both the journalists in this study and theorists say that the digital age affords any individual the ability to be a self-professed health expert. No gatekeeper, referee, or editor exists to ensure message quality or process standards in some parts of the digital realm.[87,88] Though stated in a context apart from digital media, Gastel has noted that even journalists' rhetorical choices of how and what to write carries ethical implications because public knowledge can affect health.[12] Even what journalists choose *not* to cover is consequential. These journalists confirmed that they understand this ethical responsibility through their roles as what theorists call agenda-setters. Simply put, agenda setting is a theory that media coverage choices decide public focus.[37] Indeed, the participants' responses about how they create meaning from facts did reflect what rhetorician Richard Vatz says about the power of writers as meaning makers: At the peak of their writing power, journalists' "symbols create the reality in which people act."[89]

Media Format Affects Rhetorical Choices

The journalists' responses showed they were in alignment with Rowe and Alexander who say that "something drastic has happened in the past few decades to nutrition and science communications in general"[79] The rapid advancement of communication technology means that journalists must adapt to an increasingly digital media format. The journalists communicated the many ways that moving from

predominantly print to digital media influenced their time constraints, space constraints, and rhetorical choices. As a coping mechanism to produce high quality content under increased pressures, the journalists showed evidence of using what rhetoric scholar Fahnestock calls stored representations, such as the inverted pyramid commonly used in journalism. These mental templates, as a type of content-blind framework,[72] are a representational heuristic that allow journalists to manage the personal, professional, and ethical constraints imposed by the new media environment quickly. The use of templates even transcended cognitive formations by becoming fixed formats for digital content.

Theory-based Strategies Present in These Journalists' Reporting Practices

With-it-ness as a Skill

The journalists showed the ability to effectively multi-task in an organized fashion while producing results under pressure. I labeled this skillset *with-it-ness*. This borrowed term, a description used for successful classroom teachers' abilities to function in a complicated environment, denotes a "continual awareness that prevents or minimizes problems."[90] The journalists demonstrated the type of constant vigilance common in classroom teachers as they manage simultaneous constraints. A with-it teacher, much like a with-it journalist, either pre-empts issues by anticipating them or actively acknowledges emerging issues and addresses them in a timely manner. The journalist's application of recommended theory-based strategies thereby demonstrated an intuited means to address problems through their rhetorical choices.

The journalists' practices reflected some use of recommended theory-based strategies in their reporting processes. The strategies I sought in these journalists'

rhetorical practices were not an exhaustive list of those proposed by theorists. However, I found evidence of four ("new rules," multi-systems approach, bias-management tools, and heuristics) reflected in this small subset of journalists' practices. Finding evidence of some recommended strategies shows that theorists have aptly identified practices that could contribute to better science communication. Although the journalists explicitly attempted to avoid bias, they did not express knowledge of theory-based strategies informing their practices. I found that the journalists demonstrated an intuitive use of theory-based strategies applicable to some of the specific reporting problems, such as authenticating reporting by specifying sources, maintaining transparency with disclaimer notices, and building content around human life themes. These journalists demonstrated a keen awareness of the types of rhetorical concerns that theorist Greg Myers, a linguist and rhetorician who writes about science communication, says is a key component to combat misinformation. In Myers' view, translating science is not a linear process, it is cyclical with "communicative as well as cognitive dimensions."[91] Therefore, the journalists' applied intuition that certain strategies might ameliorate problems and enhance communication shows both the cognitive ability to create a message over a specific topic and the communicative aspects of considering an audience's needs.

Although each of the four identified strategies is important, theorists and organizations concerned with science communication, such as the National Academy of Sciences, have touted heuristics as one of the most promising strategies to communicate complex topics, such as nutrition science, to minimize misinformation and the unintended negative consequences of reporting.[20] Constructing frames developed from

human life themes facilitates the heuristics, the mental shortcuts, that most people use to make decisions. Employing heuristics in message construction acknowledges the understanding that human decision making is usually not logic based. This well-established understanding has led to the call for heuristics as a new framing approach beyond the typical expert frame. However, none of the journalists mentioned being guided by the understanding that humans are not strictly logical in their decisions. Additionally, heuristics was the least used theory-based strategy among the eight journalists' practices. In fact, most of the journalists in this study employed expert frames as the primary message frame for their stories, an approach that relies on facts to inform and persuade. This approach overlooks the important aspects of human behavioral choices that heuristics seeks to address. Science communication scholar Carina Cortassa notes that the consensus in science communication studies is that expert frames should be avoided because they employ the outdated Information Deficit Model (IDM) as a mode of information transfer.[92] Simply put, the IDM implies that presenting facts from experts is the best means to address any perceived lack in public understanding. I found that, although some of the journalists said they added some components of heuristics into their writing, it did not appear to be a standard practice. Consequently, these journalists' practices do not follow theorists' call to abandon the IDM for a heuristic approach. Cortassa further explains why some theorists go against consensus to acknowledge that the IDM's use of expert frames is likely to never disappear in practice. The IDM is useful to address the gap between public science literacy and scientific knowledge.[91] In essence, the expert frame of the IDM appears to

be a quick, practical, and established go-to for the journalists because it facilitates their primary role, which is translating science to the lay public. For this reason, Cortassa writes about the "eternal recurrence"[91] of the IDM, and for this reason, journalists are not likely to abandon it.

CHAPTER V

CONCLUSIONS

In sum, theorists who *talk* about journalism issues in absolute terms might not be fully describing what all journalists are *doing*. Overall, scholars' suppositions about the challenges journalists face in the modern media environment and the recommended theory-based strategies were largely, but not fully, reflected in these journalists' practices. Participants' reporting practices did reflect several important aspects of scholarly suppositions and recommended theory-based strategies for reporting in the complicated modern media environment. The journalists' acknowledged that nutrition science is a complex topic to report and that poorly designed health messages can have negative consumer consequences. Findings showed that the journalists acknowledged their pivotal role as key translators of nutrition science for the lay public, which confirms the importance of their choosing appropriate message frames, assessing audience needs, including essential context, and maintaining standards of content quality when communicating science.

Additionally, ethical components of communication were present in the journalists' descriptions of their rhetorical choices during the reporting process. As stated by communication ethicist Josina Makau, "communication… is an inherently ethical undertaking. Regardless of context, communication involves choice, reflects values, and has consequences. These three key elements of communication form the basis of its ethical makeup."[18] Thus, the concerns the journalists addressed as they

fashioned their stories, such as their consideration of intended audience outcomes and the professional standards they sought to uphold, demonstrated the ethical concerns theorists and scholars maintain as a central tenet of communication.

It was interesting to observe how closely the reported practices of the journalists matched those of successful classroom teachers because journalists and classroom teachers share similar audience concerns and objectives. Both journalists and teachers attempt to impart knowledge to an audience that is often distant, uninterested, distrustful, overly trustful, over-stimulated, fickle, bored, skeptical, seeking entertainment over knowledge, or openly hostile to their attempts. Yet, journalists and teachers are vital communicators in a democratic society because of citizens' rights to knowledge. They both must also manage internal and external constraints and make rhetorical choices to fashion their messages for an audience with a wide range of literacy levels.

Implications

Several implications that could inform not only journalists' practices, but science communication theory and journalists' education can be drawn from this study's findings. One potential implication comes from this study's use and benefit from phenomenology as a methodology and its ability to highlight emerging issues and ideas. As an example, when this small sample of journalists mentioned awareness of the unintended consequences of poor reporting despite scholars who say most journalists are unaware, it could represent a shift in journalists' understanding of the complicated modern media environment and how their message construction can affect consumers. To explain, physician and scholar, Ben Goodacre, among others, says that one of the

contributors of poor science communication is that journalists, en masse, do not attend to the possible negative consumer outcomes of their messages, such as unintended outcomes from poor message construction. [17,23,41,93] However, in my small sample, I found the opposite attitude. The journalists all expressed concern for unintended consequences and took action in their reporting processes to prevent them. The implication is that the theorists or either wrong or that journalists are experiencing a shift in their awareness of the hazards of the new media environment for consumers. Additionally, it could reflect that the higher experience and education levels of my sample means the journalists were better informed than most.

A second implication speaks to the Information Deficit Model (IDM) controversy. Despite a theoretical consensus that the IDM is an outdated mode of information transfer, research continues to find it is still commonly used by communicators. [92] My research confirmed this finding. Expert framing was the common practice for these journalists. This practice is not necessarily alarming given a minority of scholars who say that the IDM's practicality for addressing the obvious disparity of knowledge between scientists and the lay public means it is not going away. [15, 91] For this reason, this sample likely still employs it because low public science literacy levels were a reporting concern. Yet, Matthew Nisbet and Dietram Scheufele, both leading scholars in the growing field of the science of science communication, say that addressing science literacy cannot be both the problem and the cure for better science communication.[94] Their comment suggests that strategies must reach past, embrace, or collaborate with the lingering IDM to better communicate science in the modern media

era. The implication is that if the IDM won't die—despite theoretical disdain for it—then perhaps it should be acknowledged as potentially useful in at least some types of communication or that it can be incorporated in some capacity with the trend toward heuristics in science communication.

A third implication comes from the shared experience of rapid digital growth in both journalism and the education field. Both fields must adapt to the real-time learning curve precipitated by rapid digital growth and the need to adapt to an increasingly digital audience. As scholars who write about conventional versus online teaching, Charlene Dykman and Charles Davis state, "A transition is underway. The same networking and computing technology that has revolutionized … many other facets of modern life, is now being targeted at education."[95] The four strategies that I looked for in journalists' practices resembled the strategies used by classroom teachers as they, much like journalists, manage simultaneous constraints. These two fields might, therefore, benefit from shared practices. Combining communication strategies with behavior modification strategies is one suggested approach.[96,97] For example, classroom management theories tend to approach audience interaction from a behavioral science lens,[98] which is precisely the call that Rowe and Alexander propose to make health messages more actionable.[96,97] Rowe and Alexander say that it is not enough to accurately decipher nutrition science for the public in clear language. Instead, the messages must be actionable as well as accurate to be impactful. As educators are accustomed to this type of strategy combining, their efforts could be potentially emulated by journalists as valuable examples of theory in practice.

A final implication could speak to what has been labeled by Skinner et al. as "a century-long debate" over the best way to educate journalists. [99] Is it a craft-based vocational approach or a broader-based liberal arts approach? Is journalism a practiced set of skills or is journalism its own "institutional practice of representation,"[99] with its own historical, cultural, political, and economic conditions of existence? Communication scholar Huesca speaks to these questions when he says the radical changes brought on by new technologies require journalism education to examine the "direction for curriculum development, program design, and professional training."[74] My findings showed that the journalists adhered to set of institutional beliefs evidenced by their professional ethics standards, which implies that they are not merely practicing a craft. They are knowingly participating in a moment of history grounded in cultural, political, and economic conditions when they cover a complex science topic in a rapidly changing, complicated media environment. They also knowingly function as meaning makers when prioritizing rhetorical choices to fashion health messages, which validates scholars who say that journalists "cannot simply learn by rote, prescribed skills and tropes of storytelling."[99] So, a broader-based liberal arts education could benefit the call to include more theory-based strategies, such as heuristics, which rely heavily on human life themes. Of course, it is understood that the traditional newswriting criteria of economy, attribution, fairness, balance, accuracy, and clarity will always be relevant educational components,[74] but the wide cultural lens needed to address consumers of the new media might be best cultivated through developing narrative and thematic analysis skills honed in the humanities.

Limitations

This study has several limitations. One is the small sample size, which removes the ability to generalize these findings to a larger population. However, generalization is not an aim of phenomenological examination. Instead, phenomenology's qualitative goal is the "effects of context and individual differences,"[55] so small sample sizes lend themselves well to depth of examination for interviews such as these.

Other limitations are the inherent flaws found in self-reporting along with the possibility of participant bias, which is present when, for example, participants rely on memory to respond to questions or what they anticipate is the right answer. Even though I encouraged the interviewees with phrases such as "There are no right or wrong answers. Please be as open, relaxed, and responsive as you feel comfortable," it is still possible that interviewees' remembered imprecisely or responded to show themselves favorably. It is also possible that they did not accurately remember or effectively communicate their ideas given the ranging abilities most persons have to articulate concepts, thoughts, feelings, and emotions. In fact, one interviewee openly expressed feelings of nervousness about being interviewed:

> I just love journalism, so I was really excited when you e-mailed me. I was like, 'Oh my gosh, she wants to know.' And then I got all nervous, I'm like, 'Am I going to answer ...' Not answering them right, but I want to make sure that I was able to convey what I wanted …

Other journalists asked for reassurance during the interview as to whether they were answering "correctly" despite my reassuring them there were no right or wrong answers. I interpreted any discomfort they expressed as a result, in part, of having the tables turned—a practiced interviewer becoming the somewhat nervous interviewee.

Perhaps the greatest limitation to this study is a possibility of researcher bias. Despite attempts to fashion open-ended questions that were not leading, I could have inadvertently asked questions that affected interviewees' responses. Additionally, even though I engaged in the important phenomenological practice of bracketing to achieve disciplined naivete, it is possible that I interpreted data from a biased perspective rather than allowing the global themes to emerge organically. Nonetheless, in defense of my findings, particularly the theme of *Ethics as Guideposts,* I should note that the journalists volunteered examples of challenges to ethical constraints and examples of ethics in action before I asked them anything about what role, if any, ethics play in the reporting process. Additionally, for the theme, *Bridging the Gap*, which represents the role these journalists see for themselves in the reporting process, no questions were posed that directly sought to identify that role. That specific theme was interpreted from journalists' responses that voluntarily positioned themselves in the science communication chain.

Future Research

Future research studies could go beyond small samples and qualitative descriptions that explore whether and how recommended theory-based strategies are reflected in science journalists' applied reporting practices. Phenomenology uses the human science approach to study one phenomenon from different perspectives, which necessitates small sample sizes. However, a natural science approach can look at an aspect of the phenomenon using a larger sampling. For example, surveys that examine specific aspects of journalists' reporting processes rather than the entire reporting

processes in general would be a quantitative approach. Additionally, knowing the journalists' attitudes toward press releases, a study examining how these journalists' specifically use releases to fashion stories could be of interest.

Another option could be to look at different or more diverse populations or at populations like this differently. For example, I purposely did not consider the race, gender, age or education level of the journalists for this study. However, these factors could be an interesting follow up for further interpretation. I could also avoid the issues associated with self-reporting by observing science journalists or by analyzing their artifacts. In particular, now that I know their individual processes, it could be of interest to examine the journalists' writing samples.

Finally, it is understood that the small sample size of most qualitative studies does not allow for generalizing to a larger population. Nevertheless, phenomenological studies, such as this one, can contribute to the development of research questions and hypotheses, or they can be used to build new theories to be further explored in larger quantitative studies. These journalists' description of their rhetorical choices might serve as a foundation for other studies that look at how journalists cover other topics that pose similar complexities. Thus, the audience for these results includes the theorists who construct science communication theories, scholars who recommend theory-based strategies for communicating science, and journalists who seek theory-based methods to manage the challenges and constraints of reporting nutrition science topics in the complicated modern media environment. The beneficiaries of any increased quality in

health messages will be members of the public, such as health conscious individuals, who seek and use media health messages to improve their health and prevent disease.

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APPENDIX A

INFORMED CONSENT

Please consider this information carefully before deciding whether to participate in this research.

Purpose of the research: To understand the experiences of journalists who report on nutrition science topics and to document their individual writing processes

What you will do in this research: If you choose to volunteer, you will be asked to participate in one interview and possibly a follow-up interview. You will be asked questions about your experiences and your writing process of communicating nutrition science topics. With your permission, the telephone interview will be recorded and transcribed by either a third-party transcription service, Rev.com, or a private transcriptionist. Your name will be omitted from the transcription.

Time required: The interview will take approximately one hour.

Risks: No risks are anticipated.

Benefits: The hope is that participants' contributions advance the study and practices of the field.

Confidentiality: All responses to interview questions will be kept confidential. The telephone interview recording will be destroyed immediately after transcription. Furthermore, your name will be omitted from your transcribed interview and will be replaced with a random numerical code. The key code linking your name with your assigned number will be kept in two secured spaces: in the researcher's locked home safe and in a locked file cabinet in a locked office at Texas A&M University. Only the researcher, Gwendolyn Inocencio, and the researcher's advisor, Yasha Hartberg, PhD will have access to the transcripts. The transcripts will be destroyed after the minimum three-year post-research requirement. At no time will your identity be revealed. Neither your name nor any other identifying information will be used in any publications or presentations.

Participation and withdrawal: Your participation in this study is completely voluntary, and you may refuse to participate or withdraw from the study without penalty or perceived benefits. You may withdraw by informing the researcher that you no longer wish to participate (no questions will be asked). You may skip any question during the interview and still continue to participate in the rest of the study.

To Contact the Researcher: If you have questions or concerns about this research, please contact: Gwendolyn Inocencio at 979-739-0743 or gwendolyn2015@tamu.edu. You may also contact the faculty member supervising this work: Yasha Hartberg at 979-458-7816 or yhartberg@cvm.tamu.edu.

For questions, concerns, suggestions, or complaints that are not being addressed by the researcher, research-related harm, or about your rights in this research, please contact the following program: Human Research Protection at Texas A&M University, 750 Agronomy Road, Suite 2701, College Station, TX 77843--1186. Phone: 979-458-1467. Email: irb@tamu.edu.

APPENDIX B

INTERVIEW SCRIPT

Initial Interview:
"Hello—My name is Gwendolyn Inocencio from Texas A&M University. I am working on my graduate thesis project in the science & technology journalism program. I am conducting a research study to analyze the writing processes of journalists who report on nutrition science. This knowledge will help me understand the rhetorical routines of journalists who popularize nutrition science.

Today you will be participating in a recorded telephone interview, which should take approximately one hour. Your participation is voluntary. If you do not wish to participate, you may stop at any time. You may also skip any questions and still participate in the interview. There are no risks associated with this interview process. Taking part in this interview is your agreement to participate.

This conversation is being recorded by a third-party party transcription service, Rev.com. Responses will be kept strictly confidential. The telephone recording will be destroyed immediately after transcription. Your name will be redacted from this transcript, and you will be assigned a numerical code. The key code linking your name with your assigned number will be kept in two secured spaces: in my locked home safe and in a locked file cabinet in a locked office at Texas A&M University. Only my research advisor, Yasha Hartberg, and I will have access to the transcripts. The transcripts will be destroyed after the minimum three-year post-research requirement. At no time will your identity be revealed. Neither your name nor any other identifying information will be used in any publications or presentations.

If you have any questions regarding your rights as a research subject, please contact the Human Research Protection at Texas A&M University by phone, 979-458-1467, or email irb@tamu.edu. You also have a copy of this information in the initial email requesting this interview.

If I have your permission to proceed with the interview, please state your name and how many years you have reported on nutrition science topics?

I am going to ask you questions meant to elicit candid responses about your individual approach and process for writing about nutrition science. There are no right or wrong answers. Please be as open, relaxed, and responsive as you feel comfortable."

***NOTE**: All interview questions will be consistently in line with the research topic. The following list represents the types of open-ended questions that will be chosen to elicit thorough, thoughtful participant responses:*

Background:

--"Could you tell me about your background, educational or professional, that led you to reporting on nutrition science?" ("Do you have a science background?")

--"Can you tell me what aspects of nutrition science reporting you find challenging or rewarding?"

--"If you have experience in other beats, can you tell me how nutrition science reporting compares or differs?"

--"Could you walk me through any inherent difficulties associated with this beat?"

--"Could you tell me what your biggest influences and motivations are as a nutrition science reporter or writer in general?"

Media Landscape:

--"Could you walk me through your thoughts on how, or if, media is different now than in the past?"

--"Could you describe any challenges you see for journalism as a profession today?"

--"Could you describe how you see the role/purpose of media in general?" (influence, inform, entertain)

--"Could you describe the place journalism occupies in a democratic society?"

--"What role, if any, do ethics have in journalism?"

Science Communication:

--"Could you tell me the ease or difficulty you find in communicating science?"

--"Could you describe how you rate the public's level of science literacy and how that affects your content?"

--"Do you see yourself as a risk communicator?"

--"Where, if at all, does absolute vs. relative risk factor into your content choices?"

--"How do you view, if at all, single-study findings in reporting nutrition science?"

--"What does "being cautious concerning scientific facts" mean to you?"

--"How familiar are you with analyzing a study's statistical findings?"

--“Do have any familiarity with Walter Willet? (He’s a prominent physician and nutrition researcher out of the Harvard Medical School—one of the most cited authors in clinical medicine. food frequency questionnaire/inherent biases/confirmation bias)

--“Could you tell me what trust, if any, you place in the scientific process, especially in nutrition science?”

Writing Process:

--“Would you walk me through how you choose what you will write about?”

--“Could you describe your process for locating story sources?” (or first place to go to get info to write)

--“How do you define your audience?”

--“When I mention “writing process,” what does that mean to you?”

--“Using that definition, could you describe your writing process from beginning to end, including any prewriting or thinking processes as well?”

---“When crafting your stories, what are your priorities?” (What are the must haves of every good story?) stories proud of/not proud of

--“Could you walk me through any internal and/or external pressures, if any, exerted on you as you write?”

--“Could you tell me where, if at all, nutrition science press releases figure into your writing process?”

--“Thinking about the problems that you mentioned with the media landscape/science communication, how, if at all, do you address those in your writing process?”

--“Who writes the headlines for your stories?”

--“How do you know when a piece is finished?”

***NOTE**: These additional questions could potentially be used to prompt, guide, or redirect the participant during the initial interview or as potential questions for any follow-up interviews.*

--“You mentioned _____. Could you please tell me more about that?”

"That question completes our interview. Can you think of any question that I am neglecting to ask that you think might be helpful? Do you have any questions for me? May I have your permission to contact you with any follow up questions once I begin analyzing this data? Please contact me with any future questions or information you would like to share. Also, if you have any colleagues that might be willing to speak with me, I'd be happy to engage with them. You have my contact information. I sincerely appreciate your time and contribution to this research. Thank you."

Follow-up Interview:

"Hello again—It is Gwendolyn Inocencio from Texas A&M University. As you are aware, I am working on my graduate thesis project in the science & technology journalism program. I am conducting a research study to analyze the writing processes of journalists who report on nutrition science. This knowledge will help me understand the rhetorical routines of journalists who popularize nutrition science.

You granted permission for a follow-up interview, which should take approximately 15-30 minutes. Your participation is still voluntary. If you do not wish to participate, you may stop at any time. You may also skip any questions and still participate in the interview. There are no risks associated with this interview process. Taking part in this interview is your agreement to participate.

This conversation is being recorded by a third-party party transcription service, Rev.com. The same study protocols as the initial interview apply. Responses will be kept strictly confidential. The telephone recording will be destroyed immediately after transcription. Your name will be redacted from this transcript, and it will be assigned the same numerical code. The key code linking your name with your assigned number will be kept in two secured spaces: in the researcher's locked home safe and in a locked file cabinet in a locked office at Texas A&M University. Only my researcher advisor, Yasha Hartberg, and I will have access to the transcripts. The transcripts will be destroyed after the minimum three-year post-research requirement. At no time will your identity be revealed. Neither your name nor any other identifying information will be used in any publications or presentations.

If you have any questions regarding your rights as a research subject, please contact the Human Research Protection at Texas A&M University by phone, 979-458-1467, or email irb@tamu.edu. You also have a copy of this information in the email that requested this interview.

Do I have your permission to proceed with a few clarifying questions?"

--"In the initial interview, you mentioned _____. Could you please tell me more about that?"

--"What did you mean by _____. Could you please define/clarify/explain further?"

“These questions complete our follow-up interview and should represent our final correspondence. Do you have any questions for me? Please contact me with any future questions or information you would like to share. You have my contact information. Again, I sincerely appreciate your time and contribution to this research. Thank you.”

APPENDIX C

CATEGORIES A-D AND EMERGENT CODES

Category A: Backgrounds	Category B: Media Landscape	Category C: Writing Processes	Category D: Science Communication
• Over-hyping new studies • Debunking overblown, "crazy" headlines • Balancing editorial pressure to report new findings with sound nutrition research • Individual nature of nutrition • Behavioral aspect of nutrition • Nutrition science is difficult to report • Woefully underinformed public • Goal of helping people	• Public trust • Unbiased reporting • Influences of professional organizations • Role of media in a free society • Doomed point model • Noisy environment • Click bait • Ethics • Internal pressures • External pressures • Fourth estate • Supportive team and editor • Role of media • Role of journalists • Democracy • Public literacy • Importance of context • Trust in science • Absolute vs. relative risk • Unintended consequences • Protocols for accuracy • Applied ethics • Journalists' pay • Story turnaround • Democratized media • Co-branding • Digital media issues • Editorial decisions • Power of knowledge • Journalists' influence • Local publications • 24-hour news cycle	• Editor-and-journalist relationship • Backgrounder • Role of sources • Role of storytelling • Story must-haves • Editorial decisions • Headlines	• Journalists' reporting role • Study funding • Press releases • Healthy skepticism • Audience role • Embargoes • Translation process • Helping people • Making better health choices • Unique story angles • Difficulty of communicating nutrition science • Medical wrongness and nutrition science issues from a laboratory perspective • Print issues • Generalizing findings • Public trust and mistrust • Shifts in reporting focus