The Media Propaganda Model and Framing of Risks from the Deepwater Horizon Disaster

Kristine Mattis
Independent Scholar ~ k_mattis@outlook.com

Abstract

In the United States, the public primarily learns about science and environmental information from the news media. For this reason, the framing of a prominent environmental story by the news media is of great importance in determining the messages that the public receives. It also reveals whether or not the news media inhabit their role as the fourth estate, acting in protection of the public or rather, of the powerful interests with which they can be affiliated. Using the media propaganda model as a theoretical framework, this study sought to discover whether different types of news media, in particular, large corporate, commercial news outlets versus independent not-for-profit news outlets, covered the risks stemming from the Gulf oil disaster differently based upon their funding sources. A combination of quantitative and qualitative content analysis was utilized to examine news media stories. The quantitative analysis demonstrated that significantly more news stories were devoted to the discussion of environmental and health risks in independent media than in corporate news media. Furthermore, the qualitative analysis revealed that corporate media framed the event in a much more positive tone than did independent news media, de-emphasizing risks and emphasizing the encouraging forecast for environmental recovery. Given the increasing occurrences of high-impact environmental disasters, the news media play a crucial role in information dissemination. The manner in which information is framed can serve to act in the interest of the public or in the interest of the corporate stakeholders to which certain media outlets are beholden. The differences exemplified in this study suggest that the media propaganda model may indeed be relevant in news coverage of the Deepwater Horizon disaster and that the dominant corporate news media outlets may not be protecting public interests to the extent that independent media outlets do when covering such an event.
Introduction

Just over a year past the twentieth anniversary of the Exxon Valdez oil spill that devastated the Prince William Sound in Alaska, another potentially even larger oil disaster loomed in the Gulf of Mexico. On April 20, 2010 the Deepwater Horizon oil rig exploded, killing eleven workers and gushing oil into the Gulf for 87 days (Paul et al., 2013; Valentine et al., 2010). Over 205 million gallons of oil spewed from the leaking pipe, 50 miles from the nearest shore and 5000 feet below the surface of the ocean, until the well was plugged on July 15, 2010 (Magner, 2011; Paul, et al., 2013; Reddy et al., 2012; Safina, 2011; Valentine, et al., 2010; Williams et al., 2011). The Deepwater Horizon disaster, also known as the BP oil spill or Gulf oil spill, proceeded to become the largest oil spill in the history of the United States and arguably the nation’s worst manmade environmental catastrophe (AP, 2010; Roberston & Krauss, 2010).

Risks

Both ecological and human health effects were anticipated as a result of the oil spill. The substances emanating from the spill, as well as the dispersants used in the cleanup, are implicated as carcinogens, mutagens, immunologic suppressors, neurotoxins, and endocrine disruptors (Barron, 2012; Bosch, 2003; Goldstein, Osofsky, & Lichtveld, 2011; Solomon & Janssen, 2010), thus, the potential chronic effects in humans were vast. Research of cleanup workers in the 2002 Prestige oil spill off the coast of Spain revealed DNA damage and persistent respiratory symptoms five years after exposure (McCauley, 2010; Zock et al., 2012). Increased incidence of and deaths from cancer were found among residents in the Amazon basin or Ecuador, where vast oil exploration and leakage occurs (Sebastián, Armstrong, Córdoba, & Stephens, 2001). Surveys of Exxon Valdez clean-up workers showed complaints of chronic respiratory disease, neurological impairment and multiple chemical sensitivity twenty years after that spill, though peer-reviewed short and long-term studies of health effects on this population do not exist (Moore & Burns, 2011; Solomon & Janssen, 2010). According to Mehri (2010) chromosomal aberrations and subsequent reproductive troubles are likely outcomes in oil exposed populations.

Crude is composed of thousands of types of hydrocarbon compounds, most of which are forms of aromatic hydrocarbons like benzene, toluene, and xylene, all volatile organic compounds (VOCs) (Solomon & Janssen, 2010), and polycyclic aromatic hydrocarbons (PAHs) as well as other organic compounds, such as alkanes, and traces of heavy metals, such as nickel and cadmium (Bosch, 2003; Farrington, 2013; Zheng et al., 2014). Some of the short-term clinical health risks from exposure to crude oil are predictable, based upon studies from previous spills. Acute symptoms are respiratory and dermal irritation, eye irritation, headaches, dizziness, cough, chest pain, nausea and vomiting are likely risks (Bosch, 2003; Goldstein, et al., 2011; Merhi, 2010; Solomon & Janssen, 2010). Long-term exposure to VOCs could result in future cancer risks, while short-term risks include acute respiratory and central nervous system problems (Solomon & Janssen, 2010). Hydrogen sulfide gas, a by-product of crude spills, is a neurotoxin that may result in both acute and chronic central nervous system abnormalities (Solomon & Janssen, 2010) when inhaled. While some short-term health effects from exposure to these substances are known (Mayer, 2010; Solomon & Janssen, 2010; Woodward, 2010), the lack of a great deal of epidemiological data leaves uncertainty about long-term risks (Woodward, 2010; Zheng, et al., 2014).

Nearly two million gallons of oil dispersants (Corexit 9527A and Corexit 9500A) were applied to the surface of the ocean to dissipate the oil droplets. Another 770,000 gallons were spread to the subsurface levels thousands of feet below sea level, in a manner not before attempted (Rico-Martínez, Snell, & Shearer, 2013; Subra, 2010). Because the components of the dispersants remain largely
proprietary, much of their toxicity information was limited before their widespread application (Subra, 2010). Since then, studies have revealed that the synergistic effects of dispersants and oil yield more toxicity to organisms than just crude oil exposure itself (Paul, et al., 2013; Rico-Martínez, et al., 2013).

Potential short-term risks from Corexit exposure include eye and skin irritation, difficulty breathing, cardiovascular difficulties, increased immune response, gastrointestinal illnesses, red blood cell injury, and short-term memory loss (Anderson, Franko, Lukomska, & Meade, 2011; Krajnak et al., 2011; McCauley, 2010; Roberts et al., 2011; Subra, 2010). Because Corexit has shown to alter mitochondrial function in cells leading to an increase in cell death, exposure to these dispersants runs the risk of deleterious effects to many if not all organ systems in the body (Zheng, et al., 2014).

Current research shows that human health effects were and continue to be suffered by those living in the Gulf Coast region, especially among those working on the cleanup (D'Andrea & Reddy, 2013; Juhasz, 2011; Pittman, 2013; University & Health, 2013). Moreover, evidence suggest that the risk from exposure to the contaminated Gulf waters include DNA damage, mutations, and heritable alterations that will not be visible, particularly in higher organism such as humans, for many years to come (Paul, et al., 2013). The long-term, chronic, intergenerational, and sublethal risks to humans, other organisms, and ecosystems from crude oil, its byproducts, and the Corexit dispersants used in the spill remain largely uncertain.

Framing

Since the mass media are the primary source of scientific information to the public (Dearing, 1995; Dudo, Dunwoody, & Scheufele, 2011; Dunwoody, 2005; Friedman & Egolf, 2011), it follows that citizens rely on the news media to convey information about environmental and public health risks from the Gulf oil. News media reports about the Gulf oil spill had the potential to increase the public knowledge of and discourse about the spill’s environmental and public health risk. The manner in which the news media covered the risks from the oil disaster – i.e., how the disaster was framed - has implications for the future public dialogue and public policy, as news information affects how the public forms its socio-political ideology (Goss, 2013) Furthermore, the framing of the oil spill in the news has the potential to shape audience perceptions (Entman, 1993; Gamson & Modigliani, 1989; Iyengar, 2005; Reese, Gandy, & Grant, 2001) and/or policy (Gamson & Modigliani, 1987; Iannantuono & Eyles, 2000), and augment or hamper political actions (Zehr, 2000) concerning the accompanying risks. As a result, this study was interested in whether the mass media reported on health and environmental risks from the Gulf oil disaster, and how those risks were framed in news stories.

The concept of frames in communication research, while used widely in content analysis, does not have a universally shared definition (Entman, 1993; Scheufele, 1999). With respect to journalistic stories, a frame generally refers to which information is selected, organized, and presented or understood within the context of a news story (Veenstra, Sayre, Shah, & McLeod, 2008) “to make sense of relevant events” (Gamson, 1989, p. 157). Frames make a certain aspect of an issue more salient and they are used as narrative strategies to make sense of controversial issues (Entman, 1993), often issues pertaining to science and the environment (Nisbet & Mooney, 2007). A frame represents a choice of what message to convey in relation to a particular issue (Tuchman, 1978) and an emphasis on some informational aspect of a topic to the exclusion of other aspects (Griffin & Dunwoody, 1997). Sometimes thought of as secondary agenda-setting, framing indicates the thematic emphasis of the news coverage of a particular topic. Thus, while the main topic of the news stories may have been the Gulf oil spill, the frame in question in the stories examined in this study is the risk frame, or more specifically, health and environmental risk frames.
However, because frames are defined as making certain aspects of a story more salient and resonating with a particular belief system (Entman, 1993), then many one or two word “frames” employed in research literature are really more sub-topics or “domains.” A frame must include not only the sub-topic of what is being discussed with regard to the Gulf oil spill – i.e., health and environmental risks – but how that domain is interpreted. For example, health risks from the spill could be regarded as negligible in a news story, or environmental risks to certain species could be though of as catastrophic. Consequently, a frame of a news story must include a domain (sub-topic) as well as the valence of that sub-topic. It must be more thematic to fully impart an interpretation to the audience. In this study, quantitative content analysis of news identified stories containing the domains (sub-topics) of health risks or environmental risks. The full thematic framing of these risks was then revealed through further qualitative thematic analysis.

Theory

This research study examined the framing of health and environmental risks of the Gulf oil spill in news media utilizing the theory known as the media propaganda model. The media propaganda model contends that because most large media outlets are closely connects to state and corporate interests, their messages remain closely aligned to those interests, fostering the promotion of perspectives in line with the corporate state (Herman & Chomsky, 1988). While there may be debates within the mainstream media about certain social, political, or environmental issues, the model suggests that these disputes are bounded by certain parameters in the framing of stories (Herman & Chomsky, 1988). Consequently, in the context of the Deepwater Horizon disaster, one would expect to see media outlets with ties to political and commercial interests minimizing the potential health and environmental risks of the spill, while media outlets without those particular interests might frame risks differently. If that expectation is correct, then disparate messages about risks might, in turn, affect the way the public and policy-makers perceive and make decisions about extremely sensitive environmental and public health issues following the spill.

The propaganda model is premised on the idea that the dominant, mainstream media are “firmly embedded in the market system” (Herman, 2000, p. 102) which affects the content that they produce. According to Herman and Chomsky (2002), much of the media are controlled and financed by powerful interests so by design, the content they produce will serves those interests. Individual journalists may attempt to step outside of the boundaries of the corporate stakeholders within their stories, but in aggregate, the pattern of protecting stakeholder interests will remain intact (Klaehn, 2003), because the system itself is rigged by market-driven imperatives (Herman & Chomsky, 2002). Furthermore, although powerful interests and their particular media outlets may differ slightly in their individual agendas, they share common political, economic, and social concerns (Klaehn, 2002) which result in similar underlying assumptions within the framing of their news stories.

The media propaganda model lays out five specific factors that affect the presentation of stories and that act as filters through which the mainstream media self-censor their stories (Herman, 1996, 2000; Herman & Chomsky, 1988; Klaehn, 2003). These filters help predict what ultimately becomes news and how that news is framed (Mullen & Klaehn, 2010). Two of the filters, ownership and advertising, act as the independent variables through which this study examines corporate-owned, commercially-sponsored news media stories versus independent, non-commercial news media stories of the Deepwater Horizon spill to see if the media propaganda model might predict different framing of stories. The other three filters - sources used in stories, dominant (capitalistic) ideology, and flak (rebuttals to unwanted and unintended frames) (Herman & Chomsky, 2002) - can potentially be discovered in media stories acting moderating variables, ultimately adding to the framing differences between corporate and non-corporate media stories.
Under the media propaganda theory, one would hypothesize that stories about the Deepwater Horizon disaster would differ considerably in corporate news media outlets as opposed to independently media outlets. More specially, one would hypothesize that corporate outlets would de-emphasize risks from the disaster by either utilizing risk domains less frequently than independent media outlets and/or minimizing the potential risks when they are indeed discussed.

**Methods**

This study was derived from a larger research project determining the domains (i.e., subtopics) and frames (i.e., salient themes) utilized in corporate and independent media outlet stories on the Deepwater Horizon disaster. Employing both quantitative and qualitative content analysis of print, online, and broadcast news media outlets, this study examined how often risks were discussed within news stories about the Deepwater Horizon spill, as well as how these risks were portrayed.

Daily newspapers and daily evening news programs serve as influential conveyers of information content, (even as that content may now be obtained via an online medium) (Gaskins & Jerit, 2012). As a result, the general population of interest for this project was national, corporate-owned daily newspapers and television news programs, as well as national independently-owned producers of news content in a video and print format. National and international, rather than local, media outlets were chosen because they present the Gulf oil disaster to an audience larger than those who may be directly affected by the spill and because national corporate news outlets comprise the prestige press from who national discourse and public policy are influenced (Boykoff & Boykoff, 2004).

The sample set consisted of newspapers, television news programs, and online news outlets purposively chosen to correspond to the independent variables of interest – corporate-owned and independently-owned news outlets. Each different news outlet type was represented by three print or online outlets and one television/radio outlet. Corporate-owned media were defined as outlets that have ties to commercial interests, are traded publically on the stock market, and are for-profit endeavors. Corporate outlets consisted of the most widely circulated and highest-rated newspapers and news broadcast, respectively. Independently owned media outlets were defined as deriving derived no funds from commercial or for-profit interests and being funded on a non-profit basis. It was difficult to find independent, non-profit media outlets that produce only original daily content. Most of these outlets do not have a presence in the traditional television and print realms. They instead produce daily video reports either via cable or satellite television and/or online streaming, and print material mainly online. Table 1 shows the sample set from which stories were derived.
Table 1

<table>
<thead>
<tr>
<th>News Outlet</th>
<th>Media Format</th>
<th>Place of origin</th>
<th>Corporate, Non-Profit</th>
<th>Owner</th>
<th>Other Ownership assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA Today</td>
<td>Newspaper</td>
<td>USA (Tysons Corner, VA)</td>
<td>Corporate</td>
<td>Gannett Co., Inc</td>
<td>Print (newspaper and magazine), TV, radio, digital media, (plus other joint ventures)</td>
</tr>
<tr>
<td>The Washington Post</td>
<td>Newspaper</td>
<td>USA (Washington, D.C.)</td>
<td>Corporate</td>
<td>The Washington Post Company</td>
<td>Print (newspaper only), digital media, for-profit educational services, TV, (plus other joint ventures)</td>
</tr>
<tr>
<td>NBC Nightly News</td>
<td>Television</td>
<td>USA (New York, NY)</td>
<td>Corporate</td>
<td>NBCUniversal</td>
<td>TV, cable TV, film studios, parks and resorts, digital media</td>
</tr>
<tr>
<td>The Christian Science Monitor</td>
<td>Internet (print)</td>
<td>USA (Boston, MA)</td>
<td>Independent</td>
<td>Christian Science Publishing Foundation (Trust)</td>
<td>Religious publications affiliated with, but run independently from, the C.S. Monitor</td>
</tr>
<tr>
<td>The Guardian</td>
<td>Newspaper</td>
<td>UK (London, England)</td>
<td>Independent</td>
<td>Scott Trust Foundation</td>
<td>n/a</td>
</tr>
<tr>
<td>ProPublica</td>
<td>Internet (print)</td>
<td>USA (New York, NY)</td>
<td>Independent</td>
<td>Scott Trust Foundation</td>
<td>n/a</td>
</tr>
<tr>
<td>Democracy Now</td>
<td>Television, radio, internet (video)</td>
<td>USA (New York, NY)</td>
<td>Independent</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Individual news stories about the Gulf oil spill comprised the unit of measurement through which domains and frames were identified. These stories were culled from the eight news outlets over a time period from April 10, 2010 (the date of the oil rig disaster), to April 10, 2013.

Stories about the Gulf oil disaster were obtained via a search in the Lexis-Nexis database using the keywords “Gulf oil spill,” and/or “BP spill,” and/or “Deepwater Horizon,” the terms most commonly associated with the disaster. Because the ProPublica and Democracy Now are not located on any commercial database archives, their own website archives were searched using the same keywords from the same time frame. News stories in each outlet numbered from a high of 455 to a low of 99.

A random sample of equal size (75 stories) was derived from each outlet. Because the time that the news article was published could have influenced the content obtained for analysis (since specific events occurred at specific moments in the progression of the Gulf oil spill) a stratified random sample was considered, but rejected due to the paucity of news stories after the first few months of the disaster. To avoid any potential bias that could result from the overabundance of later-date stories, a simple random sample was chosen.

Quantitative codes (representing domains of interest) and a corresponding code guidebook were derived and updated by three coders after a preliminary round of coding using a randomly derived subset of ten percent of stories. When sufficient inter-coder reliability was achieved through Krippendorff’s alpha reliability tests, (Krippendorff & Bock, 2009) the remainder of the full sample of stories was quantitatively coded for the appearance of “environmental risk” and “health risk” domains by
the primary investigator. Then, the numbers of stories utilizing the environmental and health risk
domains in corporate-owned and independently-owned media outlets were compared for significance
using Chi-Square tests.

From the quantitative codes as well as notes pertaining to each of the articles read for quantitative
analysis, a subset of 24 articles was chosen for qualitative analysis, 12 from corporate media outlets
and 12 from independent media outlets. Because qualitative thematic content analysis of news stories
is not generally well defined in terms of methodology (Fields, 1988; Jankowski & Jensen, 1991;
Macnamara, 2005) the sample size was chosen based upon general recommendations by Creswell
(Creswell, 2007). In addition, the sample size was chosen after reading through the entire quantitative
sample. Typical case samples of articles were chosen that were representative of how the given types
of media outlets thematically represented the domains of interest – i.e., environmental risks and health
risks.

Articles chosen for qualitative thematic analysis were read condensed into smaller units (phrases,
sentences, or multiple sentences) through chunking – i.e., highlighting pieces of the text and assigning
a specific code to pieces with specific meanings. Initial codes were generated through directed
open-coding. This involved both deductive content analysis, based upon what was known about the
text from the quantitative analysis and from the theoretical framework, and inductive content analysis, in
which new codes were generated as they emerged from the text. When qualitative coding was
completed, the coding was reviewed by a colleague who offered suggestions and verification about the
codes that were generated. Once corroboration was accomplished through peer-debriefing, the codes
were analyzed for emergent themes. Themes were again defined, labeled, and reviewed by a
colleague through peer debriefing. When themes were agreed upon, the data from the qualitative
analysis were organized and portions of coded articles that exemplified the emergent themes were
selected to demonstrate the thematic framing of environmental and health risks in the stories.

Results

Quantitative

Corporate media outlets and independent media outlets differed in their number of stories mentioning
health risks. The variation was significant, with independent media outlets mentioning health risks
(8.7% of stories, n = 26) almost four times more than corporate outlets (2.3% of stories, n = 7):  \( \chi^2 (1, \ N = 600) = 11.58, p = 0.0007 \). (See Figure 1.)

![Figure 1. Number of stories containing health risk domain](image)

Likewise, corporate and independent media also varied significantly in the number of stories
encompassing an environmental risk domain (see Figure 2); \( \chi^2 (1, N = 600) = 6.83, p = 0.009 \), with corporate media containing significantly fewer environmental risk domains (11% of stories, \( n = 34 \)) than independent media (19% of stories, \( n = 57 \)). Most notably, stories mentioning risks from the Deepwater Horizon disaster were scant overall.

![Figure 2. Number of stories containing environmental risk domain](image)

**Qualitative**

Subtle and nuanced differences emerged in examining the main themes in stories about environmental and health risks from the Deepwater Horizon disaster. Generally, corporate news stories, while describing and acknowledging the deleterious potential effects of the oil spill, focused on hope and resilience. In addition, while acknowledging some of the short-term health complaints of cleanup workers or the oiling of flora and fauna, they indicated the exaggeration of public fears and the safety of the oil pollutants and dispersants at the exposure levels found in the environment. The two main themes found in corporate-owned media stories were: 1. Encouraging forecast, hope for future recovery, and 2. Unfounded fears about health and environment. (See Table 2 for some examples of themes found in text.)
Table 2

**Themes from Corporate media stories and example text**

<table>
<thead>
<tr>
<th>Corporate media outlet themes</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encouraging forecast, hope for future recovery</td>
<td>The oil’s damage was relatively small, at least in comparison with the marsh’s existing problems... evidence that even plankton – some of the smallest, most sensitive creatures in the Gulf – are living in the area around the leaking (The Washington Post, 7/5/10) We’re welcomed by evidence, at least near the surface, by marine biologists, that the ecosystem here is healthy... we’re finding – visually, anyway, as everybody’s been saying – we have – we have seen no visual signs of the oil (NBC Nightly News, 7/22/10) “I have not seen any evidence, any data, that has shown wildlife sickened or killed because of dispersants” ... Short term good news. (NBC Nightly News, 8/2/10) Fortunately, conditions in the Gulf of Mexico are quite friendly to oil gobbling bacteria, and the overwhelming majority of the BP oil was recaptured, burned off, evaporated, flushed out by ocean currents, or eaten by bacteria by the end of July ... researchers haven’t found any plumes in the last six months, suggesting that they probably aren’t having a significant ecological impact at this point. (The Washington Post, 1/11/11) Gulf scientists believe that the oil has mostly evaporated, been consumed by bacteria, or dispersed in deep water. (The New York Times, 4/18/12)</td>
</tr>
<tr>
<td>Unfounded fears about health and environment</td>
<td>LuAnn White, a toxicologist and director of Tulane University's Center for Applied Environmental Public Health, doesn't believe there's much danger to people, especially those on the coast or inland... “Oil spills are ecological events, not human health events,” she says. The most dangerous gases that come off the hydrocarbons in crude oil, benzene and toluene, will disperse as they come up through 5,000 feet of ocean water and then into the air, she says. And as the entire event “is happening in the middle of the Gulf of Mexico,” they won’t have much effect on people on land. (USA Today, 5/6/10) As for workers trying to clean the spill and cap the well, if they follow standard procedures &quot;chances are when they load up the diesel on their boats they're getting a higher dose&quot; of hydrocarbons, which can cause lung irritation, than from the spilled oil,” she says. (USA Today, 5/6/10)</td>
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</tbody>
</table>
### Table 3

**Themes from Independent media stories and example text**

<table>
<thead>
<tr>
<th>Independent media outlet themes</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity of environmental and health risks and inability to recover</td>
<td>...fishermen reported feeling &quot;drugged and disoriented,&quot; &quot;coughing up stuff,&quot; and feeling &quot;weak.&quot;...One marine toxicologist and activist, Riki Ott, studied the 1989 Exxon Valdez spill ... these illnesses emerging from the Gulf were &quot;déjà vu ... What we saw with Exxon Valdez was a parallel track -- sick animals and sick people.&quot; (ProPublica, 5/26/10)</td>
</tr>
<tr>
<td>— several of the fishermen out on the worksite, they were complaining of burning eyes and strong smells. And my experience told me that they were getting exposed to dangerous chemicals — the benzenes, all the light ends off the crude — and this Corexit is a new experience for me. I have been doing some research. It contains a substance called 2-butoxyethanol, up to 60 percent by volume, which is a very, very dangerous chemical. I don’t have a lot of experience with it, but just doing the research. And I knew that they spraying this chemical in the same area where my fishermen were working... it’s chemical poisoning. They will detox them. And they may be OK today and tomorrow. But being exposed to dangerous carcinogens, who knows what’s going to hold, what’s in their future? (Democracy Now, 5/27/10a)</td>
<td></td>
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<tr>
<td>It’s been very well studied that, you know, oil or petroleum products have lots of constituents, volatile organic compounds, which include benzene, which are strongly linked to leukemia and other cancer-causing diseases — other cancer-causing chemicals.... there’s these volatile organic compounds, there’s hydrogen sulfide, which smells like rotten eggs and leads to like hardness in breathing, irritation of the eyes, and then the benzene itself, which can — like I said, has cancer-causing effects, can lead to burning of the eyes, the nose, nose bleeding, coughing. I mean, these are all of the symptoms that we hear a lot of people reporting on the ground. (Democracy Now, 5/27/10a)</td>
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<tr>
<td>— my partner and I were down in Barataria talking with shrimpers and fishermen and people affected by the oil disaster. ... the air was so chemically laden, you could smell and taste chemicals in the air. And immediately, our eyes began to burn. And everyone that we were talking with there ... everyone was complaining of different kinds of health problems — headaches, which, actually, again, within minutes, I personally was starting to experience that; shortness of breath; nausea — all kinds of different symptoms, which I then went home and started to educate myself on the immediate and then longer-term effects of the two Corexit dispersants being used and realized that myself and everyone that we spoke with down there were basically having onset of these symptoms, and people were suffering from it very much...we have people, wildlife — we have dolphins that are hemorrhaging. People who work near it are hemorrhaging internally. And that’s what dispersants are supposed to do. EPA now is taking the position that they really don’t know how dangerous it is, even though if you read the label, it tells you how dangerous it is. And, for example, in the Exxon Valdez case, people who worked with dispersants, most of them are dead now. The average death age is around fifty. (Democracy Now, 7/20/10)</td>
<td></td>
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<tr>
<td>The brown pelican had been removed from the threatened-species list just last year, but now, as the BP oil spill washes onto beaches and wetlands, the species is up against a new challenge...wildlife experts say the spill could produce mass casualties and steep declines of populations in the coming weeks, months, and years. Of particular concern: bluefin tuna, Kemp’s ridley turtles, and Florida manatees...&quot;The situation in the Gulf is unprecedented for wildlife, in terms of magnitude and numbers of species involved..., &quot;If oil gets into the waterways, we could see a significant impact on the manatees.&quot; Hewitt says. &quot;They’re herbivores, like cows, and have finely tuned digestive tracts. No one knows how this oil could affect the manatees: Nothing has ever occurred on this scale before.&quot;...The area of the Deepwater Horizon rig disaster is one of a handful in the Gulf where western Atlantic bluefinns breed, accounting for one-quarter of the species’ spawn each spring, says marine biologist Barbara Block of Stanford University in California. The oil spill, she says, will have serious effects on bluefin eggs and larvae, which free float in Gulf waters...&quot;The spill is so tragic for the bluefin because it happened right at the time of year when the fish come in to breed,&quot; Ms. Block says. &quot;Big fish can sense the oil and swim away. The smaller fish, the eggs and larvae, can’t get away.&quot;...&quot;We’ve never dealt with this type of oil release, with oil doing stuff we’ve never seen before.&quot; (The Christian Science Monitor, 5/26/10)</td>
<td></td>
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</tbody>
</table>
Table 3 (cont’d)
Themes from Independent media stories and example text

<table>
<thead>
<tr>
<th>Independent media outlet themes (cont’d)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevarication and lack of transparency</td>
<td>BP has been withholding the results of &quot;tests on the extent of workers’ exposure to evaporating oil or from the burning crude over the Gulf.&quot; The data is important to determining whether current conditions are safe for workers in the Gulf, researchers told McClatchy. BP said it’s sharing the data with &quot;legitimate interested parties,&quot; but would not release it publicly:…</td>
</tr>
<tr>
<td>(ProPublica, 5/20/10)</td>
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<td></td>
<td>I bought respirators, and I brought them down to these people. And when they tried to wear them, the BP representatives on site told them that it wasn’t a dangerous situation, and they didn’t need to wear them, and if they did, they would be taken off the job… Because BP lies, and BP protects BP. And that is the biggest problem we have in the south of Louisiana right now, is BP, with its big oil big money, is buying up all the cover — and when I say &quot;cover&quot; I mean camouflage — that they can to try to make a little of the situation, not only environmentally, but health-wise… the same situation occurred with Exxon Valdez over twenty years ago. It is a question of liability. The minute BP declares that there is a respiratory danger on the situation is the day that they let the door open for liability suits down the line. If they could have gotten away with covering this up, like they did in Alaska Valdez situation, like Exxon, they would not have to pay a penny for any kind of health-related claims.</td>
</tr>
<tr>
<td>(Democracy Now, 5/27/10a)</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

In accordance with the expectations of the media propaganda model, independent media stories about the Deepwater Horizon disaster not only mentioned environmental and health risks more often, but framed these risks as more threatening than did corporate media stories. Toxicological evidence suggests that long-term, sublethal, and ecosystem level effects are still occurring or are likely to occur as a result of the Gulf oil spill (Ali et al., 2014; Brunner et al., 2013; de Soysa et al., 2012; Incardona et al., 2014; Inkley, Gonzalez-Rothi Kronenthal, & McCormick, 2013; Schwacke et al., 2013; White et al., 2012). It takes a long time for sufficient scientific data to amass to fully comprehend the long-term environmental and health effects from such an event, but much experimental toxicological information from previous oil spills can enable scientists to speculate about risks. In accordance with the expectations of the media propaganda model, independent media stories about the Deepwater Horizon disaster not only mentioned these environmental and health risks more often, but framed these risks as more threatening than did corporate media stories. One explanation for this difference could be the threat to the oil industry posed by the risks from deep-sea drilling disaster. Granted, the corporate media reported on the repercussions of the spill as scientists began discovering them, but their stories were less speculative about potential negative ramifications of the spill than independent media stories. Some might view the independent media stories as more alarmist, but given what is known about the short and long-term toxicological effects of both petroleum by-products and the toxic dispersants utilized in the Gulf clean-up, others could say that their mention of risks at the species, population, and ecosystem levels reflects sound science and precaution. In this way, independent media were more likely to use this normative standard of reporting precautionary environmental and public health information than corporate media.

After the Gulf spill, citizens, and cleanup workers in particular, complained of various acute ailments (Abramson et al., 2013; D'Andrea & Reddy, 2013; Law, Martin, Wolkin, & Bronstein, 2011; Rangel et al., 2011; Solomon & Janssen, 2010). Science had already known that chemical constituents from the crude oil and the dispersants were toxic (Anderson, et al., 2011; D'Andrea & Reddy, 2013; Krajnak, et
al., 2011; McCauley, 2010; Roberts, et al., 2011; Solomon & Janssen, 2010; Zheng, et al., 2014), and known to be carcinogenic, mutagenic, immunotoxic, neurotoxic, and endocrine disrupting (Barron, 2012; Hewitt & Servos, 2001; Solomon & Janssen, 2010). Thus, it is reasonable to wonder why media outlets did not devote more stories to potential risks to exposed humans and other organisms. Dr. Michael Skinner, one of the scholars on the forefront of epigenetics research (Kaiser, 2014) commented that he would expect to see long-term intergenerational epigenetic from exposure to chemicals from the Gulf oil spill (Graedon & Graedon, 2014). Given the numerous uncertainty issues with risk assessment, particularly the emerging information about non-monotonic effects, sublethal effects, and epigenetic effects, it seems that news media could be lagging behind the science in reporting on potential health effects.

The lack of risk stories may be explained in part by the conservatism of science, especially when communicating risk (Brysses, Oreskes, O'Reilly, & Oppenheimer, 2013; Freudenburg & Muselli, 2010) and its preference for Type II statistical errors (Edelstein, 2004; Marshall & Picou, 2008). Interestingly, Dale Sandler, the director of the National Institutes for Environmental Health Sciences (NIEHS), stated in early 2014 that citizens’ fear of health effects from the spill were inflated in part because of media reports (Alexander-Block, 2014). Yet, unless those reports mainly existed in local media, this study demonstrates that national news stories did not appear to exaggerate health risks – in fact, they rarely mentioned them overall.

Studies of illness arising from toxic exposures (Brown, 2007; Brown & Kirwan Kelley, 2000; Brown et al., 2006) have demonstrated that physicians treating these patients are not well aware of the symptoms or causes. The media play an important role in alerting both the public and medical health professionals about risks from exposure to toxics, such as from a disaster like the Gulf oil spill (Brown, 2007). Moreover, the news media can be essential in assisting with public knowledge of toxic exposures both during current crises, and for the preparation for and/or prevention of health impacts in future disasters.

The mass media are acknowledged as an important source of risk communication to the public, and public risk perception is shaped by the way in which news stories cover risk (Allan, 2002; Driedger, 2007; Kasperson et al., 1988). Consequently, risk perception can be amplified or attenuated by the amount of attention the news media paid to risk. It could be argued that independent media amplified environmental and health risks in their framing, yet the bulk of the scientific literature on the previous oil disasters does not seem to indicate that amplification was taking place, especially considering that risks were overall scarcely covered in both corporate as well as independent media outlets. Environmental risks were mentioned in fewer than 20% of stories overall and health risks in fewer than 9%.

In terms of qualitative framing of risks, one might conclude that the corporate media erred on the side of optimism, while independent media erred on the side of precaution. These differing perspectives might be explained by the current corporate/governmental climate in the U.S., which the media propaganda model would suggest influences corporate media. Gareau (2014) explains this type of climate in his study which looked at the Montreal Protocol, a 1980s regulatory policy to decrease pollutant emissions to combat the hole in the ozone layer. Gareau suggested that the protocol was enacted at a time when the United States utilized precaution in its regulatory regime, while 21st century regulatory obstacles with regard to the environment stem in part from the fact that regulation is now based on the profit model (favoring regulations that best maximize profit) rather than on the precautionary principle. Similarly, it seems that corporate media framing of environmental and health issues may also align with the profit model, favoring economic repercussions over environmental and health effects.

By contrast, independent media framing seemed more based on the precautionary principle. This bias
of potentially amplifying risks can be construed as alarmist or unscientific, yet it is actually a value decision based upon scientific information and scientific uncertainty. Two comprehensive reports from the European Environment Agency show that a substantial number of historical environmental and public health risks might have been prevented if precautionary measures had been implemented based upon the uncertain but best known scientific evidence (Harremoes et al., 2013; Harremoës, Gee, & Vaz, 2001). Furthermore, research has shown a scientific conservatism when reporting risk (Brysse, et al., 2013; Freudenburg & Muselli, 2010), so journalists who report only on established scientific evidence about potential risks could be biasing their stories by downplaying risks. It follows that journalists who stress uncertain risks could be valuing the public interest. Dr. David Victor (2014), in discussing how to increase action on climate change suggested that the media should talk less about the scientific consensus and more about the potential disastrous risks – especially the low probability (or low consensus) but high consequence outcomes. In other words, the media should be focusing on precaution. When acting as the fourth estate, in service to the public, the news media might well err on the side of precaution according to Victor, rather than only on established consensus.

The proposition that the news media should favor precautionary messages about health and environmental risks over more conservative assumptions may counter the current norm of journalism. But the journalistic norm of necessitating full empirical evidence of risk is merely a value – particularly in areas where science is so complex and uncertainty is unavoidable. The value of conservatism is risk reporting appeared to be more prevalent in corporate news media stories on health and ecological risks of the Deepwater Horizon spill. The precautionary narrative employed more in independent news media stories does not necessarily denote an error in terms of scientific judgment, but instead might signify a media system where the public interest – i.e., protection of public health and environment - takes precedent over that of corporations, just as the media propaganda theory proposes.
References


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