The Role of News Outlets in Mediating Definitional Power

In a Contested Environmental Policy Debate

By

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ABSTRACT

Major technological changes in the media system simultaneously with the rise in the ability of powerful corporate actors to influence policy debates calls into question the efficacy of media in structuring news, particularly complex science, in ways that facilitate public understanding of the policies that ultimately determine citizens daily living conditions. This research utilizes a mixed methods analysis of media coverage of a contested state-level mining policy (AB 426) in Wisconsin to examine how emergent and legacy news outlets contend with and balance the informational needs of the public with those of powerful actors. A systemic conceptualization of Beck's construct of *definitional power* is introduced as a tool to illuminate how news constructions reflect and balance the social struggle for political influence. Media constructions of environmental health risk were chosen as a focal lens to illustrate how differing news outlets incorporate (or exclude) complex science narratives. Analysis of news coverage found that across news outlets, environmental health risk was absent in seventy-three percent of the news stories reported. No public health scientists were included as sources across news outlets. Emergent and traditional news outlets differed systematically in their choice of sources and coverage of dominant narratives. NGOs show promise as news sources that are inclusive of science risk and in the promotion of science advocates as news sources. Comparatively, traditional media constructions predominantly reflected industry and political voices, sponsored diversionary economic and deregulatory frames, and included public relations frames promoting "science confusion" proportionately more than health risk frames. The coverage of policy news by citizen journalists' offered an important contribution to the media ecology with a focus on frames of procedural injustice and environmental sustainability while heavily representing citizen concerns. Overall, the narratives of powerful actors were given more "voice" in

traditional news, while the lay public and the democratic debate would benefit from greater inclusion of science. The identified deficit of science risk news and its imbalanced distribution across outlets has implications for the education of journalists. This research supports a call for an increase in science journalists and for continued ongoing training of knowledge-based science journalists.

Chapter 1: Introduction and Study Overview

Introduction

How political and social systems negotiate and manage the complex interaction of science, technology, and the environment has become the defining issue of our time (Beck, 2009). Environmental disasters are showcased in news stories, highlighting the struggles of a democratic political system attempting to balance the needs of industry, the environment, and public health. Climate change is perhaps the most prominent example of an environmental risk facing society. News stories are reporting the increasing number of environmental tragedies such as oil spills, chemical spills into drinking water reserves, and explosions of fossil fuel carrying trains. While these stories are riveting and make for good copy, they do not focus on the heart of the issue: namely, that such disasters could be minimized or prevented by informed social policy (Dorfman & Wallach, 2012; Wallach, 2006; Wallach 1996).

On a daily basis, policies regulating environmental health risks are being decided in congress and in statehouses around the nation. These decisions structure the conditions underlying who will benefit from—and who will bear the social costs of—ongoing industrial development. In democratic societies, legislators ideally interact with an informed and engaged public (Habermas, 2006), with scientists, and with other professionals to determine policy. In an ideal world, issues are debated in the public sphere, and a representative government then creates policies that effectively navigate the tensions among stakeholders, resulting in regulations that balance economic growth and public health protections. When environmental health risk is involved, there are particularly compelling reasons for news outlets to provide effective translations of the complex science in order to facilitate public understanding and give citizen's the opportunity to participate in policy debates that create the conditions for health risk.

Environmental factors currently comprise a substantial portion of the risks to public health, accounting for 23% of all deaths worldwide and for 24% of all human diseases (World Health Organization, 2006), making the mitigation of environmental health risk a crucial policy issue. Examples of environmental health risks generated by extractive industries are detailed below and include developmental neurotoxicity in children resulting from maternal consumption of methyl mercury in fish, contamination of the drinking water with heavy metals such as lead and arsenic, and a range of lung diseases resulting from inhalation of particulate matter. As I will argue below, avoiding or ameliorating these health issues can be facilitated by news outlets that inform public discussion on policy issues.

News media occupy a pivotal position in the communication of social risk conflicts in their representation of voices that contend for policy influence and legitimacy in the public sphere. The media have been shown to play a role in policy by influencing policy-makers directly (Eveland, Hayes, Shau, & Kwak, 2005; Soroka, 2002) or indirectly by informing public opinion so that citizens have the opportunity to meaningfully engage their political representatives (Kennamer, 1992). From a public health perspective, mass media have been identified as "key actors" in the identification and interpretation of environmental issues (Schoenfeld et al, 1992) and in shaping public understanding of health risk (Martinson & Hindman, 2005). An informed policy debate is of particular importance in disputes over health risk policies in light of the recent findings of the unequal distributions of risk and benefits across social actors. The environmental and health risks of legislation are borne primarily by regional residents (Brown, Zavestoski, McCormick, Mandel, 2001) while the economic benefits derived from policy decisions on mining typically accrue disproportionately to industry rather than local communities (Freudenberg & Wilson, 2002). This unequal dichotomization provides fertile

ground for contention among competing social groups as policy makers weigh the risks and benefits of new regulation. The public looks to news outlets to navigate the complex arguments that emerge from politicians, industry groups, advocacy groups, and scientists, to decipher the implications of policy for their communities.

A review of the literature suggests that three major trends may interact to influence the efficacy of the news media in informing the public: (1) the rise in the ability of powerful actors to define for the media what is at issue (Svalastog et al, 2014; Miller & Money, 2010; Brulle, 2013; Miller & Harkins, 2010; Cory, 2009; McCright & Dunlap, 2003); (2) the digital transformation of the news media along with the emergent capacity (and limitations) of digital news coverage (Friedland, 2006; Hindman, 2008); and (3) the difficulty, for reporters, of capturing complex science (Patterson, 2013; Brumfiel, 2009, Meyer, 2006).

Media studies have long tracked the disproportionate role that powerful actors play in influencing coverage of science by shaping the framing of the policy at issue (Nisbet and Huge, 2006; Maessele 2011). A few state-level studies have focused on health risk coverage in traditional newspapers and the impact of coverage on policy creation (Kiss, 2013: Walsh-Childers, 1994). Walsh-Childers established the potential for news stories to influence policy, whereas Kiss (2013) found that routine and high impact coverage of an environmental health risk was directly related to the likelihood that legislators would consider banning BPA, and indirectly related to adoption of policy. These studies of traditional news coverage suggest that state-level news media play a central role in educating both the public and policy makers about the relative risks and benefits of science issues and contribute to debates about science-informed policy.

A few national studies have explored the effect of powerful actors on issue development in news constructions of complex science. In a content analysis of newspaper coverage of

biotechnology, Nisbet and Huge (2006) found that media play a key role in shaping the policy process when complex science (biotechnology) is at issue. Issue framing reflected the competition for attention for both policy and media agendas, and media attention increased when social protest or controversy drew attention to the risks of biotechnology. Importantly, this study identified that the powerful proponents of plant biotechnology were able to limit the policy debate through early technological framing of the science (p. 32). Earlier studies similarly found that technical framing (with the recombinant DNA) also limited public understanding of the science (Goodell, 1986). With a focus on policy debates rather than news coverage, Shingate (2006) found that the framing of biotechnology issues reflected a divergence of opinions that could be traced to the committee structure of political institutions. Specifically, issue framing tended to reflect a divergence between commercial interests and environmental advocacy groups with each social group reflecting differing definitions of the risks and benefits of biotechnology. In Shingate's study, commercial interests achieved a dominant role in shaping subsequent policy decisions.

Collectively, these findings raise the question of what role news organizations, as central institutions in informing the policy debates, may play in shaping societal decisions about policies involving scientific issues. Maeseele (2011) examined how national newspapers in Denmark differentially constructed science frames consistent with either powerful interest groups or citizen social movements regarding genetically modified organisms. Given the recent rise in corporate power and the disrupting influence of the Internet for the news media in general, it is not clear how reporters from different types of news outlets navigate this complexity in their attempts to construct science stories.

An intense public debate over mining policy (specifically, Assembly Bill 426) in northern Wisconsin offers a window for the study of how powerful groups, challenger groups, and complex science are reflected in the construction and shaping of state-level news coverage of an environmental policy that sets the conditions for risks to human health.

The Case Study

Following a long legal battle in the 1970s prompted by the discharge of mining waste (asbestos-form minerals) into Lake Superior by Reserve Mining Company, the state of Wisconsin developed one of the most environmentally protective mining bills in the county. Known as the "Mining Moratorium," this bill did not prohibit mining in Wisconsin; rather, it allowed for metallic mining provided the mining company could demonstrate that a sulfide mine anywhere in the world had operated without polluting the water resources for a period of ten years. This precautionary measure recognized that metallic mining, as a source of human health risk, releases more toxins into the environment than any other industry in the United States (Toxic Release Inventory, 2015) and that ore extraction when sulfide minerals are present has the potential to pollute the regional watershed.

To avoid the strict protections of Wisconsin mining regulation, Gogebic Taconite Company, (owned by the Multinational Cline Group), worked closely with Republican legislators in early 2011 to write a new mining bill that separated ferrous mining (taconite and iron oxides) from sulfide mining in Wisconsin law (Berquist, 2011). In December 2011 a Wisconsin State Assembly committee introduced what would become a highly controversial taconite (low-grade iron) mining bill (AB 426) and in defining a rational for the policy, the president of Gogebic Taconite claimed:

> Sulfide deposits have to be handled with special care because once exposed to air and water they can create acid drainage into the surrounding environment. *Oxide deposits [iron and taconite] do not carry this danger.* During the process, non-ferrous [sulfide] mining metals are leached from the rock using chemicals. Instead of chemicals we use only magnets to separate the iron from the sands. (Wisconsin Eye, 4:03:45, 2/17/2012 *emphasis added*).

Challenging this proposed rationale for a change in mining regulations, geologists testified in a public hearing that the "ferrous versus sulfide distinction" was "false" and misrepresented the science. They noted that sulfide contamination and the resultant "acid mine drainage" from waste runoff could come from sulfide minerals in the rock *surrounding* the taconite, as well from sulfide mineralization in the iron ore itself (WisconsinEye 2/17/2012: 2:12). Sulfide minerals (known to exist at the proposed mine site in the form of pyrite rock; USGS, 2008), once exposed to oxidation and water through extraction, could result in "hundreds of millions, perhaps billions of gallons of sulfuric acid that would be released into the watershed" (WisconsinEye, 2/17/12: 2:11). This acid mine drainage is dangerous to human health because of its potential to leach heavy metals such as arsenic, lead, and selenium into the drinking water. This exposure of sulfides can occur regardless of use of magnets in the later processing of the taconite ore, or of the designation of the target ore itself as sulfide or ferrous (iron or taconite). The utilization of somewhat confused science to certify the mining process to the public as "safe" reveals just one strategy industry promoted to define what was at issue in Assembly Bill 426.

Consistent with Beck's (2009) theory on the dichotomization of modern risk, two prominent opposing groups emerged in the policy debate, along with narratives supporting each position. The challenger group was made up of those who would disproportionately bear the environmental and health risks proposed by the mining legislation. Native American tribes located downstream of the mine, state-wide conservation groups, academic scientists, state legislators (primarily Democratic), and local residents joined together to oppose the bill. The

pro-mining group reflected the interests of the mining company (Gogebic taconite), state legislators (primarily Republican), business groups, and local residents who focused on the potential of the mine to create jobs in an economically depressed region of the state. In media constructions of news on the mining bill divergent narratives emerged regarding the value and impact of the new mining policy. This debate raised the question of how news outlets contend with health risk narratives when social actors compete to define what is at issue in environmental policy.

Public Health Risks Related to The Mining of Taconite Ore

Metallic mining is a known source of human health risk because mining releases more toxins into the environment than any other U.S. industry (Toxic Release Inventory, 2011). This risk is highly relevant for communities who are proximate to mining sites, increasing the responsibility for journalists to effectively translate the science to facilitate public engagement in policy development. To better understand the significance of this issue, the following section will outline three main risks to human health engendered by taconite mining: 1) acid mine drainage, 2) methyl-mercury poisoning 3) various forms of lung disease.

Risks via Water. In the case of this bill (AB 426), the human health risk is complex, with the primary impact being degradation in the quality of water available for the ecosystem and for drinking. In taconite mining, natural minerals (sulfates) found in the rock covering the taconite (a low grade form of iron [USGS, 2008]) are exposed during the mining process and interact with oxygen, water, and microbial processes to form sulfuric acid (EPA, 1994). Sulfuric acid can leach heavy metals (arsenic, lead, mercury, selenium) from surrounding rock into the watershed (Bundschuh, et al, 2012; WHO, 2010; Minerals Coordinating Committee, 2010; CDC, 2012), increasing the risk of heavy metal contamination of the drinking water for regional

residents (EPA, 1994). Lead has been found to result in developmental delays, learning disabilities, and behavioral problems in children (Wolfe, 2007). Arsenic can be directly toxic in high doses and drinking water with elevated levels of arsenic could lead to long-term health effects, including cancers of the skin, bladder, prostate, lung, kidney and liver (USGS, 2012).

Risks via Air. Airborne risks from taconite mining include both mercury emissions (CDC, 2012), and the release of asbestos-form particulate matter (PM .05; CDC, 2012). Mercury released into the air can spread through the mercury cycle, resulting in the bioaccumulation of methyl-mercury in fish. When consumed at sufficient levels by a woman who is pregnant, this toxin is known to cause mental retardation and developmental delays in children (Myers, 2009; Trasande, Landrigan, & Specter, 2011), as well as psychiatric symptoms in adults (Yorifuji, et al, 2011). In the Lake Superior region, one in ten children are already born with mercury levels higher than EPA recommendations (CDC, 2012).

A second airborne risk results from the blasting of surface rock to uncover the iron deposit, some of which is known to contain asbestos-form materials (With, 2013). Once airborne from blasting, asbestos-form particulate matter (PM .05) can be inhaled and lodge in the lining of the lung. In the Minnesota taconite range, mesothelioma, a rare lung cancer, occurs at a rate 200% higher than in the rest of the state (Minnesota Taconite Study, 2013).

Indigenous People. The Gogebic Mine siting is particularly problematic for members of the Bad River Band of Lake Superior Ojibwa This tribe lives along the Bad River six miles downstream of the mine site on Lake Superior. According to the proposed policy (AB 426), the taconite mine would be sited on territories ceded in the 19th century to Wisconsin by treaty with the tribe. Treaty provisions specify that tribal members maintain the rights to hunt, fish, and gather in ceded territories. Beyond the risks to drinking water, other primary risks to the tribe

stem from threats to fish and wild rice, both major factors in tribal subsistence. Sulfide contamination from the mine, if it reaches sufficient levels (>10 mg/Liter), has been shown to kill wild rice beds in Minnesota (Minnesota DNR, 2008). In addition, being downstream of the proposed mine, both the tribe and other local residents would also be at risk for air and water pollution as outlined in the sections above.

Dissertation Overview

The media play a key role in educating the public and affecting policy development; however, it is not clear how news outlets balance the needs of the public and corporate actors to meaningfully define key issues in the policy debate, particularly when the science is complex. To understand how these factors are affecting the content of news stories, this study focuses on the efforts of emergent and traditional news outlets to represent public interests when reporting on the proposed mining bill. The goal of this study is to provide an approach for systemic conceptual mapping of media constructions of complex science as they occur in a state-level policy debate. Particularly when the science narratives involve risks to human health, it is imperative for the news media to meaningfully describe what is at stake in new policies to provide the foundational knowledge for science-based decision-making.

In **Chapter 2**, the conceptualization of definitional power is introduced through a review of the scholarly literature related to power relations. The limitations of current media in structuring news content are discussed before the chapter outlines how power relations can be understood to apply in the current era to communion. This chapter argues that the concept of definitional power provides a meaningful framework for systematically uncovering influence by social actors on news discourse.

Chapter 3 describes a set of four qualitative preliminary analyses that were used to identify frames and pair them with the social actors (individuals, institutions, and organizations) who sponsor them. The frame analyses identify frame ideologies, goal orientations, and the validity of the prominent frames. Chapter three includes the methodologies used for qualitative analysis and provides examples of all eleven frames uncovered from analysis of public hearings. These findings of the qualitative analysis are then carried forward for use in the qualitative research, which is outlined in Chapters 4 and 5.

The quantitative methodology section for the source analysis (Study 1) and the frame analysis (Study 2) of mediated news stories is found in **Chapter 4**. This chapter describes the research design and strategies used in the collection and analysis of quantitative data. **Chapter 5** describes the results of the qualitative source and frame analysis. **Chapter 6** outlines contextual information on the lobbying activities of key stakeholders in the policy debate. It outlines both campaign contributions, and details hours spent lobbying by all of the social actors who participated in formal lobbying events. It ends with an overview of public opinion, as established by a tally of citizens who registered their opposition or support for the mining bill at public hearings. Finally, **Chapter 7** includes the discussion of findings and limitations of this research, and concludes with the implications of the findings from this research project.

CHAPTER 2

CONCEPTUALIZATION AND RESEARCH QUESTIONS

> *Power is knowledge. The powerful determine what rationalities are present in the decision-making process. Power is understood as rationalizing, such that truth and rationality based in knowledge no longer play a role in power relations (Flyvberg, 1998, p.x).*

Introduction

When the news media effectively communicates issues of complex science, there is immense potential for public engagement in the policy process. However, when contradictory scientific findings are put forward, the public is often left with no foundation on which to build an understanding of the issues at hand (Scheuer, 2008). Studies of the construction of news continue to question the opportunity for public participation in policy issues given the rising influence of powerful corporate actors (Brulle, 2013) and are posing questions about the ability of the media to represent the complex science of issues such as genetically modified organisms (Nisbet and Huge, 2006; Maeseele 2011) and climate change (Brulle, 2013). Thomas Patterson (2013), a well-known media scholar, argues that Americans are "mired in misinformation" because of "the corruption of public information" (p.8) and journalists' inability to deliver trustworthy and relevant news in the current media environment (p.5). Given the disruption of media roles and practices caused by technological change and the decline of science journalism, it is not clear how current news outlets navigate the competing definitions of science risk put forward by social actors when policies are contested.

To more clearly define the question of how news outlets structure science when social groups contest the relative risks and benefits of policy, the next section provides a review of the relevant literature was conducted. In particular, it focuses on the scholarship on power relations namely, how powerful groups come to dominate the decision making in a society. A

conceptualization of "definitional power" will be introduced as the first focus of this chapter. Journalistic scholarship sheds light on both the limitations and the potential of traditional and emergent news outlets in coverage of policy debates and will be the second area of attention in this review. The focus will then turn to scholarship on power relations to situate analysis of news coverage in a broader context, a context that includes social actors who employ a range of resources to influence news narratives. Historical accounts of the role of powerful elites in shaping policy identify foundational elements for informing media analysis. This review of historical scholarship will comprise the first subsection in the review of power relations. More recent conceptualizations of power include communication power, which will then be introduced before turning to the role of corporate power in communication studies. To end the section on power studies, a more robust conceptualization of definitional power will be introduced as a tool to capture the complexities of studying news accounts of contested science. The four theoretical elements conceptualized to characterize definitional power will then be outlined in detail before turning to the research questions.

An Introduction to Definitional Power

What is definitional power? In his recent book, *World at Risk*, sociologist Ulrich Beck conceptualized definitional power as the ability to define scientific risk in the social arena when key social groups contend for influence in the public staging of risk (Beck, 2009). He further asserts that:

> Risks are social constructions and definitions based upon corresponding relations of domination. Their existence takes the form of (scientific and alternative science) knowledge. As a result, their "reality" can be dramatized or minimized, transformed or simply denied… They are products of struggles and conflicts over definitions within the context of specific relations of definitional power, hence the (in varying degrees successful) results of staging. In such processes, we can observe how a multiplicity of antagonistic definitions clash on the basis of competing rationality claims…(Beck, 2009, p.30).

If this assertion is true, as it seems to be in the case of climate change science, this staging of science risk provides both an opportunity and a responsibility for news outlets in navigating the contest between social actors to represent for the public a meaningful translation of the science at issue. News media play a key role in raising public awareness of issues. Media sociology argues that news does more than just represent what is at issue; rather, meaning is constructed through the narratives put forward, and the choices made for the inclusion and exclusion of the sources selected for inclusion in news articles (Verstraeten & Maeseele, 2006). In effect, how, and if news reporters choose to re-present the issues that social actors put forward is revealed in the news stories themselves. These stories reflect the narratives that competing actors promote, their relative power to achieve media standing, and ultimately the ability of news media to determine who defines what is at issue in a policy debate.

This chapter makes the case that an empirical conceptualization of definitional power can be derived from a comprehensive analysis of the literature on power relations, its history and evolution. Once outlined, this construct is more fully developed later in this chapter for its application in an analysis of news stories. The goal of systematizing definitional power in this study is to determine its efficacy in illuminating how reporters may be better able to balance the informational needs of the public with that of powerful social actors. For this study, social actors are defined broadly as individuals, institutions, or organizations that play a role in shaping public debates. In situating news outlets in their mediating role between social actors and the public, this research reflects the belief that news media play a strong public education role and are therefore foundational in the establishment of sustainable social policy. This research argues that a media analysis of definitional power is comprised of four foundational elements: 1) uncovering the role of news outlets in how (and if) social actors are represented as sources in the news; 2) in

accurately uncovering the narratives of frames sponsors, and the validity of the frames they put forward; 3) in uncovering which actors and frames are highlighted and which are excluded from the political conversation; and 4) in identifying how information about lobbying activities may influence the issues that are presented in policy debates. The rationale for this approach will be found in the literature review below. Before more fully exploring the literature on power relations and its contribution to an understanding of the study of definitional power, we turn first to a review of the current state of the news media.

The Limitations and Potential of News Outlets in Representing Contested Science

To weigh the relative limits and potential of current news media the discussion of media must begin with a normative definition of the role of media in its representation of science news. Early models of science journalism defined the role of reporters as one of "transmission" of science from the scientist to the broader public (Meyer, 2006). A wave of scholarship after World War II focused on the knowledge-deficit of the public and called on science journalists to provide information to heighten public understanding of science (Lewenstein, 1992) More recent models are calling for the informed use of framing in an effort to "engage" the public with science information (Nisbet & Scheufele, 2007). Too often however, media accounts structure science risk as a competition between social actors. While meeting journalistic norms of "balance", this "he said, she said" (Kovach and Rosentheil, 2011) contest of competing values and statistics often leaves the public confused on the merits of the scientific evidence. Shalleh (2005) calls on journalists to expose the underlying assumptions and values put forward by competing actors during contested science debates. This approach does not expect journalists to be the ultimate arbiters of truth; rather it calls on them to promote credible evidence-based science such that citizens have some barometer to weight the arguments of competing social

groups. This study begins the process of exploring how differing news outlets navigate complex science in the current media environment when social actors differ on their interpretation of the risks and benefits of a proposed environmental policy.

Three strains of media scholarship are relevant to the limitations of media in addressing science risk in political debates. These limitations include: 1) traditional news outlets well established tendency to favor political sources and issues in their news coverage; 2) the recent decline in science journalists; 3) restrictions in reporter access to public scientists for source material. To explore these issues, relevant empirical media studies will be reviewed in this section before turning to the promises and perils of emergent forms of news media.

Top-Down Journalism. Historically studies of traditional news have shown that the media both preserve the status quo and protect powerful interest groups (Donohue, Tichenor and Olien, 1995). This has been accomplished in part through an over-representation of political actors (Entman, 2007; Gans, 1990) as well as in permitting elite components of society to frame of social issues (Page & Shapiro, 1992). When traditional media privilege the values and rationalities of elite interests the potential exists for other issues importance to the public, such as public health risk, to be minimized or excluded.

The Decline of Science Journalism. The media may be particularly vulnerable to the narratives promulgated by political actors or industry sources during scientific debates because of the dramatic decline of science reporters (Brumfiel, 2009). This decline has resulted in an overall decline of science news. For example, in 1989 there were 95 science sections in popular newspapers; by 1992 that number had dropped to 44, according to the Scientist's Institute for Public Information (SIPI, 1992). By 2006 only 34 daily newspapers fielded combined health and science sections. When science is covered, reporters not trained in science journalism have

demonstrated a tendency to utilize a "transmission" approach (Meyer, 2006), and scientists are more likely to define an issue utilizing technical, scientific frames (Nelkin, 1995). The technical framing of issues has been shown to limit public involvement with potentially contentious issues (Nisbet and Huge, 2006; Meselee, 2011).

Patterson (2013) makes a compelling argument that, of the journalists who remain, without a deep knowledge base of the science at hand, "journalists are [also] vulnerable to the experts from whom they seek information, quotes and story leads" (p.76). He points out that, when the journalist's source has an agenda, it may be difficult for the journalist to distinguish truth from misinformation potentially resulting in inadvertently passing on faulty science to the public (p. 75). Social problems involving complex science in particular may lend themselves to opportunities for the corruption of information and the dissemination of misinformation in the news.

Limited Availability of Science Sources. To complicate matters further for reporters, recent news stories have exposed political rules within some state governmental agencies that have been instituted to restrict scientists' ability to talk about science in a public context. One notable case in Wisconsin is that of Tia Nelson, the daughter of former Governo, U.S. Senator and founder of Earth Day Gaylord Nelson, who was prevented from discussing climate change in Wisconsin in the context of her job as executive director of the state's Board of Commissioners of Public Lands (Chicago Tribune, 2015, April 9). She has since resigned from her position. News from Florida (Santenillo, 2015 June 19) and Canada (Klinkenborg, 2015, September 21) has revealed similar institutional rules that limit scientist's ability to publicly discuss science.

The Potential of Emerging Forms of News Media. For new media, the ability to act as the "fourth estate" in representing the scientific interests of the public is evolving. The public is

increasingly turning to the Internet to understand science (Brossard, 2013; Brossard & Scheufele, 2013). With technological changes in the structure of the media the deliberative capacity of networked media communication has improved in three ways: 1) An individual's ability to search for news and to disseminate information has improved; 2) The capacity for working together and forming coalitions has improved; and 3) News organizations now have the capacity to work outside of the market imperatives seen in broadcast media (Friedland, 2006). Emergent media have also privileged the public over political elites in its sourcing of citizens, including a different range of voices in the public sphere (Atton & Wickendon, 2005). Combined, these factors point to the potential of emergent news outlets to increase public inclusion in policy debates.

As research on emergent media evolves however, some limitations are beginning to emerge. As outlined in detail by Hindeman (2008) issues of reach, credibility, and limited diversity among authors continues to plague developing news forms, at least in the United States. Alternative media, employing citizens as sources more often than elites, have been found to privilege an alternative "counter-elite" defined by their opposition to mainstream depictions of political events. While this approach expands the repertoire of voices to include those opposed to an issue, it can also create a separate hierarchy of reactionary political activists. Given the journalistic norm of "balance" oppositional groups as sources have been found to be over represented in this medium, at the expense of a diverse range of "ordinary citizens" and the issues they are concerned with (Atton & Wickendon, 2005). Whether this same reactionary pattern applies in emergent media's depictions of a scientific issue, rather than a political issue, has yet to be established.

European research is beginning to outline the potential for more representative models of science news. In Denmark, Internet use has allowed environmental NGOs, funded by public donations, to gain prominence as alternate science communicators for complex issues such as genetically modified foods. In this context, skilled framing of environmental risk by NGOs has contributed to democratic public involvement in political issues by shifting the narrative from an overly technical scientific narrative (on genetically modified foods) to one that contextualized the science in terms of implications for the public. This approach reflected a balance in coverage between representations of science by powerful interest groups with a perspective that was inclusive of the concerns of the public (Maeseele, 2009). This raises the question of whether emergent news outlets in the US may also be able to effectively communicate science in ways that inclusively represent the arguments of competing social actors and the general public, while also maintaining fidelity to the science.

The historic prominence of elite actors in defining issues for the media concurrent with the decline in science journalists and the potential for emergent news outlets to portray science to the public creates an interesting dynamic in which to test how science risk actually is reaching the public in news coverage of a policy debate. How do the media contend with balancing the interests of elite groups with those of citizens? When the science is contentious, whose interests are represented in news coverage? Does science itself become a focus of coverage in the absence of social actors supporting it? To begin to explore these issues, we first seek a conceptual understanding of how powerful groups can influence the public decision-making process.

Foundational Conceptualizations of Power Relations

The Decision-Makers: One Dimensional Views of Power. In the early 1950s with the publication of *The Power Elite* by C. Wright Mills a line of research on power relations was

inspired that has continued through to the modern era. Mills warned of the centralization of power that has accrued to industry, the military, and politicians. The excerpt below captures Mill's concern:

> *As the means of information and of power are centralized, some men come to occupy positions in American society from which they can look down upon, so to speak, and by their decision mightily affect, the everyday worlds of men and women…they are in positions to make decisions having major consequences (Mills, 1956, pp3-4).*

Mills identified the early origins of the supremacy of corporate economic power in the United States. This occurred as a result of congressional elections in 1866 that was solidified by the Supreme Court decision of that same year which granted Fourteenth Amendment protections for corporations (p. 271). Subsequent case law solidified a type of "corporate personhood" which allowed corporations to have some of the same legal protections as individual citizens. Mills proposes that corporate dominance as a powerful social actor continued from the late 1800s hundreds through to the New Deal (1930s).

Mills also expressed concerns with media's role in a democracy. Keeping in mind that Mills wrote in the late 1950s concurrent with the rapid diffusion of television, his concerns were identified as follows: 1) that media now guide our experiences and set our standards of reality; 2) competition across media is generally is not happening,; 4) television has encroached on small-scale discussions that contribute to democratic processes; and 5) that media have failed us as an educational force. The results, he warned:

> [With] the increased means of mass persuasion that are available, the public of public opinion has become the objective of intensive efforts to control, manage, manipulate and increasingly intimidate…power becomes, in varying degrees, uneasy before the suspected opinions of the masses, and accordingly, opinion-making becomes an accepted technique of power-holding and power getting (Mills, 1956, p. 310).

Mills seminal work on power relations identified key institutional actors and a role for ideologies, as well as highlighting the risks of a media not up to the task of holding power to

account. Building on Mills, power theories have incrementally evolved over the past sixty years, with each era adding additional insights into the body of knowledge that contribute to understanding the current dynamics of power and media.

Similar to Mills in topic, early studies of power relations focused on the issues of leadership and decision-making. Floyd Hunter (1953) chronicled leadership patterns in one American city as evidence of power relations. Although Hunter conceptualized power as a necessary and functional component of social policy, he cited concern about the "smaller number of individuals" who were found to be formulating policy and making decisions. He stated:

> There appears to be a tenuous line of communication between the governors of our society and the governed. This situation does not square with the concepts of democracy we have been taught to revere (Hunter, 1953, p.1).

Both Hunter and Mills characterized concerns about the power of elites in decision-making processes as a challenge to the inclusiveness and shared representative governance that typically defines a democratic society. This characterization spurred a research group at Harvard to respond with a line of research that defended the robustness of the American democratic processes.

The Pluralists. Robert Dahl, perhaps the best known of the pluralists, made the case that the United States is in fact broadly democratic with power relations playing no effective role in decision-making. Also focusing on the decision-makers in *Who Governs* (1961), Dahl chronicles the evolution of key politicians from the landed established aristocracy (the patricians) to the newly rich business elites (entrepreneurs), as a normal progression.

> Who else, then, should occupy the public office if not the new industrialists? Not the urban workers, who though they more and more outnumbered all the rest were immigrants lacking in status, political know-how, and economic resources…As for the middle classes, the matter was probably quite simple: why nominate and elect a grocer as mayor if you can have a manufacturer or bank president?" (Dahl, 1961, p. 30).

Thus, in the understanding of the pluralists, competition for decision makers between patrician's and entrepreneurs demonstrates a plurality of voices that compete for political gain, and assures the democratic process. Dahl's work has been critiqued as being a case study that demonstrated a "view from the top" based on demographics and decisions made between elite groups, with little emphasis on the voice of the average citizen (Lukes, 2005, p. 38). Lukes (2005) characterizes the pluralists approach as a "one dimensional" view of power relations because of its limited focus on decision-makers and the political decision that were made.

Although incomplete in their theorizing, the pluralists introduced some important elements to consider for the study of power relations: What is the relationship between elite groups that via for power? Which actors have more access and resources to influence the decision making process? Why not the grocer? Who benefits from the decisions that are made?

Non-Decisions, Mobilization of Bias: Two-Dimensional Views of Power. Advancing power theories, and responding to the overt decision-making focus of the pluralists, the concept of the "Two faces of Power" was introduced in the early 1960s (Bachrach & Baratz, 1963). This view is characterized by Schattschneiders (1970) famous quote stating that "Some issues are organized into politics while others are organized out". In this view, issues that are omitted from the conversation are seen as critical for understanding the decision-making process. Non-decisions were characterized as "a decision that results in suppression or thwarting of a latent or manifest challenge to the values or interests of the decision maker" (Luke, 2005, p. 44). For example, writing on the experience of urban blacks in the 1960s, Parenti (1970) noted, "One of the most important aspects of power …is not to prevail in a struggle, but to predetermine weather certain questions ever reach the competitive stage" (p. 523). In the struggle for allocation of resources, the rights of the community can be lost before they even have been voiced, due to

exclusionary processes in forming important policy decisions. This suppression of the awareness of an issue speaks to the heart of the ability of the public to engage in democratic decision-making.

The critique of the second dimension of power is that " [t]he bias of the system is not sustained simply by a series of individually chosen acts…but also, and more importantly by the socially structured and culturally patterned behavior of groups and the practices of institutions" (Luke, 2005, p. 26). For example, when the public does voice concerns, the adequacy of that knowledge is often determined by a counter positioning of lay and expert knowledge that can put the general public at a relative disadvantage (Gaventa & Cornwall, 2008).

The contribution of the second dimension of power to our understanding of power relations lies in drawing our attention to the key issues that may be intentionally excluded from public awareness. Structural or procedural practices may systematically exclude important considerations or actors, systematically biasing the decision-making process.

Influence on Belief Systems: The Third Dimension of Power. The third dimension of power calls for identifying the differing values and rationalities of divergent social actors within a culture, (Luke, 2005, p.44). In this view, power is defined as:

> The capacity to secure compliance to domination through the shaping of beliefs and desires, by imposing internal constraints under historically changing circumstances (p. 144).

In reference to communication this view may involve, in short, locating the power processes behind the social construction of meanings and patterns that serve to get the powerless groups to act and believe in a certain manner that they otherwise might not, to the benefit of more powerful actors, and to the detriment of the less powerful groups (Gaventa,1980, p.15-16). According to

the third dimension of power, those with power may advance norms or social values that serve to hide or deflect public attention from issues critical to the public good.

The third dimension of power differentiates influence from power in that influence can exist through inducement, encouragement, persuasion, and at times manipulation, as well as under conditions of conflict of interest or no conflict of interest. Comparatively, power is exercised through either overt or covert reference to coercion, through the use of threat or force (Luke, 2005, p. 36). The threat may either be observable or covert, or occur under conditions of a conflict of interest. Later communication studies tie manipulation to power processes and will be discussed below.

Communication Power

From a media sociology perspective, the power to define issues is achieved and shaped within the process of communication itself (Verstraeten & Maeseele, 2006). Habermas (2006) draws our attention to "the power of institutions (media, lobby groups, corporations, etc.) to select and shape the presentation of messages" and to the "strategic uses of political and social power to influence the agendas as well as the triggering and framing of public issues" (Habermas, 2006, p. 415). This "communication power" is achieved "by the construction of meaning on the basis of the discourses through which social actors guide their action" (Castells, 2000, p. 8). Specifically, based on findings from an in-depth, ten-year case study of decision-making in Denmark, Bent Flyvberg argued, "power constitutes rationality". By this Flyvberg means that rationalizations developed by those in power become the knowledge base from which social policy is determined. He asserts:

> [T]his is done by describing what is said, and what is hidden, the necessary articulations, and the forbidden ones, and the relations between these. Variants and different effects of the discursive elements must be studied with reference to who speaks and from what position of power, in which institutional context (Flyvberg, 2001, p.123).

In this study Flyvberg refers to the role of both business elites and state politicians who, at times, worked together to influence which rationalities were included in the decision-making process.

The Role of Corporate Power in Communication

Historically, highly resourced elite groups exercise power through material and strategic engagement with the political process. Traditionally these groups have included politicians, aristocrats, businessmen, corporations, and entrepreneurs. Mills highlighted the powerful position that corporations had achieved prior to the New Deal in the United States. That position was enhanced in 2010 with the Supreme Court decision in Citizens United v. Federal Election Commission, which identifies political spending—by corporations, among other entities—as a form of protected speech. Recent scholars argue that the power of corporations to "capture policy" is predicated on both material and communicative action:

> [W]e see agency as necessarily made up of discursive and non-discursive elements and it is for this reason that we argue that communication is a necessary focus for work on corporate agency and corporate influence (Miller & Mooney, 2010, p. 463).

The effort to influence communication on the part of corporate actors serves to both enhance economic gain and establish legitimacy in the public sphere in order to influence policy (Miller & Harkins, 2010). For example, conservative think tanks funded by the fossil fuel industry were found to expend $700 million dollars annually disseminating climate information aimed to discredit climate science (Brulle, 2013).

Political scientists Miller and Harkins (2010) draw our attention to the assertion that industry utilizes both material and communicative power to influence not only policy capture but also " a wide range of arenas" of debate and decision-making (p. 566). Miller and Harkins argue that corporations have superior "communicative agency" in public debates in part because of the vast inequalities in the resources and abilities of social actors. Few citizens have access to public

relations teams, or the capital to conduct marketing campaigns. Corporations are well positioned to utilize misinformation or "spin" as a strategy to influece policy (Miller and Mooney, 2010). This may be particularly true with scientific information. Additionally, the role of lobbying and public relations becomes a part of the "specific set of tactics" that can be utilized to reveal an overall corporate communication strategy (Miller and Harkins, 2010, p. 566). As social actors, corporations are positioned to employ a range of material and communicative resources to attain political advantage.

The communication literature has documented a limited number of discursive strategies used by powerful actors to define issues for the public. The withholding of information (Lukes, 2005) has been intentionally utilized by elites to direct the public towards specific policy options (Flyvberg, 1998) or to redefine an issue as non-problematic (Molotch, 1980). The invisibility of an issue through lack of media coverage can lead to a "death by neglect" (Thompson, 2005, p.49). Freudenburg (2000) has called for increased attention to the manner in which powerful interests define issues as "non-problematic."

Shaping the amount and quality of media coverage is a strategy used by both corporate actors and challenger groups to influence policy. For example, Pralle (2006) found that increased media coverage of pesticide use prompted by challenger groups correlated with an increase in municipal regulations. Similarly, the quantity of media coverage of technical issues, along with repetition of information, was found to affect public opinion in ways similar to that of story content (Mazur, 1981).

Finally, "diversionary framing," or the heavy emphasis on the relative benefits of a specific policy approach, has been shown to shift the focus of public attention away from other components of a regulatory issue (such as health risk), and diminish attention to challenger

groups (Freudenberg & Gramling, 1994). Similarly, the use of highly technical framing has resulted in less news coverage, effectively minimizing the risks of new technologies (biotechnology) in the public eye (Nisbet and Huge, 2006) and leading to diminished public debate on these complex issues (Maeseele, 2011).

The Role of the State

Scholars have also focused on the role of the state in shaping and controlling communications. Castells argues that:

> [T]o challenge existing power relationships it is necessary to produce alternative discourses, that have the potential to overwhelm the disciplinary discursive capacity of the state as a necessary step to neutralizing its use of violence."(Castells, 2009, p. 16).

As state actors, historically politicians have been constrained by their role in a representative democracy. To remain true to a deliberative model of democracy, the legitimization process must "pass through a public sphere to foster considered public opinions" (Habermas, 2006, p. 418). In other words, in order to retain legitimacy and be viewed by the public as reasonable representatives of government, policy makers are expected--in theory--to include public opinion in decision-making. In the political realm, legitimacy in its most basic form can be described as the recognition, by less powerful actors, that the ability of leaders to make decisions is reasonable, either because the content of the decision is legitimate or the decision has been reached through a legitimate and reasonable procedure. (Luke, 2005, p. 34-37). For contested policies, then, the importance of the perception of a fair and just political process becomes even more critical. This structure, when working optimally, creates a check and balance on the unfettered exercise of power by state legislators.

When combined, these theories of corporate agency, of social science, and of communication power suggest that both industrial and state actors have immense potential to

influence civic discourse. This line of reasoning also suggests that the power of the political actors that represent the state, when combined with the material and communicative resources of industry, create an enhanced potential to synergistically influence and define social issues.

However, in the mediated public sphere political legitimacy is theorized to occur only under limited conditions. According to Habermas (2006), in complex social systems, the media can facilitate deliberative legitimation processes only if 1) a self-regulating media system gains independence from its social environments -political or commercial- and, 2) if audiences provide feedback in the context of an informed elite discourse and a responsive civil society (Habermas, 2006, p. 412). With complex issues such as science risk, a "responsive civil society" is conditioned on an understanding of the relative benefits and risks of the science. This places a large responsibility on reporters, who need the training and resources to meaningfully translate science. Media autonomy ultimately depends on "a lack of interference from political power, from functional system imperatives like market forces, and from the social power of special interest groups" (Friedland, Hove, Rojas, 2006, p. 19). This functional autonomy allows reporters to focus on accurately informing the public on complex policy issues and the representative inclusion of social actors, while also holding power to account. New forms of communication offer the potential to offset the corrosive power of political and social elites, and to step outside of the market constraints imposed by the dependence on commercial revenue. Whether this power is realized will be examined in this study, with a focus on understanding the strategies that social groups use to attain the power to define what is at issue in a contentious policy debate.

Definitional Power as a Form of Communication Power

> *Power is not an institution, and not a structure; neither is it a certain strength we are endowed with; it is the name that one attributes to a complex strategical situation in a particular society" (Foucault, 1979, p. 93).*

Building on prior theorists this section articulates dimensions of definitional power's manifestation in news accounts and argues that this conceptualization provides a meaningful framework for systematically uncovering the influence that social actors employ in public policy debates. Beck (2009) argues "Journalists have the distinct honor of translating science for the public good" in their thoughtful construction of news stories (p.31). This can be accomplished most effectively when journalists understand how definitional power operates in the public sphere and are able to use this understanding to uncover strategic messaging, and take these strategies into account in reporting on positions of social actors, while also offering meaningful translations of the science at issue in policy development.

Ulrich Beck (2009) has offered a broad conceptualization of definitional power as "the ability to define scientific risk in the social arena when key social groups contend for influence in the public staging of risk" (p. 31). It rests with those social actors who master the means of defining an issue for public consumption. For Beck, definitional power can be determined by understanding the following questions: Which groups will bear the social risk(s) of policy, and which groups will benefit from the issue as it is defined? Which kind of knowledge is put forward, and which is excluded? Who has control over the scientific and legal rules that create this knowledge base? Who decides on compensation for groups that bear the latent effects of risk? Do these affected groups have a voice in decision-making? And finally, what counts as scientific "proof" when the knowledge is contested? (Beck, 2009, p. 30-35).

Drawing on historical conceptualizations of the exercise of power in the decision-making process, four elements essential to the conceptualization of definitional power emerge. First, theories concerning the first dimension of power identify the critical role played by key decision-makers. From a democratic perspective, these decision-makers include not only the politicians who make the decisions but also other social actors such as business and industry groups, social advocacy groups, scientists and technical experts, as well as citizens. Evidence of involvement by these groups would be found not only in public debate but also in media depictions as those actors that the journalists (including citizen journalists) determine are central in their news stories.

A second essential component for understanding definitional power as suggested by Beck, is in delineating what types of knowledge are put forward and which are excluded. Are there key social actors or key ideas missing from the discussion? If so, are their rules governing who is included and excluded from contributing to the debate? Here, Beck's theory is consistent with the second dimension of power in pointing to elements that influence decision-making in a society. This study suggests that deficiencies in the decision-making process can be identified in media depictions of a policy debate through a contextualized source and frame analysis that is grounded through a systematic analysis of the range of issues in the public sphere. However, while identifying the frames and sources that are absent sheds light on who gets voice in a policy debate, the content of the information presented also provides insights.

To this end, the third element of definitional power includes a focus on framing. Recall that the third dimension of power identifies that power is exercised by attempts to influence belief systems (Lukes, 2005). Frames have been identified as interpretive discourse used to promote a particular social position. Characterization of frames in terms of policy position and

ideological rationalities, as well as pairing them with their sponsors, provides insight into whose rationalities are being put forward into the public sphere and whose perspectives are included in news constructions of the policy discussion. Further, in characterizing the goal orientation (for or against the mining bill) of frame sponsors, insights can be gained as to the motivations of social actors that will inform public understanding of the contentious issues. In addition, a comprehensive interrogation of how definitional power is exercised would require a validity check on the narratives promoted by varied social actors. This evaluation identifies if there is effort to sway the debate by actively attempting to shape belief systems and create alternate systems of meaning.

Finally, political science scholars make a compelling argument that lobbying activities enhance "corporate agency" and the ability of corporate actors to influence public communication. When these activities are made public, they have the potential to shed light on elite relationships and contribute to public understanding of the policy positions embraced by the business community.

Based on past theoretical research, this study will seek to uncover definitional power by focusing on four key communication elements: 1) actors, who can be seen in media studies as sources; 2) the frames sponsored by these social actors; 3) issues of inclusion and exclusion as outlined in the second dimension of power; and 4) corporate lobbying activities. Within the study of news coverage, definitional power will thus be defined as the ability of social actors (individuals, institutions, or organizations), through a variety of techniques and strategies, to control the dominant narrative in the news. The empirical support for inclusion of these four elements will be reviewed below. While issues of inclusion and exclusion are self explanatory, the other three elements that together constitute definitional power are described in detail below.

Necessary Components for Identifying Definitional Power in the News

Key Actors: Source Analysis. To account for the role of power in influencing news coverage, research must explore the alternate rationalities of social actors within a society (Lukes, 2005). The inclusion or exclusion of news sources are at the heart of understanding media's staging of social conflicts. To study the actors that contend for voice in the public sphere, Simon Cottle (2003) proposes two pertinent frameworks to enable media-source analysis: sociological theories, and theories of communicative action. Each, he proposes, focuses on different questions, yet each also contributes to our understanding of how power informs media-source relations.

First, sociological paradigms have focused on an actor's strategic attempts to attain power through media access, as well as on the roles of news reporters. Together, theory argues, these elements structure public information in the news. Bennett (1990), for example, promoted an "index model" of source inclusion, in which the range of views expressed in the media are narrowly indexed to reflect the opinions of mainstream politicians However, Schlesinger (1990) argued that to attain the power of "primary definition" of an issue in the media, even elite sources must depend on strategic action. When social actors contend for media influence, sociological theory identifies political dissensus as an opportunity for challenger groups, rather than political elites, to attain voice in news constructions of the debate at hand.

Second, theories of communicative action call for a pragmatic approach in exploring how power is manifest "at the moment of enactment" by attending to who actually is engaged in the discussion, and the implications of the reporter's choice to selectively represent one source over another. Although typically applied to broadcast media, this theory interrogates how participants are accessed and how institutional practices constrain or facilitate source inclusion (Cottle, 2003).

This study argues that news constructions reflect reporter choices in sourcing, as well as highlighting differences across institutions in their practice of source inclusion.

Framing. Frames can be seen as a key element in a strategic approach to influence public opinion and gain definitional advantage in policy debates. Frames in media accounts have been shown to influence both citizens' and legislators' evaluations of the relative risks and benefits of an issue (Ferree, Gamson, Gerhards, & Rucht, 2002; Caravalho & Burgess, 2005) as well as public opinion (Druckman, 2001). Frames have been defined as the "central organizing idea…for making sense of relevant events, suggesting what is at issue" in news dialogue (Gamson and Modigliani, 1989). With complex issues, frames help simplify ideas by assigning greater weight to certain arguments over others, and in highlighting for the public what may be problematic about an issue (Ferree et al, 2002). Some scholars have found that frames provide a "specific means to examine how the news media construct ideological meanings largely consistent with the interests of powerful elites" (Carragee and Roefs, 2004 p. 222).

In light of the social and political distribution of power, framing reflects both the ideologies (Goffman, 1974) and the goal rationalities (Wise & Brewer, 2010) of divergent social groups in the contest to define the dominant narrative. The efficacy of frame choice in influencing public opinion has been shown to depend on the ideological affiliations of the social groups involved (Price, Nir, Capella, 2005). Nelson (2004) demonstrated a mechanism for this effect, finding that value framing influenced people's judgments and that these judgments in turn mediated the relationship between frames and subjects' opinions. As such, stories in the news provide a platform on which social groups and their ideologies compete in the construction of social reality (Gurevitch and Levy, 1985).

The ability of a frame to become prominent in news coverage depends on a complex range of factors including the frame sponsor's economic and communicative resources, access to political elites (Gitlin, 1980: Tuchman, 1983), and the ability to choose a frame that resonates with cultural worldviews (Gamson, 1992), such as "master frames" of injustice, democracy, and human rights (Benford & Snow, 2000). Issues that are selected and framed by political actors directly influence the frequency of frames reported in mediated coverage of an event (Hanggli & Kriesi, 2010).

Motivated public groups may form their own frames that evolve from personal experience, conventional knowledge, and cultural influences (Wynne, 1992). Social groups gain momentum and form cohesion through "the trust and cooperation" that are generated among participants by shared understandings (Kinder, 2008). Special interest groups have long worked to construct policy images by combining factual and emotional elements (Baumgartner & Jones, 2009). Yet, organizations with superior political power have demonstrated a greater probability that their frames will be adopted by media (Hanggli, 2011) and have aquired more media coverage when the frames included an element of conflict, drama, and strong emotion (Hanggli, 2011: Kee, Ibraham, Ahmad & Khiang, 2012).

Framing as a key element in science communication has been widely established (Nisbet & Scheufele, 2009; Peters, 2008), yet on issues of complex science (such as biotechnology), studies are only beginning to reveal effective framing strategies. Nisbet and Huge (2006) found that an early focus on regulatory and technical frames in the media results in "non-decision making," limiting public participation in the discussion of science. In this same study, when contested frames (conflict and morality) were mostly absent in the early stages of policy coverage by the media, the scientific issue received less overall news coverage. Most recently,

emerging scholarship on issues of public health revealed that goal-directed framing (for or against a policy) can shape opinion about public health issues. Yet when a frame with the opposite valance (for verses against a policy) was introduced into the news story (a counter-frame) the original effects seen with a single goal oriented frame were eliminated (Wise & Brewer, 2010). Similarly, utilizing opposing frames to evoke different values has been shown to diminish framing effects (Druckman, 2003, Brewer, 2003).

Corporate strategies. Miller and Mooney (2010) make a strong case for identifying lobbying as a central communication strategy used by industry that has resulted in undermining democratic processes. They define lobbying as "the attempt by organized interests to influence policy and the decision-making of governmental or other similar institutions" (p. 463). Recognizing that all social groups can lobby for political influence, Miller and Mooney nonetheless contend that public relations (PR) efforts and lobbying can work in tandem to manipulate public opinion and create unity among elites, often at the expense of the public good. As such, the authors argue that studies of corporate communication power should include not only "ideology" or cultural communication, but also misinformation and lobbying activities.

Research Questions and Hypotheses

Introduction

The complexity of science risk calls for reporters to be able to provide in-depth translation of science, while also tying these issues to legislative decision-making protocols and the risks of public exposures. Traditional media may be compromised in translating science risk because of an historical bias toward elite actors, the decline in science journalists, or the restrictions on scientists as news sources. The literature is not clear on how, or if, emergent

media forms can contribute to the media ecology on issues of science risk for public policy debates.

The study of power relations has shed light on key elements that need to be taken into account to understand how the views of some social actors (and not others) attain status in the news, and subsequently in legislative policy. Key elements for consideration of power in news analysis, as noted earlier in this text, include: 1) uncovering the role of news outlets in how (and if) social actors are represented as sources in the news; 2) in accurately uncovering the rationalities of frames sponsors, and the validity of the frames they put forward; 3) in uncovering which actors and frames are highlighted and which are excluded from the political conversation; and 4) in identifying how lobbying may influence the issues that are presented in policy debates. Together, these four elements constitute a tool for the analysis of definitional power- a construct that will structure the research questions for this series of studies.

Research Questions and Hypotheses

The literature review outlines the many questions that remain unanswered for understanding how science risk is depicted in news outlets when social actors compete to define the dominant news narrative with the goal of influencing policy. The research questions for this content analysis are divided into two studies, a source analysis and a frame analysis. The determination of frames and the pairing of frames with the social groups sponsoring them was accomplished in a qualitative analysis, which will be described in chapter 3.

Quantitative Source Analysis. Source analysis is one approach in identification of the groups that media privilege through their inclusion in news coverage (Cottle, 2003). Historically traditional news has depended more on elites as sources to define political issues (Gans, 2003; Donahue, Tichner, & Olien, 1995), while alternative media appear to opt for an opposing

hierarchy of political activists as privileged sources (Atton, 2003). Ideally, news media would act in the public interest by outlining the positions of key social actors, while also translating the science that defines public risk and including a representative sample stakeholders. To explore how differing news outlets in the current media ecology navigate this complexity the following research questions were posed by the source analysis:

RQ1: Which social actors are selected by emergent and traditional news outlets as sources to represent and characterize the differing rationalities on the policy debate?

RQ2: Are there systematic differences across emergent and traditional news outlets in the sources they select to represent what is at issue in the mining bill?

H1: Elite actors (politicians and industry groups) will be most prominent in traditional media.

H2: Citizen journalists will represent citizen sources more prominently than other news outlets.

H3: Actors representing issues of science (scientists, science advocates) will be less represented relative to political/corporate actors or citizens across media types.

Quantitative Frame Analysis. Frame analysis has been widely established in media studies of science communication (Nisbet; Scheufele, 2009; Brossard & Scheufele, 2013). Recent research on controversial science in national press coverage has revealed the influence of powerful social groups in defining science issues for the public. Individually, a range of tactics has been shown to influence the effects of media frames on audience perceptions of an issue. These include: the overly technological framing of science issues (Nisbet & Huge, 2006), use of diversionary framing (Freudenberg & Gramling, 1994), and counter-framing, (Wise and Brewer, 2010) have all been shown to influence the efficacy of frames in influencing readers. One goal of

this study was to uncover the efficacy of divergent news outlets in accurately representing the scientific evidence for the risks and benefits of this proposed legislation (Assembly Bill 426), given the range of strategies deployed by social actors to influence the policy debate.

Maeseele (2011) found that national newspapers differed in their depiction of the relative risks and benefits of genetically modified organisms, however his analysis did not include new forms of media. Similarly, Nisbet and Huge (2006) found that powerful actors were able to limit the national news coverage of genetically modified foods by highlighting the technological aspects of the issue. Challenger groups briefly were able to politicize the issue, however coverage then returned to technological framing. Again, this study focused on national newspaper coverage. To uncover if this pattern holds for state-level policy issues, and across emergent, as well as traditional forms of media, this study asks the following research questions.

RQ3: Are there systematic differences in the selection (presence or absence), representation (presence and prominence), and rationalities of frames across types of news outlets that differentially reflect sponsor affiliation by key social groups?

H4: Emergent news outlets will include a larger proportion of frames promoting sustainability values than will traditional news outlets.

Newspaper articles have been found to differ in the prominent ideologies they use to depict climate change science, revealing an bias by different newspapers in their ideological focus when constructing articles containing science news (Carvalho, 2007). In political science research Miller and Mooney (2010) have called for communication studies that identify the ideologies being advanced in corporate communications to understand a key element of corporate agency in capturing policy. Finally, the efficacy of frames in communicating interpretive constructs to an audience has been shown to depend on the ideological affiliations of

the social groups involved (Price, Nir, Capella, 2005). Therefore identification of news outlets that structure content that privileges specific ideologies over others helps to identify news outlets that are more oriented to issues of public concern-such as public health. This study attempts to determine if news outlets differ in representing values of sustainability when crafting stories describing mining policy.

H5: states that health risk frames will be proportionately more dominant in news articles written by citizen journalists and NGOs than traditional news outlets. As health risk is may be uniquely relevant to the public (Maibach, Nisbet, Baldwin, Akerlof, & Diao, 2010) it is important to understand which news outlets include health risk as a major focus in their coverage of a policy that defines the conditions for public health risk. This inquiry reflects research in Europe, where in a media analysis of the social risks and benefits of genetically modified organisms, NGOs were found to be emergent as alternative science communicators (Maeseele 2009).

When diversionary frames of the relative benefits of a policy are heavily represented in news coverage, this focus detracts attention from issues that may be critical to the public (Freudenberg & Gramling, 1994), such as environmental health risk. Diversionary frames are those frames heavily promoted by a social group to deflect attention away from other important issues, and the challenger groups that may be promoting alternative frames. Recent research has demonstrated, through an extensive analysis of research on the extractive industries, that there is "no scientific basis for accepting the widespread "obvious" assumption that mining will lead to economic improvement" in rural communities (Freudenburg, & Wilson, 2002, p. 549). The authors conclude that the overwhelming body of evidence from 301 studies on the economic impacts of mining demonstrated that the long-term effects of mining are "consistently and

significantly negative" for the community. Therefore, for this research *economic gain* frames were identified as diversionary frames that were not supported by the economic research on mining.

H6: Frame construction in traditional media will reflect industry strategies of diversionary framing more prominently than in news stories written by NGOs or citizen journalists.

H7: Public relations counter-frames representing the "safety' (*science confusion, process protects, and technological progress*) of the proposed mine would be more prominently represented in traditional media than *health risk* frames.

Many studies have found that frames are effective in influencing reader response to an issue when presented in a news story (Gamson & Modigliani,1989; Entman, 1993). However, when counter-frames that propose an opposing value (or goal) are present the effect of framing was negated. Findings from these studies show that goal or value framing can shape public opinion about health issues, but when competitive frames are present (counter-frames) they undermine framing effects (Wise and Brewer, 2010).

CHAPTER 3:
STUDY 1: QUALITATIVE ANALYSIS OF SOURCES AND FRAMES

Introduction

A qualitative study was conducted to identify the prominent frames used in public discourse concerning Assembly Bill 426, and to pair these frames with the social actors (individuals, institutions, organizations) who sponsored them, as well as to set the stage for three additional qualitative analyses. These qualitative studies utilized over 32 hours of transcribed material from both audio and video recordings of public hearings and from public informational meetings. The findings from these qualitative studies identified the categories of the social actors who played a key role in the policy debate and the frames they sponsored, as well as identifying frame categories of frame ideologies, goal orientations and the validity of the frames. These findings established the main source and frame data to be utilized in the subsequent qualitative analyses of news coverage of the mining bill that is detailed in Chapters 4 and 5.

This chapter will begin with the analysis conducted for the first qualitative study (frame and source identification) and includes a detailed accounting of the data collection, a section outlining the data analysis, and concludes with the findings from this study. Each of the three sets of analysis (frame ideology, goal orientation, and frame validity) will be discussed in order and include sections that explain the data analysis, followed by the findings. The chapter then ends with reflections on the limitations of these studies, followed by a summary of the pertinent findings from this set of qualitative analyses.

Primary Qualitative Study

The first study was the most comprehensive of the qualitative analyses, and was foundational in establishing not only key stakeholders in the policy debate, but also in establishing the prominent frames that they promoted to describe what was at issue in the newly

proposed, and highly contested mining policy. Once the frame categories were established, this allowed for further analyses into patterns of discourse utilized by each social group. The sections below detail the process utilized in data collection, data analysis, and the findings. This chapter will end with detailed examples of each of the dominant frames uncovered in the analysis.

Data Collection

To collect qualitative frame data and identify frame typologies, information was collected from a series of public meetings about the mining bill held in the state. Wisconsin Public Radio (WPR) hosted the first public informational meeting on the mine on January 19, 2011 and all three hours of this meeting were transcribed and included in the analysis to capture the earliest public narratives concerning the proposed changes to Wisconsin mining law. In addition, testimony from the first three public hearings on Assembly Bill 426 (The Penokee Mine Bill) was recorded by WisconsinEye (a public service outlet that video records all legislative meetings in Wisconsin) and was transcribed for analysis. Finally, a one-hour video taped public meeting was transcribed from March 30, 2012 to capture dialogue between NGOs in a public informational session on the mine that occurred late in the policy debate.

The three public hearings sponsored by the Wisconsin legislature provided foundational material to draw from for uncovering the frames social actors put forward. An informal hearing on October 27, 2011, as well as the two formal hearings after the bill was introduced (December 14, 2011, and January 11, 2012) resulted in approximately 29 hours (28 hours, 48 minutes, and 42 seconds) of public discourse on the mining bill. These three public hearings were chosen for analysis because they were the first three legislatively sponsored hearings, meaning they would represent the full range of social actors hoping to influence the content of public policy, and the narratives they promoted would be the earliest available for media to report on. In total, between

the three public hearings and two public meetings almost 33 hours (32 hours, 48 minutes, and 42 seconds) of transcribed public discourse formed the basis from which to run a qualitative analysis designed to identify frames and their sponsors.

Source Identification

Twelve categories of social actors were prominent in the preliminary analysis of public hearings/ public meetings and were selected to capture a representative sample of spokespeople expressive the full range of views on the proposed mining legislation (AB 426). The selection involved first itemization, then categorization of the speakers at the public meetings into categories based on similarities to other social actors. For example, the public citizens who registered against the mining bill were grouped with other citizens who registered in opposition to the bill. Citizens who were undecided about the mining policy and did not voice either support or opposition were categorized as balanced (neutral). Politicians were categorized based on political affiliations, or areas that they represented (local politicians) and scientists were grouped based on their identified employer. Once categorized, these social actors were utilized in a later quantitative study to examine which sources were selected by news outlets for inclusion in news stories about mining policy. The sources identified by qualitative analysis included: industry, both Republican and Democratic politicians, local governmental officials, science advocates, industry-funded scientists, scientists employed by academia, scientists funded by public tax dollars, academics who specialized in mining issues, public citizens who supported the bill, citizens who opposed the bill, and those citizens who were undecided.

Identification of Frames

The transcriptions were systematically analyzed by means of a qualitative Grounded Theory analysis (Strauss & Corbin, 1990) to inductively construct a matrix of the dominant

frames that emerged from the analysis of the collected text material, as well as to connect them with the sponsors of these frames. For the purpose of this study, frames were defined as the "interpretive discursive product in which some aspects of a "perceived reality'' are selected and emphasized to enhance meaning, to become more visible, or to become more memorable to an audience. This framing of language advances a specific problem definition, presupposes moral judgments, and offers solutions for the audience" (Entman, 1993, p. 52).

The detection of frames occurred through a dialectical process in which frame examples emerged in public dialogue, were identified, and categorized based on similarities to other emergent frames. An iterative process of open coding was utilized to compare and contrast frame elements with the goal of either confirming or refuting original categorization. Once all frames had been categorized, a tentative frame matrix was developed that included the frame sponsor, and the problem definition. Frames were then placed in categories and named. As information was collected throughout the transcription, frames were compared and contrasted to identify elements that would refute or confirm original categorization of frame placement in the matrix. When there was disagreement about the frame categorization, the argumentation was reviewed, and when necessary, a new category was added. Frame categories were continuously compared and contrasted to other extant categories. This process resulted in eleven tentative frame categories.

The results were then compared with frames utilized by other communication researchers who had utilized similar techniques in the categorization and of complex science frames (Nisbet & Scheufele, 2009; Nisbet and Huge, 2006; Gamson and Modigiliani, 1989). While some frame categories were consistent with established research, others were unique to this study. For example, the *economic gain* frame matched categories of the "economic prospects" frame

(Maeseele, 2013) and the "market/ economic prospects" (Nisbet and Huge, 2006) frames used in prior research on scientific issues (genetically modified foods; GMO). The economic focus was also paralleled in the economic development/competitiveness frames of Nisbet and Scheufele (2009). However, most of the frames identified in this study were not identified in the other three studies. he public discourse delimited the range of frames that emerged over the course of the public meetings.

The frame matrix was finalized with the top eleven most prominent frames chosen for the frame matrix (See Table 3.1). These included: *responsible mining, science precaution, economic damage, health risk, environmental risk, procedural justice, economic gain, regulatory certainty, science confusion, process protects, and technological progress*.

Frames and Their Sponsors

In this section, examples of the frames identified by the qualitative analysis are included along with the narratives describing the frames to give the reader a clear understanding of what constituted each frame category for this study. When the data were taken from public hearing testimony, the location of the quote follows in parenthesis. For example (WisconsinEye, December 14, 2011; 01:15:35) shows that this quote derived from public hearing testimony captured on video by WisconsinEye. The hearing occurred on December 14, 2011, and this particular quote was recorded in the first hour of that hearing, 15 minutes and 35 seconds into the first hour. Each of the eleven frames uncovered in the analysis will be described below, as well as an overview of which social actors were prominent sponsors of these frames. The frame descriptions will follow the same order of the frame matrix outlined in Table 3.1. below.

Table 3.1

Strategic Frame Matrix

Responsible Mining (RM)	A focus on both economic gain and strong environmental protection - conveys the possibility of both.
Scientific Pre-caution (SP)	Science precaution refers to the precautionary principal, long-term thinking, concern for future generations, concern for sustainability, stewardship of the land, environmental protection.
Economic Damage (ED)	Economic damage refers to costs of remediation, loss of property values, loss of tourism and forestry jobs, expense of cleanup, added infrastructure costs, loss of tax revenue.
Health Risk (HR)	References direct risks to human health posed by the mining bill; including acid mine drainage, leaching of heavy metals into the drinking water, methyl-mercury contamination of fish, rice, mesothelioma, lung disease, etc.
Environmental Risk (ER)	Focus on concerns for water quality of wetlands, lakes, rivers, concerns for Lake Superior, risk to pristine environment, draw-down of water table.
Procedural Justice (PJ)	Procedural justice issues refer to concern about the legitimacy of the legal process, concerns for corruption, "fast-tracking" of legislation, campaign donations, taking away citizen voice, violation of treaty rights, collusion.
Economic Gain (EG)	Promises of economic prosperity, jobs, millions of dollars of tax revenue, 82K dollar salaries, millions of dollars of community development
Regulatory Certainty (RC)	Focus on "streamlining" existing legislation, industry needs "certainty" to invest in Wisconsin, no end to the process, companies need a clear process, current law faulty
Science Confusion (SC)	Science confusion frames often utilize incomplete science, oxides not sulfides, magnets not chemicals, mining here years ago and "trout don't glow", risks less with oxide minerals, false comparisons, confusion with shaft mining.
Process Protects (PP)	Focuses on protection though existing regulations (even though mining is exempt from them) the rules haven't changed, still has to go through DNR, bill doesn't change any existing protections, strict environmental regulations
Technological Progress (TP)	Vague references to a technological fix: "the process has improved", "mining has changed in the last x years", and "technology has come a long way"

Responsible Mining

Responsible mining was a frame promoted by both state and local politicians, and its use began before the mining bill was formally introduced to the public. This frame is a "middle-way" approach, which took the position that the mining bill would facilitate both an economic boon and simultaneously protect the environment. The Mayor of Hurley (a town in the county where the mine would be sited) put forward this frame when he proclaimed:

> It's a beautiful area, we all love living up here, We all need clean water and clean air, and we also need a lot of jobs up here (WisconsinEye, October 26, 2011; 02:20:06).

In November of 2011, the Iron County Democratic Party passed the following resolution defining responsible mining that was captured in later news coverage. The resolution defined responsible mining as follows:

> By "responsible development" the consensus of the two parties is: Development that will provide good paying jobs while protecting the environment and providing adequate tax revenues to the state and local municipalities (Berguist, 2011, November 21).

The frame of *responsible mining* appeared to have been particularly appealing to politicians because it represented views held by constituents on what would emerge as a primarily two-sided argument-those who were for the economic development promised by the mining bill, and conservationists who prioritized environmental protection.

Science Precaution

Scientific precaution was a particularly interesting frame for the study of science communication. Reflecting its title, this frame urged caution in the development of new legislation and strongly promoted science based decision-making. The two quotes below are from Mike Wiggins, the Chief of the Bad River Band of the Lake Superior Ojibwa.

> As a sovereign nation we are granted certain authority…status as a state, most recently for setting water quality standards with the EPA, protecting the water quality

> within our reservation-that took us years to get, and we are talking about legislation that directly impacts the environment. These standards are being done for a particular company, potentially at the expense of the environment, potentially at the expense to the public…those types of things are a far cry from science and the processes that we had to go through just to protect our waters…(WisconsinEye, October 27, 2011, 02:38: 24)

> …what we are sending a message about, what our message is about today is about keeping the integrity of the reviews, of the thoroughness of the science aspects intact. And to do that you need time, you need administrative capacity. You need the ability to get in and look at, the ability to review these environmental impact statements. We have water quality standards; we are going after air quality standards-we have tools to protect our homeland and, you know, we are going to utilize those to our full ability. (WisconsinEye, October 27, 2011, 03:05:56).

The quotes above are included in their entirety to more accurately reflect the narrative communication style of the Native Americans who provided public hearing testimony, and to highlight why this narrative style does not lend itself to traditional journalistic norms – which often focus on short, impactful statements.

Economic Damage

The main idea behind the *economic damage* frame is in heightening awareness of the economic damage that the mine could cause. Primarily NGOs, small business owners, and citizens who relied on income from the tourism industry promoted this concern. In the first formal legislative hearing, (and six days after the bill was released to the public), a citizen shared her concern in her testimony at the hearing:

> I read an article about Ice Age Trails which noted that some land forms are better seen here [in Wisconsin] than anywhere in world. The value of Wisconsin is in natural resources, and outdoors activities. Mining is boom and bust. I read a Corporate Report; tourism brings in $13 billion dollars a year, and it produces 310,330 jobs, with a $7.3 billion payroll. Our resources are already endangered…(WisconsinEye, 2011, December 14; 01:09:20).

Other economic loss frames were focused on the costs of the mining bill for taxpayers. These concerns emerged after amendments were made to the bill that would have limited the mining

companies liability for an environmental impact study-resulting in an estimated $550,000 to 3.8 million dollars of cost shifting from industry to the public (AP, 2011, January 12), and in the redistribution of the revenues generated by the mine. Existing law allowed for 100% of the revenues to go to the affected local municipalities, the proposed amendments would reduce that amount to 60%. This change generated a large amount of public concern from both citizens, and local politicians. A small business owner voiced her concerns in the second formal public hearing:

> I have substantive process concerns about this bill –taxpayers of Wisconsin called on to pay significant subsidies to the company, particularly on the cap to when the fees for the DNR are cut, and other ways the and shift the costs to the taxpayers, If they are going to be making a lot of money I wonder why the taxpayers are going to be called on to pick this up? (WisconsinEye, January 11, 2012; 00:18:08).

Health Risk Frames

Health risk frames were characterized from narratives that directly made the connection between the proposed mine and risk to human health. These included the risks of heavy metal contamination to the drinking water, methyl-mercury contamination of fish, lung disease resulting from inhalation of particulate matter, damage to the rice crops or to game fish from acid mine runoff, and general mentions of health risk or disease. The health risk frame was promoted primarily by NGOs, democratic politicians, and concerned citizens. Although politicians do not generally testify at public hearings, their concerns can be voiced as questions to those people testifying at the public hearing. For example, Assemblywoman Penny Shafter (a Democrat) queried an economist who was hired to testify by the mining company as follows:

> Schafer (D) Q. The promise of jobs is very attractive, particularly in the climate we are living in today- do you think the economic impact outweighs the environmental impact and the health impacts on the public health?
>
> A. Minnesota made that decision, I think the situation in Minnesota is no different than Wisconsin

> Schafer (D) Q. Minnesota decided that the economic benefits outweigh the costs? Were you here when the chairman made the comment on the impact on the environment for generations to come?
>
> A. Yes
>
> Schafer (D) Q. And you still think that the economic impact outweighs the impact on the health of the public?
>
> A. Yes that would be my opinion (WisconsinEye, 2011, December 14: 01:50:13).

As an example of a frame that characterizes risk to the health of the food supply, the Environmental Health Specialist for the Red Cliff Tribe testified about the effects of mining on fish as follows:

> In Labrador, Newfoundland, Canada, lake trout taken from lakes with elevated levels of iron ore mining effluent have a higher rate of DNA oxidation damage known as bleached fish syndrome, and depleted levels of vitamin A. Lake trout are a valuable resource to the tribe and local fishermen. Any alteration deeply alters the economics and health of the Lake Superior fishery.

Environmental Risk

Concerns for the risks to the environment of Northern Wisconsin and Lake Superior were common in public hearing testimony. This frame was primarily specific to risks identified to the wetlands, streams, and rivers of the proposed mining region. One citizen brought maps of protected wetlands near the proposed mining site. The environmental risk focus is clear in his testimony:

> Wetlands in that zone are connected to areas of special natural resources interest, including Class 1 trout streams. Those wetlands are currently protected. DNR can't consider mitigation to offset fill of those wetlands. This bill changes that, eliminates that protection. Hundreds of acres would be subject to fill and mitigation anywhere in the state. Why does this matter? These are headwaters of our water, source of fishing, tourism and recreation…(WisconsinEye, December 14, 2011; 02:43:27).

The environmental risk frame was promoted primarily by environmental NGOs, local citizens, and citizens who wanted to preserve the quality of hunting and fishing in the area, as well as landowners who had vacation homes in the area.

Procedural Justice

Procedural justice frames are unique in that both citizens who were proclaimed Republicans, and citizens who were proclaimed Democrats promoted them. Non-governmental organizations who were opposed to the bill also were strong proponents of this frame. *Procedural justice* frames first emerged during the first formal public hearing after the bill was introduced. This focus on procedural justice emerged for a number of reasons. First the public hearing was 300 miles from the site of the mine-causing local residents to have an extensive drive just to participate. One citizen voiced this concern.

> This venue is a 6 1/2 hour drive south from the constituents most affected by this bill, 6 1/2 hours from the mining site whose permitting process it wishes to expedite, 6 1/2 hours from the region that is being asked to exchange short-term economic gain for the potential of long-term environmental impacts (WisconsinEye, December 14, 2011; 02:20:50).

The second reason for procedural justice concerns stemmed from concerns by Democratic members of the Assembly Committee about authorship of the proposed legislation. Their concern raised public awareness that this was not a bill written by the Assembly committee who was introducing it. What follows is an exchange between Democratic representatives on the Assembly Committee, and the Republican chair of the committee:

> Schafer (D): I would like to object to the bill being introduced in this fashion. I don't think it is a committee bill. I think the bill should, I would like to object to the bill being introduced as a committee bill. I believe the bill has not been worked on in committee and would like to just put that objection out there.
>
> Chair Mary Williams (R): Any other discussion?
>
> Rep. Pausch (D) I have a question as to who actually wrote the bill?
>
> Chair Mary Williams (R.) I think there was a group of folks who had input in it...I think there was a group effort.
>
> Pasch: I have a question, who wrote this bill? Usually the authors name is on the bill, and there is no name on the bill.

This line questioning by Democratic committee members continued throughout the hearing, with the effect of insuring that both the public and the press were alerted to the idea that the authorship of this bill was in question, and that the chair was not forthcoming about authorship. The fact that this bill (AB 426) was written by the mining company, in coordination with a few Republican representatives came out in the press a few weeks later (Berquist, 2011). These and other procedural abnormalities heightened public sensitivity to procedural issues in the development, and progression of this bill.

Economic Gain Frames

Economic gain frames were first promoted by representatives of Gogebic Taconite, and were taken up by Republican legislators, and also members of the public. In the first public town-hall meeting on this bill, (eleven months before the bill was introduced to the public), the President of Gogebic Taconite described the economic impact of the mine:

> So if you look at other mines that are producing in that seven to eight million ton range, how many people work there? Its about 600 to 650 people…the average metallic wage in Michigan and Minnesota at the mid-eighty thousand dollars including benefits (WPR, January 19, 2011; 38:28).

Local politicians also spoke on behalf of the revenue this mine could generate for local economies.

> For tax benefits of iron ore mining…in Minnesota 57 million dollars annually goes into their educational system. With iron counties declining …additional help to support the schools and local units of government would certainly benefit iron county tax-payers and tax payers state wide (WPR, January 19, 2011; 01:23:48).

Regulatory Certainty

The idea of "regulatory certainty" referred to the benefits of "streamlining" existing Wisconsin mining regulations because they were too cumbersome for business, and therefore discouraged investment in Wisconsin. Mary Williams, the Republican chair of the Assembly

Committee that introduced the bill described the need for this change in the first two minutes of the first formal public hearing on the mining bill:

> To be clear, our current laws do allow mining – if you look at state flag what do you see on there? Mining. This process is about finding ways to responsibly streamline our permitting and regulatory process and create certainty for projects in the future…we want a long-term an update to our process that will benefit all future projects, jobs, and environmental concerns. I believe in eliminating the barriers to responsible mining, after all a miner is predominantly displayed on our flag WisconsinEye, December 14, 2011; 00:01:06)

Business owners also spoke in favor of this change, and the following refrain was echoed almost verbatim throughout the public hearing on December 14, 2011. Speaking on behalf of the Economic Development Association, one member stated:

> This bill creates certainty in iron mining process by establishing a clearly defined permitting process (WisconsinEye, December 14, 2011; 01:04:24).

Science Confusion

The name *science confusion* derives from the technical description of aspects of mining. The science in these frames was at times difficult to follow, and, as the frame developed over time, it was paired with reassurances of mine safety. Science confusion was introduced as at the first town hall meeting in January 19, 2011 by the President of Gogebic taconite:

> … to another point that I made, this is iron mining, it is not sulfide mining. Because we have a physical process, smashing rock, and pulling iron out with magnets, not heavy chemical treating… it is very, very different from some recent proposals have been, this is not a plant that is going to use cyanide, this is not a plant that is going to use heavy acids to leach metals from a complex sulfide ore, it is a mechanical process. It's a physical process; it is not a chemical process (WPR, January 19, 2011;00:36:55).

Later evolutions of this frame became increasingly complex:

> Sulfide deposits have to be handled with special care because once exposed to air and water they can create acid drainage into the surrounding environment. *Oxide deposits [iron and taconite] do not carry this danger.* During the process, non-ferrous [sulfide] mining metals are leached from the rock using chemicals. Instead of chemicals we use

> only magnets to separate the iron from the sands. (Wisconsin Eye, 4:03:45, 2/17/2012 *emphasis added*).

Science confusion frames are significant because they have technical aspects paired with promises of safety- a promise that is not supported by current research. Interestingly, citizens picked up these frames, as did later news media accounts of the safety of taconite mining.

Process Protects Frames

The frames labeled *process protects* reflect promises made by local and Republican state politicians, manufacturing groups, and also by citizens who supported the mine. In characterizing the mining bill, a spokesman for Wisconsin Manufacturing and Commerce explained the following:

> I think what is important for everyone in the room to know is that, the [mining] bill really focused on changing the permitting process and the approval standards for the DNR but it didn't change any of our underlying environmental quality standards. In other works, we have air quality standards on the books right now, this bill didn't change them, we have groundwater quality standards on the books right now, this bill didn't change them, and we have surface water quality standards on the books right now, and this bill didn't change them either. So, despite the permitting changes in the bill the DNR would be applying the same environmental standards to the permitting processes that we have on the books today. So when Matt [an environmental advocate] talks about arsenic, and mercury and lead and other really scary heavy metals and substances, well, nobody wants that in their drinking water and this bill didn't allow that, this bill did not change the groundwater standard that is allowed to be for arsenic, or lead or mercury, or any other toxic substances (WisconsinEye, March 20, 2012; 00:38:30)

This frame is unique in its assurances of the strong environmental protections found in Wisconsin law, however fails to include the fact that the mining company had been specifically exempted from meeting Wisconsin environmental standards in this bill (AB 426).

Technological Progress Frames

The frame of technological progress is characterized by vague promises of a technological fix. Industry, manufacturing advocacy groups, and some citizens who accurately note that mining technology has come a long way promote these frames heavily. Unfortunately,

the resolution of sulfide minerals and acid mine drainage has not been resolved by science, nor has the issue of mercury emissions from taconite processing plants. This frame put forward by a representative of Gogebic Taconite at the public town-hall meeting goes as follows:

> Think about all the technical innovation that has occurred in the automotive industry between 1970 and 2011. This has happened in the mining industry as well. The machines are more powerful - they are automated by computers. But what they do is essentially unchanged. They mine the ore, move the ore, crush the ore, use magnets to remove the iron, make the irons into pellets so that they can be shipped. But despite having the same essential function, each individual piece has echoed that sort of transformation in what's happened in the automotive industry in terms of evolution (WPR, January 19, 2011; 00:27:51).

Examples of all eleven frames identified from public hearings and public meetings were described above to provide the reader with a deeper understanding of the categories identified.

Challenges in Frame Identification

In order to establish a reasonable number of frames for analysis, it is not possible to include all possible frames. However, in a process of iterative discourse analysis the most prominent frames that emerged were included in the study. Often frames were a variant of the same interpretation, and variants were included in the category that most closely described each frame. One frame that was difficult to categorize, but nonetheless prominent, was *responsible mining.* Politicians initially coined this phrase. These politicians represented electoral districts that were divided in their support of the mining bill. The intent of this frame was to convey that economic growth and "environmentally responsible" taconite mining was possible at this site. Because the politicians who coined this frame did not support the mining bill in its current form, but supported the idea of an environmentally responsible mine in their later voting, *responsible mining* was coded as a sustainability frame.

Additional Qualitative Frame Analysis

Once the frames were identified and categorized based on public hearing and public informational meetings, three further analyses were run. Each analysis is detailed in the three sections that follow. The first analysis concerns the ideological orientation of each of the eleven primary frames. This analysis was conducted based on research that calls for the identification of ideologies being used by corporations in their public relations efforts to capture policy (Miller and Mooney, 2010). The second analysis is designed to establish goal orientations for these frames, based on the dominant preference of the groups sponsoring this frame. The third analysis of frames in this group involves the establishment of frame validity. Recall from Chapter 2 that media scholar Jürgen Habermas has identified a role for frame validity in identifying strategic public discourse meant to advantage one social group over another.

Ideology of Dominant Frames

Prior research has demonstrated that through careful analysis both persuasive intent (Nisbet and Huge, 2006) and ideological affiliation (Maeseele, 2011) can be uncovered within texts. Ideology was defined normatively and pertains to "a system of values, norms and political preferences, linked to a program of action vis-à-vis a given social and political order" (Carvalho, 2007, p.225). This definition was utilized along with the process of critical discourse analysis in identification of the ideological rationalities of the frame sources for this study. The qualitative frame analysis revealed that the frames were grouped into dimensional categories, based on the world-views expressed by different social groups in the conflict over the meaning of the mining bill. As seen in Table 3.2 three dimensions were uncovered. The first dimension demonstrated a concern for sustainability and science precaution, and included frames of *responsible mining, science precaution, economic damage, human health risk,* and *environmental risk*. The second

dimension captures a deep concern for democratic processes and includes one frame, *procedural justice*. This frame emerges from a common concern for the integrity of the democratic process for this policy development, and includes citizens both for and against the mining bill. The third dimension could most adequately be categorized as a power dimension, as the frames within it were most heavily promoted by industry and political elites. This dimension captures concern for economic growth and free-market deregulation, as well as reflecting public relations efforts. Frames in this category include: *economic gain, regulatory certainty, science confusion, process protects,* and *technological progress*.

Table 3.2

Ideological dimensions and goal rationalities of frame categories

Value/Goal Dimensions	
Sustainability (Against bill)	Responsible Mining
	Science Precaution
	Economic Damage
	Health Risk
	Environmental Risk
Pro-justice (Mixed goals)	Procedural Justice
Power/ Public Relations (For bill)	Economic Gain
	Regulatory Certainty
	Science Confusion
	Process Protects
	Tech Progress

Table 3.2. Represents the three ideological dimensions and three goal orientations of each frame category as identified through critical discourse analysis of public hearing testimony.

Challenges with Ideology

With the exception of one prominent frame, frames could be paired with ideological positions, as well as with goal orientations. Individuals who both supported and opposed the mining bill, as well as individuals who supported sustainability and economic growth and/or

deregulation employed the *procedural justice* frame. Therefore, it was necessary to assign this frame to its own dimension, and no assignment of goal orientation was possible with this frame.

Identification of Goal Orientations

In this analysis, the eleven frames spanned three ideological dimensions and three discernable goal orientations (for or against the mining bill, or undetermined). Goal orientations (for or against the mine) were determined through verbal representations by frame sponsors. In public hearing testimony, the person giving testimony identified in advance support or opposition to the mining bill. The goal orientations are represented in Table 3.2

Frame Validity

Once the frames were identified, critical discourse analysis was utilized to determine the validity of these frames. A definition of "validity" for this research draws on the work of Jurgen Habermas. Habermas (1984) is concerned with "universal pragmatics" or an ideal set of principles that contribute to mutual understanding between a listener and a speaker. However, Habermas is also is also concerned with "strategic communication" which may be antithetical to mutual understanding. Habermas (1982/1984) argues that within every communication, claims of comprehensibility, truth, sincerity, and legitimacy can be discerned, and can act as universally accepted standards. Establishment of validity includes an interrogation of these four principles (comprehensibility, truth, sincerity, and legitimacy of the frames). Later scholars found a way to operationalize this approach for use in textual analysis (Cukier, 2009).

As seen in Table 3.3, the four validity claims of comprehensibility, truth, sincerity, and legitimacy as defined by Crukier (2009) are outlined below. A representative subset of each of the prominent frames was interrogated in this study to see if they met the criteria for validity. Of the eleven frame categories interrogated, three emerged that did not meet the criteria for validity.

These include; *science confusion, process protects,* and *technological progress*. Industry representatives or business groups initially sponsored this cluster of frames.

Table 3.3
Operationalization of the four validity frames for analysis

Validity claim	Criteria for ideal communication	Potential distortion	Validity test	Speech elements for empirical analysis
Comprehensibility	What is said is audible (or legible) and intelligible.	Confusion	Is the communication sufficiently intelligible? Is the communication complete? Is the level of detail too burdensome for the reader or hearer?	Completeness of physical representation; Syntactic and semantic rules
Truth	The propositional content of what is said is factual or true.	Misrepresentation	Is evidence and reasoning provided sufficient?	Argumentation
Sincerity	The speaker is honest (or sincere) in what she says.	False Assurance	Is what is said consistent with how it is said?	Connotative language; Hyperbole Metaphors; Jargon
Legitimacy	What the speaker says (and hence does) is right or appropriate in the light of existing norms or values.	Illegitimacy	Are competing 'logics' (e.g. Stakeholders) equally represented?	Use of 'experts' and 'authorities' Silences

Table 3.3. Operationalization of the four validity criteria as defined by Crukier (2009, p. 180).

The conceptualization of these four terms for this study was based on a modification of Crukier's work. To meet the claim of validity, frames must pass all four of the criteria for comprehensibility, truth, sincerity, and legitimacy. The validity claims are defined for this research as follows:

Comprehensibility: Comprehensibility here is defined as completeness of the symbolic representation utilizing a shared language with syntactical and semantic correctness. The validity of the discourse may be in question with use of incomplete messages, information overload, or use of language the participant cannot understand. To that this study adds overly technical

scientific information that is not readily understood by a lay audience. Analysis is informed by the question of, is the communication complete and without omissions that would impact its meaning? Is the amount of information sufficient or overwhelming for the audience?

Truth: Violations of validity for the truth claim include incomplete statements against which counterarguments cannot be developed, false statements-or statements that do not correspond to the "objective" world as determined by the most recent scientific evidence. For example, the assertion by industry that oxide ores do not carry the same risk of acid mine drainage as sulfide ores. This assertion may be true of there are no sulfide minerals in the ore or the rock surrounding the ore, as there are with this mine site. This statement is incomplete, and also not true.

Sincerity: Sincerity concerns the correspondence between the message and the speaker's intention. Is what is said consistent with what is meant? Violations of the validity claim can be ascertained by observing discrepancies between the actor's speech and behaviors. To interrogate this claim Crukier suggests an examination of what is implied with what is stated in the discourse. Is there an intention to elicit an emotional response? Is there agreement between explicit (denotative) and implicit (connotative) language that may point to a hidden agenda?

Legitimacy: In public communication, this criterion reflects the "degree of representation and silencing of dissenting voices" (Van Dijk, 2002). Here questions that need to be asked are: Who is allowed to speak? Who is considered an expert? What information is missing in this discourse?

Limitations of the Qualitative Studies

In assignment of ideological rationalities to the frame categories, the "power" categorization was assigned based on the actors who were promoting these frames. The first two

frames in that category, *economic gain* and *regulatory certainty* could reliably be categorized as neoliberal frames employed by the elites in this debate. However, the next three public relations frames including *science confusion*, *process protect*, and *technological progress,* were more difficult to categorize based on ideology. These frames, as they were put forward in dialogue appeared to be frames to reassure the public of the safety of the mine. However, their lack of ability to meet the validity criteria placed them more in line with a public relations strategy than any identifiable ideology.

Summary

This series of qualitative studies was designed to identify a range of social groups from the public dialogue, as well as the prominent frames that they sponsored for use in the content analysis that follows. This effort identified twelve groups of social actors and eleven prominent frames from over 32 hours of discourse from public meetings. Examples of the dominant frames were included to give the reader a more comprehensive understanding of the policy issues being publically debated. Once frames were identified in the first analysis, three analyses were run to determine frame ideologies, goal-orientations (for or against the mining bill) of frame sponsors, and whether a representative sample from each frame group met the criteria for frame validity. The findings from these three qualitative analyses were designed to add depth to the quantitative analyses that follow.

CHAPTER 4

METHODS AND MEASURMENT OF VARIABLES

Introduction

One major premise of this research is that the integration of both qualitative and quantitative methods is needed to address the complex questions put forward by this study. The methodological approach described in this chapter utilizes mixed methods to explore news coverage patterns across both emergent forms of news media, and traditional newspapers. The first task of this research, as outlined in Chapter 3, was to conduct a qualitative analysis of discourse from public hearings and public informational meetings to identify the competing social actors (individuals, institutions, and organizations) who work to define and publicize issues in the public policy debate, as well as to identify the prominent frames with which they were associated in the hearings. The analysis then turns to the study of news coverage of the proposed mining bill.

Once the qualitative analyses were complete, the groundwork was laid for a quantitative content analysis of news coverage of the mining bill. The content analysis of news coverage consisted of two studies. A source analysis of actors who were selected by news outlets for inclusion in articles about the mining bill was the subject of the first study. This study explored which social actors were represented in media coverage to identify who is given a voice in debate over proposed legislation, and if that voice differs across news outlets? A frame analysis carried the content analysis forward by exploring how news outlets differ in their selection, representation, and emphasis of frames included in their news stories. The qualitative analyses found that frames used in public discourse reflected differing ideologies, goal orientations, and validity criteria. The quantitative studies will be employed to identify associations between

frames and the social actors (institutions, groups, and individuals) and to explore how news outlets reflected the interests of opposing groups in their representation of these frames. To further shed light on potential motivations of social actors a post-hoc analysis was conducted to examine the lobbying efforts of these groups. Theory suggests that source analysis, and frame analyses (including the ideologies, goal orientations, and validity factors of frames) and a description of lobbying activities all contribute to an understanding of who has definitional power in the contest for policy influence.

The primary focus of this chapter is on the methodologies utilized in two quantitative studies. In the sections that follow, a brief review of the qualitative findings is offered before turning to the quantitative methodologies used for news analysis of the media news stories. The next section will outline a data collection process that resulted in the data set utilized for both quantitative studies. Following the description of the data collection the data analysis and the challenges in data analysis will be reviewed for the source analysis. The narrative will then turn to the frame analysis. The sections outlined below will include an explaining of the process of data analysis, followed by an outline of the challenges uncovered in the data analysis. A section concerning the decision rule for analysis of findings will follow. The final section summarizes the methodology used for this research.

Overview of the Qualitative Analyses

As outlined in Chapter 3, a primary qualitative analysis of public hearing testimony and public informational meetings was conducted to uncover the dominant frames utilized by social actors who were in competition to influence the dominant policy narrative for the Wisconsin mining bill (AB 426). The preliminary analysis identified twelve categories of stakeholders who participated in the policy debate. It also identified eleven prominent frames (see Table 3.1).

These identified frames included: *responsible mining, science precaution, economic damage, health risk, environmental risk, procedural justice, economic gain, regulatory certainty, science confusion, process protects, and technological progress*.

Once these prominent frames were identified, a series of three secondary analyses were run to determine frame ideologies, goal orientations (for or against the mine) and frame validity. In all, three ideological dimensions were identified: sustainability, procedural justice, and a power orientation. In terms of goal orientation, social actors opposed to the mining bill predominantly sponsored frames supporting sustainability. Social actors supporting the mining bill prominently reflected neoliberal values. Citizens both for and against the mining bill endorsed a desire for fair play in the political process, precluding the procedural justice dimension from being assigned a goal orientation. Finally, for the analysis of frame validity, three frames did not meet validity criteria for truth or comprehensiveness. These included frames that misrepresented the science with the goal of promoting a "safe" mine (science confusion), those that promised that the regulatory process would protect the environment (process protects) even though the mining company was exempt from meeting those regulations, and frames that promised that mining was safe because of some vague technological development. Once these frames were identified and categorized the qualitative study was complete, the source and frame data could be utilized in the two subsequent quantitative studies that followed which will be detailed below.

Quantitative Content Analysis of News Stories

Combined Data Collection for the Content Analysis (Source and Frame Studies)

Data were collected from both hard copy and online news articles over the entire six-month media attention cycle of the policy debate (November 14, 2011-April 22, 2012, inclusive).

News stories were defined broadly as those text articles that appeared either online, or in the selected hard copy newspapers (described in detail below), and that included descriptive information, analysis, commentary, letters to the editor, or background information on the proposed mining bill (AB 426). Meeting notices, and articles shorter than three sentences long were not included as news articles. There was no upper limit assigned to article length.

To capture traditional news about the policy debate, four hardcopy newspapers were selected. *The Iron County Miner* (the Miner) and *The Ashland Daily Press* reflect local news coverage in the counties where the mine would be sited. Two newspapers with statewide readership, The *Milwaukee Journal Sentinel* (the Journal-Sentinel), and *The Wisconsin State Journal* (the State Journal) were also selected as the most widely circulated state newspapers, both of which include coverage of the state-house as a primary mission. When an article appeared both in print and online, the print version was chosen for analysis.

A search of both Lexus Nexus and Google was utilized to identify news articles available from the Internet. A time delimited key-word search was conducted over the same six month period (November 14, 2011 – April 22, 2012, inclusive) The key-word search was broad and included "taconite" AND "min(*)" AND "Wisconsin." For each news source identified, once a story was collected from that source a second keyword search was done within each site using the above keywords to identify any additional articles within that site. The news stories reflected five categories of authorship: NGOs, Citizen Journalists, citizens who have written letters to the editor, and professional journalists at either local or statewide newspaper outlets. These categories were combined to reflect the differing levels of experience and expertise of authorship in the construction of news stories. This division yielded three groups for analysis: Citizen journalists (including citizens who wrote letters to the editor for inclusion in the opinion pages

n=151), NGOs (n=25), and traditional media (local and state newspapers; n=135), for a census of 311 news articles. Those citizens who wrote letters to the editor were included in the Citizen Journalist category to represent the views of members of the pubic who were trying to participate in the pubic debate, and whose views received public visibility.

Challenges in quantitative data collection

The process of data collection was extensive and intended to capture all relevant articles in in each of the four newspapers across the state during one media attention cycle of the mining bill (November 14, 2011-April 22, 2012, inclusive) All Lexus-Nexus articles were utilized as well as a date-limited Google search to reflect articles that may be found by the public. However, variants in Google algorithms may have resulted in omission of some articles. To compensate for this, once a news site was identified as carrying stories on the mining bill, a separate search was conducted within that site for articles that the search engine did not capture. This was effective for newspapers, and sites that had internal search functions. For citizen blogs this was not always the case. Although every effort was made to identify all mine-related articles on citizen blogs, some may have been inadvertently missed.

Analysis of Sources Chosen for Inclusion in News Articles

Data Analysis

Material chosen for analysis in this study included direct quotes within the article or paraphrased quotes by journalists (including citizen journalists). The unit of analysis was a quotation. All 311 articles were interrogated to identify sources for quotes in the news using the twelve source categories of social actors (individuals, institutions, or organizations) identified in the preliminary study were used. The sources categories were collapsed for purposes of analysis into three primary groups representing categories of politics/ business (industry, republican

politicians, democratic politicians, local politicians) science, (science advocates, industry scientists, academic scientists or public scientists), or the public (public for the mining bill, public against the mining bill, neutral public sources). NGOs were split for purposes of analysis between those supporting the mining bill and those opposing the mining bill. Those supporting the bill were grouped with industry as sources. Those opposed were grouped with science advocates. These groups were combined to identify whether political/business elites continue to predominate as sources in news coverage in traditional media, as well as in emergent news outlets. The scientist category was included to represent the social actors who were promoting accurate science and who were include in news stories about an environmental policy that was comprised of regulations that structured the conditions for environmental and public health risk. Finally, citizens are considered key social actors in a democracy, and their grouping was to determine how often their voices are represented in news stories about a policy that will affect their community.

Challenges in the source analysis

Within the data three main challenges emerged in the analysis of sources selected by news reporters. First, because citizens and sometimes citizen journalists often do not use the same techniques as trained reporters, they underutilized quotes as a form of representing others views relative to traditional newspapers. In addition, some of the scientists cited in articles by citizen journalists used pseudonyms (Hematite, and Magnetite), so these quotes could not be reliably tracked to scientists as sources and were, therefore, omitted. This omission resulted in an underrepresentation of the scientists used as sources in news articles written by citizen journalists. Finally, NGOs tend to use advocates as sources for science news. Some can be reliably identified as having training in science, while some have degrees in political science, and some have no

identifiable training. Quotes by these sources were then attributed under the science category to "science advocates." Additionally, advocates often utilized science from nationally reputable sources such as the Centers for Disease Control and Prevention (CDC), or the Environmental Protection Agency (EPA). Although these sites represent reputable science, the news article cited agencies rather than people as sources, and therefore these were not included in the coding of source quotes. This under represented the science included in news articles written by NGOs.

Analysis of Frames Included in News Stories

Data Analysis

For this study the unit of analysis was the news story, and the frames were coded within each news article. In the news articles reviewed (n=311) the frame variable was coded as 0=absent, 1=present, or 2=outstanding focus (main theme of article), to indicate frame prominence (Nisbet and Huge, 2006). More specifically, to operationalize this coding scheme, if the frame was present anywhere in the news article it was coded 1. All frames were counted within each article and the frame that occurred with the greatest frequency (was the most prominent frame) in an article was coded 2. Further, each frame only had one assigned value, and was not coded present when it was coded as outstanding focus. When two frames occurred with equal frequency in an article a strategy was needed to determine the most prominent frame. If one of the tied frames was present in the headline, that frame was coded prominent-if not, no frame was coded as prominent for that article. Frames were categorized by article date and sorted based on the type of news outlet where the frames occurred. Inter-coder reliability was tested by means of Krippendorf's alpha on a random sample taken from each of the three categories, for a total of 20% of the articles evaluated. Inter-rater reliability was .80, indicating good agreement between the two coders.

Challenges and Limitations in the Data Analysis

The coding scheme would prove quite accurate in identifying stories in which a frame was absent. Similarly the most prominent frame could be accurately captured. However, the "present" code could underrepresent how often a frame appeared in the story. Previous research identifies that repetition of a frame affects public opinion on an issue (Mazur, 1981), so that may be one limitation of this design.

Decision Rule

As the quantitative analyses for this research were based on a census of news articles a decision rule was made to clarify significance and account for error in the quantitative studies. For this study differences have to be greater than 5% for purposes of judging whether a hypothesis is supported or not.

CHAPTER 5: RESULTS FROM THE CONTENT ANALYSIS OF SOURCES AND FRAMES

Introduction

In the first two chapters of this dissertation power relations were reviewed and components of definitional power were identified as a foundational tool for analysis of news constructions and how stories represent the views of contending social groups in a public policy debate. This research is founded in a media sociological concept that news is not simply transmitted to the public, rather there are decisions made in the construction of news stories. These constructions may favor some actors and some interpretations over others, resulting in representations that support a biased interpretation of the relative risks and benefits of the proposed policy, and as such the news may contribute to an under-informed public as well as to the development of policies that do not recognize elements that are important to the full range of stakeholders, such as sustainability or the protection of human health.

The quantitative source analyses were designed to identify whether three social groupings (industry/political actors, scientific actors, or public actors) were advantaged by either emergent new forms of news media or by depictions in traditional newspapers. Favoring of elite groups could identify the ability of powerful actors to dominate in sourcing for news stories. Comparatively a focus on the prominence of scientists as sources would highlight the science information available to the public that could be examined for its potential to provide sufficient information for citizens to engage with their legislators in this policy debate. Similarly, by including the public as a source to represent civic concerns, this research could determine which news outlets include citizen voices as valid contributors to the public debate.

The quantitative frame study was designed to identify the ability of social groups to control the interpretation of an issue by attaining prominence in news narratives. In the arena of public opinion attaining definitional power affords a social actor key advantage in policy influence. Specifically, the overarching research question posed by this section is whether, and to what extent the framing of policy news by different types of news providers meaningfully structures the science of health risk to engage the public, if instead news coverage reflects the attempts of key social actors (individuals, institutions, agencies) to strategically redirect the focus of the news to advantage a limited interpretation of the risks conditioned by the proposed legislation?

Source Analysis Results (Research Question 1 & 2, Hypothesis 1-3)

Overall, 2,342 quotations were collected from 311 print articles written by citizen journalists (n=700), NGOs (n=79), and traditional media (n=1563) over the six months of the mining policy debate. Citations included direct quotes within the article or paraphrased quotes by journalists (including citizen journalists).

Research Question 1

Research question one (RQ1) asked, which social actors get selected by emergent and traditional news outlets to represent and characterize the differing rationalities of the policy debate? The twelve source categories are arrayed by media type in Table 5.1 shown below.

Table 5.1

Sources included in news articles by citizen journalists, NGOs, and traditional news outlets

TYPE	IND	POL (R.)	POL (D.)	LOC GOV	SCI-ADV	SCI-IND	SCI-ACAD	SCI-PUB	ACAD	PUB FOR (+)	PUB (-)	PUB BAL
Cit	84	69	10	13	63	0	0	16	61	13	371	0
NGOs	18	8	11	1	3	0	1	2	0	0	35	0
Trad.	282	392.5	349.5	138	63	13	18	58	3	64	175	7
Total	384	469.5	370.5	152	129	13	19	76	64	77	581	7

Table 5.1. Represents the frequency and category of source quotations included in stories by each news outlet. IND-industry, POL REP-Republican politician, POL-DEM = Democratic politician, LOC GOV=local governmental politicians, SCI-ADV=science advocates, SCI-IND=industry scientists, SCI-ACAD=scientists employed at universities, SCI-PUB=publicly employed scientists, ACAD=academics specializing in science, PUB FOR=public for the mining bill, PUB(-) = public against the mining bill, PUB BAL=public who are undecided. Content analysis includes a population of articles so all differences are significant.

Citizens opposed to the mine were the sources who appeared in stories most often, comprising 23% (582) of all quotations found in news stories on the mining bill. The majority of these (371) were included in news stories written by citizen journalists. The public citizens who were "for" the mine also were less represented in the media, with this group receiving only 3% (7) of all quotes. Not surprisingly, the undecided public was included in news stories the least amount of time with less than 1% (7) of the total quotations coming from this group. Republican lawmakers were the second most favored by media with 20% (469.5), of all quotes followed by industry representatives, who evidenced 16% (384) of all quotes included in news stories Democratic lawmaker's statements comprised 16% (370.5) of the source quotations. Local government officials who represented the community that would be the home of the proposed mine, comprise 11% (152) of the quotes collected.

For the scientists, their representation in quotes across all news outlets combined was significantly lower than for political or industry elites. Of interest, the largest representation in this group was from science advocates whose quotes comprised 6% (129) of all of the source

quotes included in news articles about the mine. Science advocates are spokespeople for science who may, or may not have formal training in science. Relative to elites, public scientists (scientists paid with public dollars) also were included relatively infrequently, with just 3% (76) of the source citations. The largest majority of source quotes from this group came from a Native American Environmental Specialist. Academics who focused on science issues in their career were the next group most frequently tapped as science sources, evidencing 2% (54) of all quotes in the news articles collected. University scientists were largely not included as sources by news outlets with less that 1% (19) of the quotes over the six-month media attention cycle coming from University scientists. Finally, industry scientists were utilized as a source for information rarely, again less than 1% (13 times) with all of these inclusions being from traditional newspaper journalists. This section outlined a description of which social actors were chosen as sources of information on the mining bill across all three different news outlets in this study.

Research Question 2

Research question two (RQ) asked, if there are systematic differences across news outlets in the sources they select to represent what is at issue in the mining bill? This analysis was designed to determine which social actors achieve standing in news coverage, and therefore voice in the policy debate. To look for a systematic difference in inclusion and exclusion, the twelve categories of sources were collapsed into three primary categories. Recall from Chapter 4 that these categories include:1) political/industry elites (industry, Republican politicians, Democratic politicians, and local government); 2) scientists (science advocates, industry scientists, academic scientists, public scientists, and academics specializing in a science research topic); and 3) the citizens (public for the bill, public opposed to the bill, and neutral undecided or undeclared publics).

To begin the analysis, the combined category of scientists was compared to the combined group of traditional elites, and the public citizens grouping (data not shown). The scientists evidenced significantly less source with 12% (301 quotations) of the total across all news outlets. Comparatively, the combined category of traditional elites (industry/politicians, local politicians) were utilized as sources the most of any group, comprising 58% (1376) of all of the quotes. Overall, members of the general public represented 28% (665) of the quotes included by reporters in news stories. In effect, scientists were given less than about a quarter of the voice of elite actors (industry/politicians), and less than half of that of public as sources in news articles concerning environmental policy development.

Figure 5.1

Proportion of sources within each news outlet included in news articles

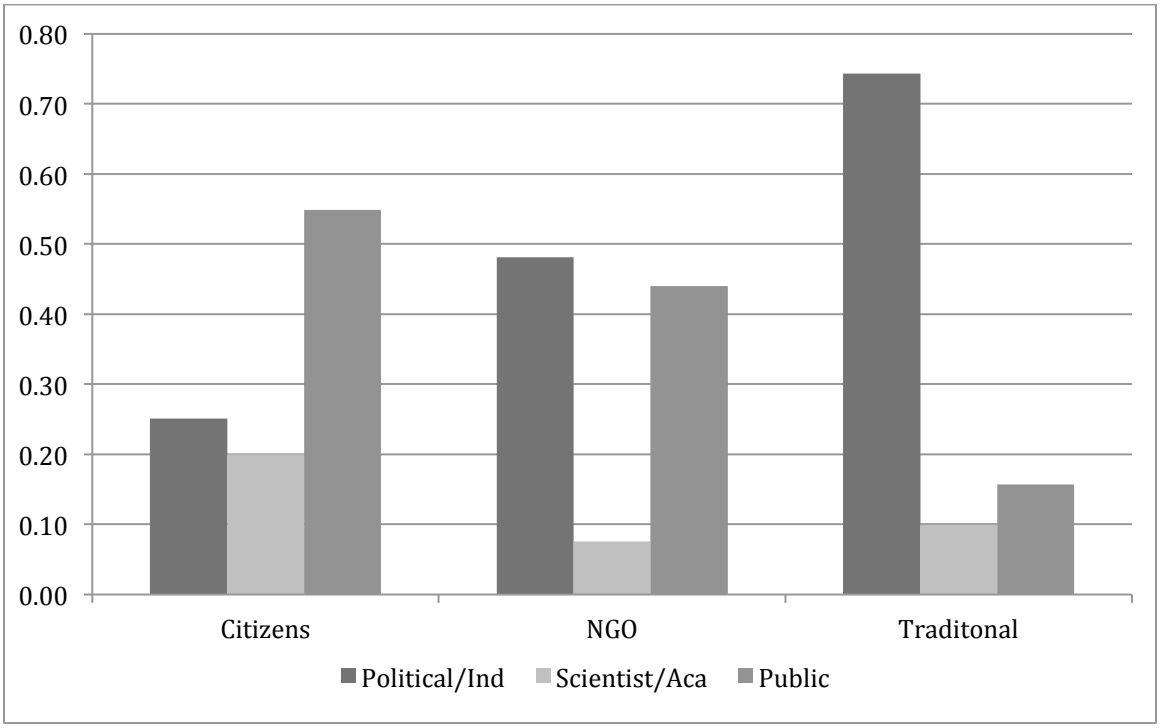

Figure 5.1. Representation of categories of social actors utilized as sources across three types of news outlets: citizen journalists, NGOs, or traditional newspapers.

As depicted in Figure 5.1 when the sources selected for each news outlet are analyzed according to the proportion of quotes within each of the three types of news outlets, a clear pattern of selection bias appears. Traditional news stories heavily favor sources in the industry/politician category with 74 % of the sources coming from this category compared with NGOs, which drew on political/industry sources as 48% of their sources, and citizen journalists using political/industry as only 25% of their sources.

In the scientist/ academic category, surprisingly, citizen journalists included the most quotes from scientists with 20% of their citations coming from this group representing a significant difference from either of the other two news outlets. Traditional media included scientists 10% of the time, and NGOs the least with only 8% of their source quotations coming from the scientist group.

In the final category of the public, not surprisingly citizen journalists included the public 55% of the time in their stories. NGOs followed closely with 44% of the quotes coming from citizens. The public fared the worst in traditional media stories with almost 16% of the sources coming from the public.

Thus, news outlets differed in their patterns of sources selected to represent their perspectives and viewpoints on the proposed legislation. Scientists fared worst in each of the respective news outlets relative to either elite groups (politicians/industry) or the public. Citizen journalists emerged as advocates for the public, but as we saw in Table 5.1 those stories primarily featured members of the public who opposed the bill. NGOs evidenced a rough balance of quotes used from industry/political groups and the public (.48 verses .44 respectively), with again scientists again being significantly less represented in this news outlet. One could argue that the systematic differences in source representation between news outlets may be

balanced in the greater media ecology, if all other things, such as reach and credibility were equal across news outlets.

Hypothesis 1: Elites

The first hypothesis (H1) asserted that elite actors (politicians and industry groups) would be the most prominent sources in traditional media, consistent with past research. This hypothesis is supported for traditional media. Overall traditional media utilized 1563 quotes in their news stories. The elite category of sources includes industry sources, Democratic and Republican politicians, and local politicians from the communities in which the mine is sited. This group accounted for a total of 64% (1162) of all of the quotes in traditional media. Scientists made up10% (155) of the quotes within this medium, while members of the public were represented in 16% (246) of the quotes used. In traditional media these data indicate that elites as a group are the most prominent group utilized in news outlets to characterize the policy debate for the public.

Hypothesis 2: Citizen Sources

Hypothesis two (H2) stated that citizen journalists would feature citizen sources more prominently than other news outlets. This category includes citizens who support the mining bill, citizens who oppose the mining bill, and citizens who are undecided. This hypothesis is supported. Comparing the base frequency and the proportion of sources quoted within each outlet, Citizen journalists quoted public sources for 55% (384) of their source content. NGOs used just citizens for just 44%(35) of their quotes. While, traditional media quotes comprised 16%(246) of the sources used in traditional news stories.

Hypothesis 3: Scientists

The third hypothesis (H3), and the most significant for science communication, states that actors representing issues of science (scientists, science advocates) will be less represented relative to political/corporate actors or citizens across media types. This hypothesis was supported. Again looking at both base frequency and the proportion of times within each news outlet that the sources are utilized, scientists utilizes as sources much less often than both other groups (political/industry groups, publics). Citizens did the best at gathering 20% (140) of their quotes from the scientists group. Both of the other news types utilized significantly fewer quotes from scientists with traditional newspapers gathering 10% (155 quotes) compared to NGOs who collected only 6 (8%) of their quotes from scientists.

A post hoc analysis was run to more closely examine which scientists were being relied on as sources for the different news outlets. Looking only at the population of science citations, Table 5.2 identifies the proportion of scientists of each scientist sub- group relative to the total number of scientists utilized in each outlet. All three news outlets in this study appear to be relying on "science advocates" to convey the science involved in mining policy more heavily than on public scientists, or any other of the five groups of scientists. The science advocate group is the most frequently sourced group of "scientists" across all three news outlets. In stories disseminated by NGOs, 50% of the "scientist" quotes came from science advocates, followed by 45% for citizen journalists and 41% for traditional media. Second, public scientists are the next most highly sourced group for traditional media (37%) and NGOs (33%), while citizen journalists quote public scientists just 11% of the time. Notably for the category of public scientists, not a single quote was found from a public health scientist in news articles during the six months of this study. Third, citizen journalists appear to rely heavily on academics that

specialize in science topics, using them as sources in 44% of their articles. Finally, traditional media is the only news outlet to use industry scientists; 8% of their total scientist quotes originate with industry. It is not clear why public scientists are less prevalent in news stories than are science advocates. Further research may be able to address this question. .

Table 5.2

Breakdown of type of scientist by news outlet

	Citizen Journalist	Traditional Newspapers	NGOs
SCI- Advocate	0.45	0.41	0.5
SCI-Public	0.11	0.37	0.33
SCI-Academic	0	0.12	0.17
Academics	0.44	0.02	0
SCI-Industry	0	0.08	0

Table 5.2. Represents the within group proportion of scientists used as sources relative to all scientists used as sources for that news outlet. Content analysis includes a population of articles so all differences are significant.

The Frame Analysis Results (Research Question 3: Hypothesis 4-7)

Research Question 3:

RQ3. Are there are systematic differences in the selection (presence or absence), representation (presence and prominence), and the ideological focus of frames across types of news outlets that differentially reflect sponsorship by key social groups? The first focus of RQ3 was to identify if there are systematic differences across news outlets in the issues that were selected to describe and characterize the mining legislation being debated, with the goal of determining the proportion of stories within each news outlet in which a specific frame was absent.

Across all news outlets, *health risk* was absent from seventy-three percent of the stories written about the mining bill. As seen in Table 5.4, traditional media omitted *health risk* frames (.83*)* and *responsible mining* frames (.83) from a majority of their news stories. *Science*

precaution (.82) and *economic damage* caused by mining were the next most absent frames in traditional news. Comparatively, NGOs frames of *responsible mining* (.92) and *science precaution* (.80) were absent in the largest proportion of the stories they wrote, followed by economic gain (.64), and regulatory certainty (.60). Among the news outlets, the public was most likely to find health risk in stories written by NGOs, with NGOs omitting *health risk* frames in only forty percent (.40) of their news stories. Finally, citizen journalists were most likely to exclude frames of *responsible mining* (.97), *regulatory certainty* (.79), *science precaution* (.77) and *economic damage* (.71), as frames in news articles about the mining bill. Of interest, citizen journalists also had a high percentage of stories (.69) that did not include a health risk frame. (Public relations frames of *science confusion, process protects*, and *technological progress*

The second focus of RQ3 was in identifying systematic differences in the representation (presence and prominence) or emphasis of frames included in each media outlet. Recall that the prominence of a frame most likely reflects some combination of sponsor's economic and communicative resources (Gitlin, 1980; Tuchman, 1983), sponsorship by political actors (Haggli & Kriesi, 2010) and/or resonance with cultural worldviews (Gamson, 1992). Figure 5.2 clearly illustrates a systematic difference in the dominant frames chosen by traditional media, NGOs, and citizen journalists to represent what was at issue in the mining policy debate. Consistent with earlier research, traditional media appear to continue to represent issues of priority for industry and conservative political elites in ranking frames of *economic gain* a clear first (.76), followed by *regulatory certainty* (.61). Perhaps reflecting concerns for journalistic norms of balance (or conflict), risk to the environment ranked third (.60), followed by concerns for *procedural justice* (.56). Of note, *health risk* frames were ranked sixth in traditional media, with issues of health

risk occurring in just seventeen percent of all traditional news stories-the least prominent for the news outlets examined.

Figure 5.2

Proportion of articles within each news outlet where frame is present or prominent

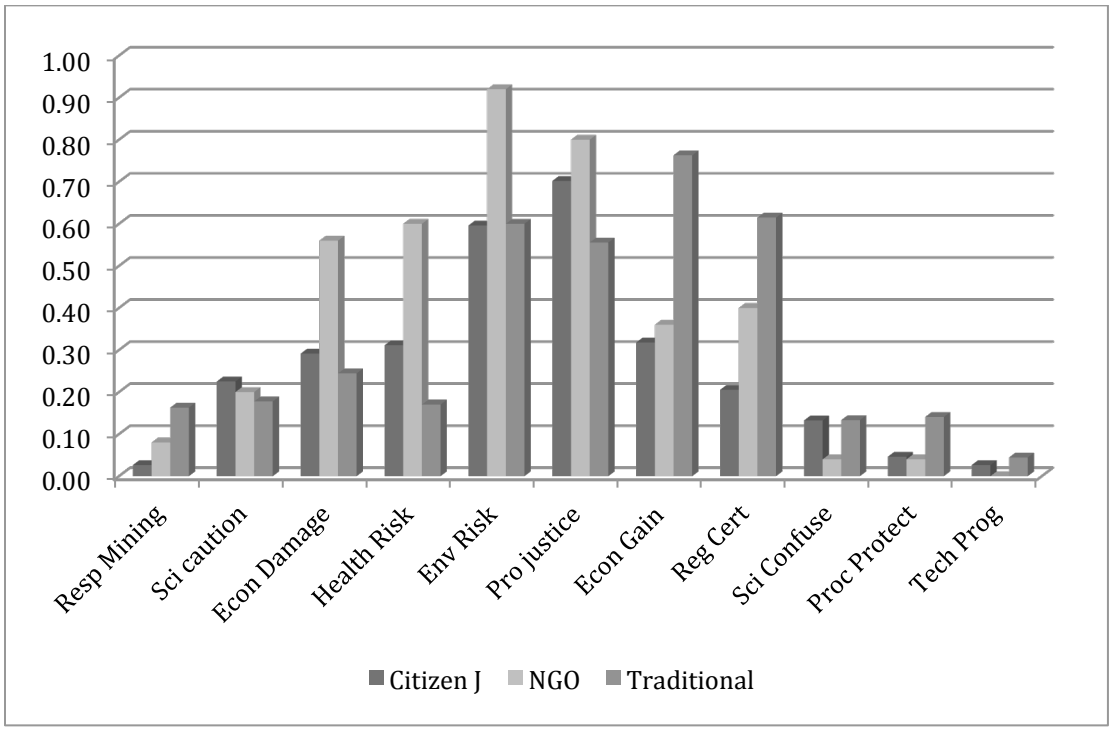

Figure 5.2. Proportion of articles within each news outlet where the frame is present or prominent by type of news outlet. Content analysis includes a population of articles so all differences are significant.

In comparison, articles constructed by NGOs identify *environmental risk* (.92*)* as the major focus occurring in ninety-two percent of the stories written. For NGOs concerns for *procedural justice* ranked second (.80) and *health risk* ranked third in prominence (.60) with *economic damage* caused by mining ranking fourth (.56).

Finally, within articles written by citizen journalists, frames of *procedural justice* (.70) and *environmental risk* (.60) emerged as the dominant themes included in news stories, reflecting

concerns for both democratic process and sustainability. *Health risk* (.31), *economic gain* (.32), and *science precaution* (.23) were somewhat less prominently represented.

The final focus of RQ3 was in identifying if ideologies systematically differed across news outlets. Recall that the third dimension of power has to do with the social construction of meaning and shaping of belief systems. This view calls for identifying values and rationalities of divergent social actors within a culture, as well as in specifying the mechanisms by which powerful entities may act to influence the belief systems of less powerful social actors (Lukes, 2005, p.44). In media studies, as discussed earlier in this text, a focus on ideologies can affect what scientific information is viewed as relevant (Carvalho, 2007). Therefore to determine what frames both politicians and the public would be exposed to through coverage in news articles, the preliminary study categorized identified frames by ideology. This study quantifies the frames that occur in each ideological category by news outlet type.

As seen in Table 5.4 (below) there were systematic differences in both ideology and goals of prominent frames across all three types of news outlets. Recall that in the preliminary study, the analysis of discursive data from public hearing and public testimony allowed for the categorization of prominent frames by ideologies and the goal rationalities of the frame sponsors. The frames on the top left of the table are consistent with values of sustainability and science precaution, as well as the goal orientation of opposition to the mining bill. Conservation groups, Native Americans, Democrats, and some citizen groups were the sponsors of the predominant frames in this dimension, and NGOs and citizen journalists most prominently represent these rationalities in their news coverage.

Table 5.4
Ideology and goal rationalities of frames

Value/Goal Dimensions		Citizen Journ.	Rank	NGOs	Rank	Traditional Papers	Rank
Sustainability (Against bill)	Responsible Mining	0.03		0.08		0.16	
	Science Precaution	0.23		0.20		0.18	
	Economic Damage	0.29		0.56	4	0.24	
	Health Risk	0.31	4	0.60	3	0.17	
	Environmental Risk	0.60	2	0.92	1	0.60	3
Pro-justice	Procedural Justice	0.70	1	0.80	2	0.56	4
Neoliberal (For bill)	Economic Gain	0.32	3	0.36		0.76	1
	Regulatory Certainty	0.21		0.40		0.61	2
	Science Confusion	0.13		0.04		0.13	
	Process Protects	0.05		0.04		0.14	
	Tech Progress	0.03		0		0.04	

Notes: Proportion of frames within each news outlet that were coded present or prominent. Frames are grouped based on ideology and goal rationalities identified in critical discourse analysis of public hearing testimony. Number of news article for each group: Citizen journalists n=151, NGOs n=25, Traditional media n=135. The content analysis includes a population of articles, so all represented differences are significant.

Conversely, frames lower in the table comprise the power dimension, which includes the neoliberal ideologies of economic gain and regulatory certainty and reflect pro-mining goals sponsored by industry, Republican lawmakers, business lobbyists, and some citizens. Traditional media predominantly represents this group. Of note, the third ideological dimension was striking in the data reflecting a shared value of procedural justice and fairness in the legal process. This dimension reflects sponsorship and the goal orientations of citizens both for and against the mine. All three news outlets included procedural justice frames prominently in their coverage.

Hypothesis 4: Sustainability

H4 hypothesizes that emergent news outlets will include a larger proportion of frames promoting sustainability values than will traditional news outlets. Frames that characterized the

main focus of a news article were coded as the prominent frame. These frames were then categorized based on the ideological position that they represent. H4 hypothesizes that the two emergent news outlets (NGOs and citizen journalists) will include a larger proportion of frames promoting sustainability values than will traditional news outlets. Table 5.5 reveals the proportion of prominent frames within each news outlet that characterize the mining bill either as a risk to sustainability, as a threat to democratic process (through corruption of the judicial process), or as a beneficial opportunity for the community.

Table 5.5
Prominent ideological frame within each news outlet

Value/Goal Dimensions		Citizen Journ.	Rank	NGOs	Rank	Traditional Papers	Rank
Sustainability (Against bill)	Responsible Mining	0.01		0.02		0.04	
	Science Precaution	0.07		0.04		0.04	
	Economic Damage	0.10	4	0.12	4	0.09	
	Health Risk	0.11	3	0.14	3	0.05	
	Environmental Risk	0.20	2	0.26	1	0.16	3
Total		0.49		0.58		0.38	
Pro-justice	Procedural Justice	0.28	1	0.22	2	0.17	2
Neoliberal (For bill)	Economic Gain	0.11	3	0.09		0.22	1
	Regulatory Certainty	0.06		0.09		0.15	4
	Science Confusion	0.04		0.01		0.03	
	Process Protects	0.01		0.01		0.03	
	Tech Progress	0.01		0		0.01	
Total		0.23		0.2		0.44	

Table 5.5 Shows proportion of frames within each news outlet that are coded as *prominent* in each ideological dimension. Content analysis includes a population of articles so all differences are significant.

Citizen journalists devoted 49% of their prominent coverage to frames promoting sustainability, followed by concerns for a fair democratic process (28%), with only 23% of their prominent frames representing the proposed benefits (economic gain, regulatory certainty, and "safety") of the mining bill. Comparatively, NGOs demonstrated a significantly stronger

commitment to sustainability in their frame choice by devoting a full 58% of their prominent frame coverage to values frames endorsing sustainability. The majority of these (26%) focused on environmental risk. Concern for the democratic process was also evident in news articles by NGOs with 22% of their stories prominently displaying *procedural justice* frames. Just 20% of NGO articles contained frames in which the proposed benefits of the mine were prominent. Finally, traditional papers employed the smallest proportion of prominent frames focused on sustainability at 38%, significantly less than the other two news outlets. Instead the main focus for traditional papers was on the benefits of the mining bill, with 44% of the of the news stories containing prominent beneficial frames. Of those beneficial frames 22% focused on economic gain or job creation. Procedural justice as a prominent focus for news stories occurred 17% of the time in traditional newspapers. Based on these data, H4 is supported, emergent news forms appear to forefront issues of sustainability in their news stories, proportionately more often than traditional newspapers.

Hypothesis 5: Health Risk Frames

H5 states that the category of health risk frames will be proportionately more prevalent in news articles written by citizen journalists and NGOs than traditional news outlets. The health risk frame serves as a focal lens to examine how complex science issues that are highly relevant to the public are covered in the news. In this frame we see clear differences between news outlets in representations of the health risk of extractive mining. An example of a health risk frame taken from an article posted by a citizen journalist gives the reader some idea of the content of a health risk frame:

> Studies conducted on taconite mining in Minnesota and Michigan show that aggressive excavation of taconite and the processing of taconite pellets can cause toxic heavy metals - including arsenic, lead, and mercury - to leach into air and water. For citizens living in the communities around a mine who are drinking groundwater or eating

contaminated fish, the consequences can be fatal (Schuman, 2012, January 28).

H4 hypothesized that frames of *health risk* will be more prominently represented in news stories constructed by NGOs and citizen journalists. Regarding *health risk* frames, Figure 5.2 shows that while articles by NGOs contained a relatively high proportion of stories that included *health risk* (.60) citizen journalists included *health risk* in about a third (.31) of their articles. Traditional media evidenced the least amount of stories with *health risk* frames (.17) of all of the news outlets. The data support H4, health risk frames will be more prominently represented in news articles written by citizen journalists and NGOs.

Hypothesis 6: Diversionary Framing

Hypothesis six **(**H6) states that frame construction in traditional media will reflect industry strategies of diversionary framing more prominently than in news stories written by NGOs or citizen journalists.

Recall that "diversionary framing" is defined in the research literature as a frame that promotes a strong emphasis on the relative benefits of specific elements of a policy approach without concomitant inclusion of debit information. Freudenberg and Gramling (1994) have characterized diversionary frames as those frames that are employed by key social groups to shift public attention away from a critical component of a policy issue, or to distract attention from challenger groups. As predicted in H5, diversionary frames promising *economic gain* (.76), and *regulatory certainty* (.61) provided by the mining bill were relatively more prominent in traditional media than in other news outlets. This lends credibility to the idea of disproportionate representation of frames promoted by powerful interests in traditional media. Comparatively, NGOs dedicated a bit more than a third of their stories to frames with *economic gain* (.36), while citizen journalists also included *economic gain* frames in about a third of their articles

(.32). Similarly, *regulatory certainty* (deregulation) was the second most prominent frame for traditional media (.61) again showing media support for industry claims, while NGOs included *regulatory certainty* in only forty percent of their stories (.40), followed by citizen journalists (.21), who did not seem to prioritize this issue. The data support H5, diversionary issues of *economic gain* and *regulatory certainty* (deregulation) were more prominent in traditional news stories about the proposed mine than in articles by either citizen journalist or NGOs.

Hypothesis 7: Counter-framing of Risk

Hypothesis seven (H7) proposed that public relations counter-frames (would be more prominently represented in traditional media than *health risk* frames. Recall from the validity check in the preliminary analysis that frames representing the "safety" of the mine were categorized as public relations frames. These frames include: *science confusion, process protects, and technological progress*. An example of the *science confusion* frame, put forward by Gogebic Taconite Company, was included in the introduction and reproduced in this chapter as an example:

> Sulfide deposits have to be handled with special care because once exposed to air and water they can create acid drainage into the surrounding environment. *Oxide deposits [iron and taconite] do not carry this danger.* During the process, non-ferrous [sulfide] mining metals are leached from the rock using chemicals. Instead of chemicals we use only magnets to separate the iron from the sands. (Wisconsin Eye, 4:03:45, 2/17/2012 *emphasis added*).

Similarly*, Process protects* frames assure the public that the environmental protections in Wisconsin are strong and they have not changed when in fact the mining company was specifically exempted from meeting environmental regulations in the proposed legislation, (as evidenced by the former head of the Wisconsin Department of Natural Resources: (WI EYE,

9AB 426, 3/20/12, 00:41:37). Finally, *technological progress* frames promise some vague new developments in mine safety as in the example here:

> The passage of the bill will clearly be of economic benefit to northern Wisconsin and environmental safeguards have been put in place in what promoters say will be a state of the art mining facility. (Iron County Miner, 2012 February 2).

Figure 5.3

Counter-framing of "safety" relative to health risk by news outlets

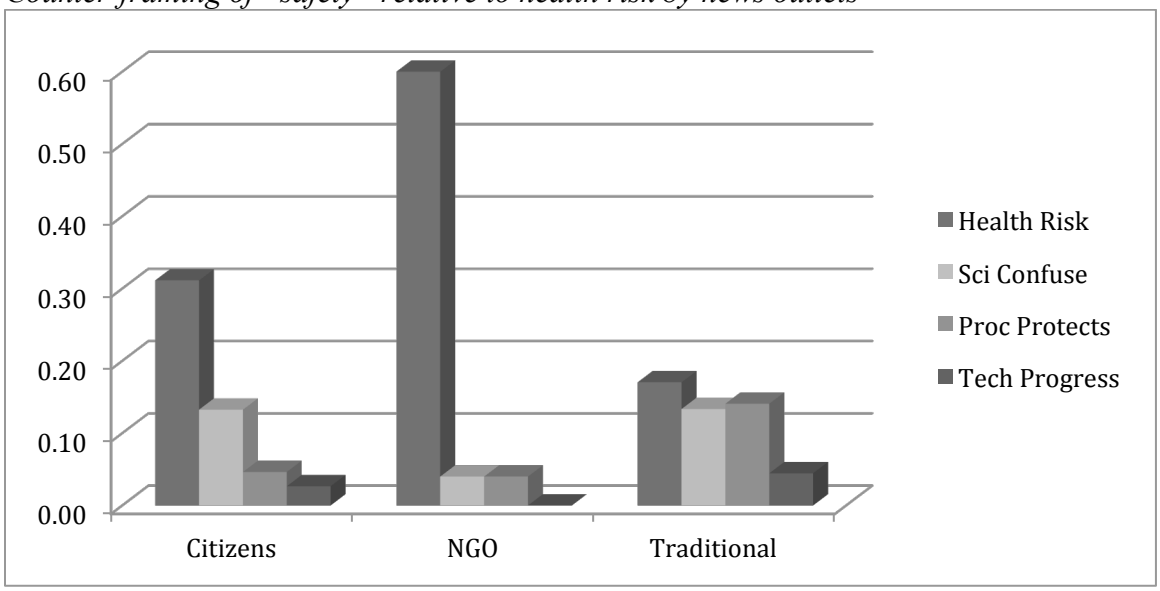

Figure 5.3 Portion of frames within each news outlet representing health risk, compared to public relations frames promoting the "safety" of the proposed mining legislation (AB 426).

As seen in Figure 5.3, in traditional media, these three public relations frames when combined were present in a greater proportion than were frames of *health risk*. *Health risk* frames were included in seventeen percent of the mining stories in traditional media. Science confusion (.13), process protects (.14) and technological progress (.04) frames together comprised thirty-one percent of the frames used in traditional media to characterize the proposed mining bill as "safe". Recall that counter-framing negates the effect of the frame in health risk research (Wise and Brewer, 2010).

Interestingly, news writers for NGOs ignored the *science confusion* frames (.04) much more effectively than either citizen journalists (.13) or traditional reporters (.13) who were tied in the proportion of news stories that selected these frames for inclusion. This finding points to the influence of PR counter-frames on citizen and traditional journalists alike.

In terms of frames that promise that the regulatory process will protect the public (*process protects*), again traditional media were more likely to include this frame (.14). Both citizen journalists (.05) and NGOs (.04) included a very small overall percent of this narrative in their framing. Finally, on issues of vague *technological progress* that would insure a safe mine, traditional outlets included the greatest proportion of news stories containing this frame (.04), followed by citizen journalists (.03) with NGOs including zero stories that promoted this frame. While relatively small the findings for the technological progress frames were included to accurately reflect the overall proportion of public relations frames that were used in counter-framing the health risks of the mine. Overall H6 was supported, counter-frames representing the "safety' of the proposed mine (*science confusion, process protects, and technological progress*) would be more prominently represented in traditional media than health risk frames.

CHAPTER 6: LOBBYING ACTIVITIES

A POST HOC ANALYSIS

Introduction

Recent research has defined lobbying activities as a key component used by stakeholders to "capture policy. Scholars argue that when lobbying activities permit special interest groups to attain favor in the decision-making process, the democratic process is undermined. Lobbying is defined as follows:

> Lobbying is the attempt by organized interests to influence policy and the decision making of governmental or other similar institutions. Lobbying can and does take place in political systems without any or significant formal democratic mechanisms. However, it is in formally democratic political systems that it has become a significant industry and indeed public issue (Miller & Mooney, 2010).

Prominent scholars have identified that lobbying activities play a role in promoting corporate interests and need to be taken into account in media studies (Miller & Mooney, 2010; Miller & Harkins, 2010; Nisbet and Huge, 2006). Miller and Harkins argue that "corporate agency" results from inequality of resources and the abilities of social actors to promote issues. To understand how resources are deployed in the policy debate, a post-hoc analysis identified campaign donations to key political actors, and the hours spent by stakeholders in lobbying politicians during the development of the mining policy.

This chapter will begin by outlining a post hoc analysis of campaign contributions, and hours spent by lobbying groups with the goal of providing insight into the ties between legislators and special interest groups, as well as the efforts by a range of social actors to influence the policy development of AB 426. The chapter will then turn to a section that outlines the interests of the public. This is accomplished by examining the support or opposition to the mining bill recorded by those who register for public hearings. A section on each of these three

activities, 1) campaign contributions as a form of lobbying, 2) an analysis of the key stakeholders who spent time lobbying legislators, and 3) a record of public support or opposition to the mining bill, follows below.

Campaign Contributions

Assembly Bill 426 was represented as an update to Wisconsin mining law, and was designed to separate ferrous (iron mining) law from sulfide mining law. The bill was introduced on December 14, 2011 at a public hearing in West Allis Wisconsin. The debate over the wording and content of the legislation continued over a five-month period and ended March 23, 2012 when the bill failed by one vote in the Senate. Primarily the voting reflected a party line vote, with the exception of one Republican Senator who opposed the bill.

The campaign contributions to legislators before and during the legislative session in which the bill was discussed demonstrate a significant difference in support of the two political parties. Between the end of 2010 and June 2012 special interest groups that supported changes to mining regulations in Northern Wisconsin contributed $15.6 million to the Wisconsin legislature and GOP Governor Scott Walker (Wisconsin Democracy Campaign, 2012). Of these, the Wisconsin legislature received $4.25 million dollars during this time from interests that supported mining deregulation. Republican legislators (and their legislative campaign committees) received $3.38 million or 79 percent of the contributions made by mining deregulation interests. Comparatively, Democratic legislators (and their legislative campaign committees) received $875,866 or 21 percent of the contributions made by mining deregulation interests. Governor Walker, who supported a change in regulations to attract mining projects, received $11.34 million dollars from 2010 through April 23, 2012 from interests that supported deregulation (Wisconsin Democracy Campaign, 2013).

In a separate time frame (August 1, 2010 – July 31, 2012) with data reporting broken down by legislator and how they voted on the mining bill, from donors who supported the mining bill-legislators who voted for the mining bill obtained an average of $7,631 dollars, while those who voted no received on average $3, 129 dollars from donors advocating for the bill. Comparatively, from donors opposed to the bill those who voted for the bill received just $4 dollars, while those who voted against the bill received $575 dollars (Maplight, 2012). In effect, those who voted for the mining bill received 144% more in campaign donations from stakeholders supporting the bill than those who voted against it. From stakeholders opposing the mining bill, those who voted no received 131 times as much money in campaign donations than those who voted yes for the bill (Maplight, 2012). Clearly highly resourced social actors appear to be supporting this bill and utilizing campaign donations to support legislators whose votes reflect stakeholder interests. Similarly, those opposed to the bill also appear to be utilizing donations to extend their influence-although they appear to have fewer resources to expend on this approach. Should reporters chose to include this information in their news stories about the proposed mining legislation, it would shed light on the efforts of various stakeholder groups to influence the policy decisions, as well as the influences on those legislators who are receiving those donations.

In addition, stakeholders also have donated to interests who supported Governor Scott Walker. Donations were disclosed in September of 2014. The American Democracy Legal Fund sent a letter to petition the United States Attorneys office documenting a $700,000-dollar donation to the Wisconsin Club for Growth from Gogebic Taconite. Although the connections are currently being contested in a legal battle, it is known that Wisconsin Club for Growth supported Scott Walker in his recall campaign and that the Governor signed into law a

subsequent mining bill within a year of winning his recall election (Wisconsin Democracy Campaign, 2015).

While campaign donations cannot be causally linked to legislators' decisions to support or oppose legislation, they nonetheless provide background information for the public to take into account in understanding the forces at play in a policy debate. Detailed information was not available regarding the breakdown of contributions to Democratic Senators, although it is known that they received just 21% of the donations from mining advocates. This information shines light on resources active in the policy debate and lays the foundation for future network analysis, and ethnographic work in these areas.

Hours Spent Lobbying

Assembly Bill 426 was the second most lobbied bill in 2011, with lobbying activities beginning in July. This is somewhat surprising, as the bill was not made public until December 8, 2011. In an analysis of the official record from the Wisconsin Government Accountability Board thirty-three separate stakeholders lobbied politicians to either support or oppose the mining bill. Seven additional groups also lobbied, but did not disclose their position on the bill and therefore were not included in this analysis. As seen in Table 7.1, twenty-one groups spent a total of 6859 hours lobbying politicians to support the mining bill, comprising 67% of the lobbying effort for AB 426. These social actors included the mining company, Gogebic Taconite, which accounted for 7% of all of the hours spent lobbying attributable to them, Wisconsin Manufacturers & Commerce (10%) and Wisconsin Property Taxpayers, Inc. (32%). Comparatively, eleven groups lobbied against the mining bill, with a total of 3334 hours spent, and approximately 33% of the lobbying effort on the bill expended. This group was comprised

almost exclusively of environmental advocacy groups with the exception of the St Croix Band of the Chippewa (Ojibwa) tribe.

Table 6.1

Lobbying activities of social actors both in support of and opposed to AB 426

Name of Organization (For)	Hours	%		Name of Organization (Against)	Hours	%
Ag. Producers of WI	14	0.14		Clean Wisconsin	456	4.47
Americans for Prosperity	10	0.10		League of Women Voters	4	0.04
Assoc. Builders/Contractors	109	1.07		Midwest Environmental. Advocates	14	0.14
Assoc. Gen Contractors	10	0.10		Nature Conservancy	96	0.94
ATC Management	10	0.10		River Alliance	6	0.06
Gogebic Taconite LLC	730	7.16		Sierra Club	24	0.24
Iron Workers North Cent. St	64	0.63		St. Croix Chippewa	36	0.35
Metro Mil Chamber	55	0.54		WI Assoc. of Lakes	13	0.13
Northern State Power/Excell	394	3.87		WI League of Cons. Voters	2409	23.63
Operating Engineers	114	1.12		WI Wetlands Assoc.	2	0.02
Tavern League	24	0.24		WI Wildlife Federation	274	2.69
United Sportsmen	58	0.57		TOTAL HOURS SPENT (AGAINST)	3334	32.71
Wisconsin Bankers	39	0.38				
WI Economic Dev. Assoc.	108	1.06				
Wi Laborers Dist. Council	42	0.41				
WI. Manufacturers & Comm.	1043	10.23				
WI Mining Assoc.	324	3.18				
WI Pipe Trades Assoc.	50	0.49				
WI Property Tax Payers Inc.	3268	32.06				
WI Restaurant Ass.	110	1.08				
WI State Council of Carpenters	283	2.78				
TOTAL HOURS SPENT (For)	6859	67.29				

Table 6.1 This table details the lobbying hours spent by social groups to influence Wisconsin legislators. It includes the total hours spent lobbying and the percentage of total hours for each group.

By far the largest contributor to the anti-bill effort was the Wisconsin League of Conservation Voters with approximately 24% of the lobbying hours across groups, followed by Clean Wisconsin, which contributed 4% of the total lobbying hours on this bill. In all, those opposed to

the bill were seen by politicians only about at third of the time relative to those who supported it. Again, cause and effect can not be determined by tracking lobbying hours, yet these activities illuminate the social actors who have a great deal of contact with the legislators.

What Does the Pubic Think?

Public opinion can perhaps best be comprehensively gauged by polling results obtained from a reputable institution. For Assembly Bill 426, two polls were conducted during the course of the mining debate. However, neither poll was conducted by an independent agency; rather one poll was conducted by a conservative think tank, while an environmental advocacy group conducted the other. The first poll was commissioned by Wisconsin Manufacturers and Commerce, a business advocacy group, and conducted eight months before the mining bill was introduced. Because of its timing, this poll could not measure public opinion on the mining bill. The League of Conservation Voters (an environmental advocacy group) conducted the other poll. According to analysis by Marquette University this poll was found to be unreliable (Wichowski, 2012) and the results are not included here.

However, one reliable indicator of public opinion can be obtained by reviewing the position of registrants for the three formal public hearings that were held on AB 426. Although reliable, this information most likely reflects citizens who are highly motivated to participate in the political process rather than a cross section of the public. The Assembly Committee on Jobs, the Economy, and Small Business sponsored the first public hearing held on AB 426 in West Allis Wisconsin on December 14, 2011. The results showed opposition to the bill with 63% of registrants opposed the bill (225), and 37% in favor (131). It should be noted that this hearing was 300 miles from the communities where the mine was to be located.

The same Assembly committee held the second public hearing on January, 11, 2012 in Hurley, Wisconsin, which is located in the area where the mine was to be sited. At this location, opposition to the mining bill increased relative to the first hearing with 85% (358) of the registrants opposed AB 426 and 15% (61) registering in favor (Committee Proceedings, 2012, January 11). The Joint Committee on Finance held the final public hearing for AB 426 on February 27, 2012 at the Wisconsin State Capitol building. For this final hearing, 92% (353) of the registrants opposed the mining bill, while 8% (31) of those registered supported the bill. Overall the data show that of the 1160 people who registered at the public hearing 81% (937) opposed AB 426.

Summary

The power to define an issue in the public sphere affords social actors a particular advantage. In addition to attempting to motivate the legislators to support a particular viewpoint both through their vote, one way to gain definitional power is to recruit a public figure to represent your views to the public. Politicians have long been recognized as elites that are well represented by the media. Should legislators be swayed to represent the views of these social actors, news media provides a platform to legitimize and amplify these viewpoints for the public. Campaign donations and hours spent lobbying provides a tangible way to track this effort by stakeholders and to make clear another avenue used by them for attaining definitional power.

It is important to recognize first that causal connections between donations and level of support for or against the bill cannot be made with this information. Rather these correlations illuminate forces that may be at work from social groups to influence policy decisions, and provide information that could provide context for news stories to inform the public of the background and activities of the various stakeholders who are prominent in the public debate.

The politicians who voted for the mining bill clearly benefited more financially than the legislators who voted against the bill. For example, the Republicans who supported the bill were received over 79% (4.25 million dollars) of the donations from advocates while Democrats who uniformly opposed the bill received or 21% ($875,866) from those groups. Similar disparities exist when examining hours spent directly meeting with legislators to lobby them either to support or oppose the bill. Hours spent lobbying was included to provide insight into the many stakeholders who compete to define what is at stake in the policy debate, and gain understanding on this mechanism for stakeholders influence on policy. Social actors who advocated for support of the bill accounted for 67% of the time spent with legislators as opposed to 33% of the time that legislators met with those opposed to the bill. Chart 6.1 identifies that the social actors lobbying for the bill included the Mining industry itself as well as a range of business groups who would benefit from the development of a taconite mine. The groups opposed consisted almost exclusively of environmental groups.

Finally registration from public hearing was tallied to get a glimpse into how the public was responding to this legislation as it moved through the development process. This information was incomplete and no conclusions could reliable be drawn from the data on public perceptions of the mining bill. However, future research should more effectively account for public opinion as a counterweight to the varied interests of stakeholder groups who are active in gaining media attention during the policy debate. This information could alert reporters of what the public concerns are so they can create stories that include public concerns equally to that of active stakeholder groups.

Together information on campaign donations and hours spent lobbying can provide context for news readers to be able to situate narratives with the groups promoting them, as well

as potential motivations of these groups. Including this information in news stories allows the readers to have a broader understanding of the opposing forces arguing for and against the mine.

In general the role of lobbying activities, and their ability to influence news coverage is under theorized in the communications field. This chapter was an attempt to begin to explore how potential linkages between stakeholders and legislators could inform communications theory. This chapter supports the idea that attention to lobbying activities is essential to understanding the many forces that influence the communication process. It also supports the call for further development of this area for media studies.

CHAPTER 7: DISCUSSION OF THE FINDINGS, LIMITATIONS, AND IMPLICATIONS OF THIS RESEARCH

This study began with the assertion that the defining issues of our time are contingent on how political and social systems negotiate and manage the complex interaction of science, technology, and the environment (Beck, 2009). This study sought to uncover how varied news outlets mediated a contentious struggle between opposing social actors as they vied to influence a state level environmental policy (AB 426). This study utilized a conceptual model of definitional power to explore how varied news outlets balanced and represented the interests of highly resourced social actors with that of opposing stakeholders to represent issues of importance to the public.

An analytical approach was introduced based on the theory of definitional power (Beck, 2009), which asserts that science risks are social constructions, defined by social actors who compete to give meaning to the risk through the public "staging" of that risk. Particularly when the science is comprised of risks to public health risk (as it was in this case) compelling reasons exist for news outlets in providing effective translations of risks in order to facilitate public understanding, allowing for citizen's to gain the opportunity to participate in the very policy debates that structure the conditions for health risk in their communities. Building on prior theorists, this study proposed that definitional power can be functionally defined as the ability of social actors (individuals, institutions, or organizations), through a variety of techniques and strategies, to control the dominant narrative in the news. This conceptualization provides a meaningful framework for a systematic study of news coverage.

The design of this study is based on the four key elements that comprise definitional power. The four elements include: 1) uncovering the role of news outlets in how (and if) social actors are represented as sources in the news through source analysis; 2) in accurately uncovering the narratives of frames sponsors, and the validity of the frames they put forward; 3) in uncovering which actors and frames are highlighted and which are excluded from the political conversation; and 4) in identifying how information about lobbying activities may influence the issues that are presented in policy debates. This approach is exploratory and proposed to see if definitional power could pragmatically be applied to the study of science communication in policy news.

A mixed methods analysis was conducted for this research. The analysis was comprised of a set of qualitative studies designed to uncover the social actors who were active in the political debate, as well as to identify the prominent frames that these groups promoted. Once these frames were categorized, frame ideology, goal orientation, and frame validity were established. The researcher then utilized the source and frame categories identified from the qualitative analysis in a content analysis designed to discover which sources and frames achieved prominence in both traditional newspaper stories about the mining debate as well as in stories posted by NGOs and citizen journalists on the Internet.

Each of the key findings from this research will be discussed beginning with a focus on the findings from the source analysis, and followed by a discussion of the results from the framing studies, and an overview of the lobbying activities that contextualize the analyses. Issues of inclusion and exclusion will be incorporated in the discussed throughout each section. The limitations of this project will then be reviewed before turning the conclusion and implication of this research.

Source Analysis

Sources analysis reflects the first dimension of power. It points to the skill of social actors in achieving standing in news coverage as well as the ability of news outlets to mediate the influence of social actors through an evidence based representation of the issues.

An overview of who the sources were is necessary before proceeding to the discussion. Twelve categories of social actors identified in the qualitative study were collapsed into three representative groups who were tracked as sources for the content analysis of news stories. These groups included: 1) traditional elites (industry representatives, politicians from both political parties, and local politicians, 2) scientists (including science advocates, public scientists, academic scientists, academics specializing in mining issues, and industry scientists, and 3) the public (including citizens for and against the mining bill, as well as undecided or undeclared citizens.

In general, the elite group of politicians and industry was split, with Republican legislators and industry promoting the mining bill, and Democratic legislators opposing the bill. This group overwhelmingly represented the benefits of mining and the safety of taconite mines specifically through a series of public relations frames that will be discussed in detail below. Comparatively the scientist group represented a voice of reason from which policy decisions could be made based on scientific evidence. Of concern, no public health scientists were used as sources throughout the six months of debate in the development of mining legislation in spite of the fact that metallic mining, releases more toxins into the environment than any other industry in the United States (Toxic Release Inventory, 2011). Other public scientists were also scarce. Of those sources included in news stories, “science advocates’ (or public citizens who may or may not have any education in science, and who were not currently working as scientists) were the

largest group of sources who were included in news stories. Finally, when examining how the lay public was included as sources in news stories, citizen journalists did the best job of including citizens. Overwhelmingly the citizens who were cited were opposed to the mining bill. Each news outlet demonstrated a different profile in which social actors they favored as sources pointing to differences in how social actors are mediated across news outlets. Traditional media heavily favored elite (industry/political) sources, citizen journalists favored the public as sources, and NGOs showed a preference for elites, with the group of citizens who were quoted in news articles following closely behind in this medium. In all three types of news outlets, scientists were the least often represented as sources in their news stories.

Looking more specifically at the source analysis when it is broken down by type of news outlet citizen journalists evidenced a significantly higher proportionate inclusion of scientists (20%) as news sources, than either traditional media (10%) or NGOs (.8%). The subgroup of scientists that was proportionately most included in each news outlets were science advocates- those citizens who may or may not have formal training in science, but who were used as sources to define scientific, or environmental issues that came up during the mining debate. This introduces the question of why scientists were relatively less represented than other social actors in the discussion of a controversial environmental bill that structures the conditions for a highly dangerous industry? This may be a topic for future investigation.

Industry and political elites were heavily favored in traditional newspapers, accounting for a large majority (74%) of all of the sources included in news on the mining bill, and lending credibility to the idea that powerful groups are highly represented in the news. NGOs utilized elite sources in about 48% of their news stories, with the smallest representation of elites in articles written by citizen journalists (25%). This bias towards social elites becomes more

nuanced when examining the frequency of source inclusion from among the elite group of politicians and industry representatives.

While one could argue that the opposing parties in Wisconsin politics theoretically could provide a balance of views on the mining bill, this evidence does not hold up when including industry as a primary source of information. Democrats, who were opposed to this mining legislation, were quoted 370.5 times in traditional news accounts. This, in fact was a rough balance with Republicans, who primarily opposed the bill, and who evidenced 392.5 quotes in news articles. However, industry was a strong proponent of the mining legislation, and was included with quotes in news articles 288 times. So within the elite category, proponents of the mining bill (and economic rationalities) were heavily overrepresented in traditional media.

When reviewing the findings from the source studies, it was clear that citizen journalists relied most heavily on other citizens for sources, with 55% of their source material coming from the public. In the media ecology, this news outlet could theoretically provide a voice for citizens that are not seen in other forms of media. Within this group however, the vast majority of citizens who were quoted were citizens who opposed the mine. Of the 384 citizens quoted in stories by citizen journalists, just 13 voiced support for the mine, and no citizens who were undecided were quoted. This finding lends support to research that identified that reporter choice of sources reflects a hierarchy both in the selection of elite sources, and in the selection of sources opposing the elites. In the later, oppositional voices dominated, rather than a representative sample of the public. This approach excludes a wider representation of views on the issue, minimizing the voice of ordinary citizens. In this case those who favor the mine, or who are undecided were underrepresented in articles by citizen journalists, as well as across all news types.

The final finding in the source analysis is that science advocates, rather than scientists, appear to be employed as key sources for environmental commentary in traditional newspapers. It is not clear from this research why trained journalists would choose science advocates over scientists to characterize the environmental and health risks of the mining bill? Potentially, institutional limitations restrict the ability of public scientists to discuss their perspectives with news reporters, or journalistic norms could preclude journalists from having the time, or opportunity to access journalists? In any case, the source data indicates that scientists are largely absent in the public debate over mining policy, potentially limiting the foundational information available to the public which would allow them to weigh the relative risks and benefits of the mining bill based on scientific evidence.

Frame Analysis

Consistent with the third dimension of power, the framing of stories provides an opportunity for social actor's to influence the beliefs of both the public and legislators of legislators concerning the relative risks and benefits of a mine. This study explored the dominant narratives put forward by competing social actors in the policy debate, and the efficacy of news outlets in their selection and representations of the issues put forward.

In selective coding of the frames, three ideological dimensions were found. Ideology has been found to act as a filter in the public interpretation of frames, and prior research has found that newspapers differ in the ideologies they include in their news stories (Carvelho, 2007). The first dimension identified from frames included in news coverage of the mining bill demonstrated a concern for sustainability and science precaution, and included frames of *responsible mining, science precaution, economic damage, human health risk,* and *environmental risk*. A second dimension captures a deep concern for democratic processes and

includes one frame, *procedural justice*. This frame emerges from a common concern for the integrity of the democratic process for this policy development, and includes citizens both for and against the mining bill. The third dimension could most adequately be categorized as a power dimension, as the frames within it were most heavily promoted by industry and political elites. This dimension captures concern for economic growth and free-market values, as well as reflecting public relations efforts. Frames in this category include: *economic gain, regulatory certainty, science confusion, process protects,* and *technological progress*.

News outlets differed in their priorities in representing powerful interests, challenger groups, and the complex science that is at issue in a mining policy (AB 426). The differences in representation of frames point to both the limits and the potential of news media in moderating the effects of key stakeholders to meaningfully engage and inform the of the scientific issues involved in the proposed legislation. The selection (or exclusion) of frames points to the second dimension of power. The exclusion of issues from news coverage potentially limits the public discussion of those issues. Similarly, the representation, or choices made in the emphasis of some frames over others also influences the amount and type of frames that the public is exposed to. In effect then reporters chose which interpretations of the mining policy are highlighted and which are minimized in their coverage.

In traditional media, health risk frames were absent in eighty-three percent of their news stories, making it less likely that this issue would be influential for public opinion on the mining policy. Instead, the prominent frames represented in traditional news stories reflected neoliberal values put forward by powerful industry groups, and included a focus on economic gain and regulatory certainty (deregulation) consistent with prior research on other issues (Paige and Shapiro, 1992). The prominence of these economic values points to industry success in the

strategy of promoting diversionary frames that disproportionately emphasis the benefits of mining to legitimize their stated goal of passing the mining bill. Issues of environmental risk and procedural justice articulated by Native Americans and conservation groups were present in traditional news, but were relatively less prominent. Traditional media included the smallest number of frames outlining the health risks of mining of the news outlets studied.

Of concern, industry-sponsored public relations frames conveying the "safety" of the mine (science confusion, process protects, and technological progress) were included in traditional news articles, and when combined in the analysis, appeared almost twice as often as frames conveying public health risk, lending credibility to the idea that highly resourced social actors appear to be privileged by news outlets in the inclusion of the frames they promote. Traditional media emerged as the least likely of the three media types to construct meaningful narratives on health risk to facilitate public engagement, or inform policies that protect public health when complex science is at issue in state-level policy debates. This research identifies a role for knowledge-based reporters, with specific training in science as well as in journalistic practices (Patterson, 2013), that could challenge industry framing of complex science to meaningfully inform the public and policy makers alike.

Another key finding in the framing study is that NGOs appear to be emerging as an important public health voice in representing health risk frames. NGOs represented a commitment to sustainability by including the highest proportion of health risk frames of the three outlets studied in their news stories on the proposed mining bill (AB 426) with sixty-percent of their stories having some reference to health risk. Recent literature in Denmark (Maeseele, 2009) proposed that NGOs are emerging as key science communicators. This study confirms that finding, and more narrowly demonstrates the importance of NGOs in

communicating the complex science of environmental health risk in a mediated state-level policy debate. In addition to bringing health risk to the forefront in their coverage of policy, importantly NGOs were the most successful at minimizing diversionary frames, and excluding public relations counter-frames, potentially allowing for greater efficacy of the health frames included (Wise & Brewer, 2010). Unfortunately, NGOs offered the least number of stories on the mining bill of any of the news outlets (n=25); with all of their news stories being found on the Internet-meaning the public would need to specifically search the websites of these organizations, or conduct an Internet search to find them.

Citizen journalists are key communicators in a democratic society because of their ability to represent issues of critical important to the lay public. In this study citizen journalists were essential in bringing issues of procedural justice to the forefront as well as reinforcing a focus on concerns for environmental and health risk. Not surprisingly, citizen journalists included economic gain as the third most prominent issue in their coverage of the mining bill, and ranked second highest in inclusion of science confusion frames in their news stories, perhaps reflecting the influence of traditional media on these emergent news outlets? Yet, as an emergent news originator, research identifies that citizen journalists continue to be hindered by issues of reach and credibility (Hindman, 2008). However, alternative media models, such The Seattle Times, offer networked media platforms that link citizen journalists with traditional media, allowing for community concerns to be heard by the broader public. This networking strategy allows for citizen journalists to attain broader reach, as well as facilitating a minimal level of journalistic training to enhance news credibility (Friedland, 2014). Innovating media strategies such as these provide a platform where environmental health risk issues could be elevated, through networked media, to a broader public increasing the probability of public engagement and subsequently of

health informed environmental policy.

Frame Ideologies

This research included a focus on frame ideologies in response to social scientists, who have called for the identification of ideologies in corporate communications as a way of identifying strategies used by corporate actors to advance "corporate agency" in "policy capture" (Miller and Mooney, 2010). In studies of media coverage of climate change, Carvalho (2000, 1007, 2008) found a persistent bias in the construction of science news across newspaper outlets that she argues contributes to misperceptions of climate science. The identification of news outlets that promote the ideologies of some stakeholder groups over others, points to the potential for bias in news coverage. In the case of science news, this research argues that the role of news writers is to reflect the views of varied stakeholders, while also retaining fidelity to the science. Meaningful translations of science are essential to inform and engage both the public who will be affected by this legislation, as well as the policy makers who craft the regulations that condition the day to day living conditions for their constituents.

Meaningful translations of science are essential to inform and engage both the public who will be affected by this legislation, as well as the policy makers who craft the regulations that condition the day to day living conditions for their constituents. A frame analysis that ranked the most prominent frames used in news stories demonstrated that citizen journalists employed procedural justice frames more prominently than other frames in their news articles, followed by concerns for environmental risk. Health risk was tied for third most prominent frame in stories written by citizen journalists; with worries about economic damage the mine may cause being the fourth most prominent frame for this group. Prominent frame rankings for stories emerging from NGOs closely resemble that of citizen journalists. NGOs stores most prominently displayed

frames concerned with environmental risk, then procedural justice, followed by health risk frames, and concerns for economic damage caused by the mine. Comparatively, traditional media reflected neoliberal values of economic gain, followed by concerns for procedural justice, environmental damage, and deregulation in their most prominent frames. If all other things were equal in the media ecology, one could argue that readers could get a broad range of views by reading across news outlets. However, again issues of limited reach may disadvantage citizen journalists (Hindeman, 2008), resulting in the net effect of fewer citizen voices available in the news ecology, given the difficulties in accessing these sites.

Goal Orientations

By characterizing the goal orientations (for or against the mining bill) of frame sponsors, insights can be gained as to the motivations of social actors that could be utilized by news organizations to inform public understanding of the contested issues. Additionally, recent research found that goal-directed framing (for or against a policy) in public health could shape public opinion regarding the issue. However, while a single goal-oriented health frame can shape reader perceptions of the issue, when a frame with the opposite valence or with opposing values was introduced into the news story (a counter-frame) the framing effects were eliminated (Wise & Brewer, 2010). In this study, counter framing was evidenced in the construction of frames that promised mine safety. However, these counter frames did not meet the criteria for validity as described below.

Frame Validity

The preliminary study included validity checks on the eleven most prominent frames utilized in public discourse. Analysis identified three frames that did not meet the criteria for truth or comprehensibility, and were therefore labeled as public relations frames. These included

science confusion, process protects, and *technological progress* frames. Proponents of the mine utilized these frames to promote the idea of "safe" mining, and to counter the health risk frames put forward by mine opponents.

The quantitative analysis found that news outlets varied in their ability to filter the misinformation put forward in these counter frames. Before turning to the findings from the analysis of the counter-frames, a review of health risk coverage is necessary.

In the quantitative analysis of frame representation, NGOs appeared to be emergent as prominent science communicators, as they evidenced the highest proportion of news stories that included health risk frames (60%). Of the other two news outlet types, citizen journalists included health risk frames in a greater proportion of their news stories (30%) than did traditional journalists (17%). The frames used to counter-frame health risk, (by promoting the idea that mining is safe), included: science confusion, process protects, and technological progress frames. This study found that the trained journalists in traditional media included proportionately more misinformation frames than health risk frames in their coverage of the mining bill. Science confusion (13%) and promises that the regulatory process would protect the public (process protects, 14%) were found most often in traditional newspapers. Citizen journalists also were less able to filter misinformation, and 13% of the frames that they included in their stories were science confusion frames. Based on prior research (Wise and Brewer, 2010) this inclusion could potentially negate the influence of the health risk frame for the news audience.

Limitations of the Research

While this research has demonstrated the potential of a systematic approach for identifying how social actors gain definitional power in news coverage of policy issues, some

limitations to this approach also emerged. First, while determining frames from analysis of public discourse is a robust method of accurately pairing frames with their sponsors, it is also very time consuming, and omits the politicians who do not appear at public hearings or public meetings. However, the categories established for source and frame collection appear to be sufficiently broad to include the frame and sourcing contributions of these actors when they appear later in news coverage of the policy debate.

A second limitation of the quantitative portion of this study was that the news content collected for analysis included only text news articles from traditional newspapers and the Internet. Text news was specifically chosen because most original news content still originates in text media. However, in the digital age a more robust approach would be to collect news from across the full range of news channels available to the public including television, radio, video and audio coverage on the Internet, and social media stories.

A third limitation is reflected in Chapter 6, in the inclusion of lobbying data. Lobbying data can provide context of the forces at play in the policy debate, and reflect the efforts of varied social actors to influence policy makers. However, to more thoroughly investigate why policy makers favor some positions over others a more intensive investigation into the influence of lobbying activities would be recommended. For example, network analysis of the affiliations of politicians, other key stakeholders, and proximate groups would yield a more nuanced understanding of factors that influence the policies that are made. This approach followed by interviews with select members of each network would make for more robust contextual data.

A fourth limitation of this study is that media analysis was limited to within-group comparisons for news outlets because of the extensive variations in number of news stories generated by each outlet.

Finally, news articles for emergent media were collected from the Internet. Variations in algorithms may influence reliability in data collection for the purposes of replicating this data. It is unclear how this limitation can be eliminated. However, every effort was made to collect every story on the proposed taconite bill over the six-month media attention cycle for the policy debate. This included searching within identified sites for additional material that the Internet may have missed through a keyword search. For those sites that did not have a search option, a manual search of titles was conducted to identify stories on the taconite mine.

Conclusion and Implications

The introductory chapter of this project began with the assertion that the defining issue of our time is situated in how political and social systems negotiate and manage the complex interaction of science, technology, and the environment (Beck, 2009). When combined, the findings from these studies point to the ongoing difficulties of news outlets to meaningfully represent the science of environmental health risk across news outlets. In traditional media, powerful elites predominate as sources for news coverage in newspaper coverage, and both scientists and citizens are under-represented as sources for the news. Economic and deregulatory frames dominated news coverage in this medium. Health risk frames are proportionately the least represented issue. Additionally, the combination of the three misinformation frames rendered them the most prominent in traditional news stories, relative to the other two news outlet types. The misinformation frames promoted the "safety" of the mine, and acted to counter-frame health risk in traditional news articles. If public reaction to these frames were consistent with other health research on framing, (Wise and Brewer, 2010) these counter-frames would negate the efficacy of the health risk frame for readers.

NGOs appear to be emergent in their ability to promote health risk frames in the news,

but were the most limited in the number of stories they produced concerning the mine. While using credible science from national science organizations such as the EPA or the CDC, much like citizen journalists, NGOs utilize relatively few scientists in their news stories. However, science advocates-who often work for, or are members of NGOs have succeeded in becoming the most prominent sources for science quotations in traditional newspapers. Additionally, NGOs were able to lobby politicians for a substantial number of hours promoting issues of environmental risk, and sustainable practices. However, these hours paled in comparison to the hours invested by pro-mining interests, including construction trades, industry, and business organizations.

Finally, citizen journalists play a role in strongly representing citizen voices in the news ecology, in this case primarily citizens who opposed the mine. This focus could offset the bias in traditional news sourcing of elites, should this emergent form of news be able to extend its reach. Interestingly, citizen journalists were the most effective at finding experts to use as sources, including scientists and academics that focus on mining activities as a central part of their research.

Together citizen journalists and NGOs provided a focus on sustainability and procedural justice in the dominant frames that they promoted. Nonetheless, the established credibility and greater reach of traditional newspapers insures that elite actors received a greater voice in the public sphere.

Extant research has identified a potential solution to the issues identified in this study. First, should NGOs and citizen journalists achieve greater reach, their focus on sustainability and the risks of mining could provide the representation of these interests that traditional media do not. In studies of the media ecology in Seattle, Friedland (2014) has identified a news platform in

which traditional newspapers network with smaller outlets provided by citizen journalists. A system similar to that in Wisconsin would promote greater reach for the broader range of stakeholder views represented in news by citizen journalists and NGOs.

Second, Thomas Patterson advocates for "knowledge-based" journalists who would be able to challenge the misinformation disseminated by highly resourced social actors. This approach would call for a restructuring of journalistic education to include not only a mastery of journalistic practices but also a foundational knowledge base in science.

Finally, this research argues for a reevaluation of the journalistic practices of "balance" and sourcing for science communication. Providing opposing accounts of science risk and benefit does not constitute effective science communication. Rather, as Beck (2009) has theorized, and this study has empirically supported, social actors stage favorable definitions of science that then are reported in the news. Without some arbiter of scientific accuracy, the public is left to decode the science, often in line with ideologies (Price, Nir, Capella, 2005; Carvalho, 2007) or limited prior experiences (Bostrom, 1994 Kempton, 1997).

What remains is to gain an understanding of why trained journalists do not access scientists to contextualize these complex issues, and how to better train journalists and science journalists to be aware of the forces that shape their news stories. In a capitalist economic system, when expansionist and free market values are promoted by powerful actors while the science points to a limited supply of environmental resources, who would be better positioned than science journalists to promote a holistic understanding of the science to move the debate towards a sustainable resolution?

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