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Villainous or valiant? Depictions of oil and coal in American fiction and nonfiction narratives

Emily Grubert[a,*], Mark Algee-Hewitt[b]

[a] Emmett Interdisciplinary Program in Environment and Resources, Stanford University, 473 Via Ortega, Y2E2 Building, Suite 226, Stanford, CA 94305, USA
[b] Department of English, Stanford University, 450 Serra Mall, Building 460, Room 201, Stanford, CA 94305, USA

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ABSTRACT

Energy is fundamental to human existence, and its ubiquity has allowed energy to enter cultural consciousness in a manner that is reflected in the stories that we tell ourselves and others. Modern society runs on fossil fuels like oil and coal, two resources that are frequently discussed in part due to their contribution to both positive and negative outcomes. This research uses a digital ecocritical approach to explore a corpus of 60 narratives, both fictional and nonfictional, published between 2002 and 2016 by US authors. We combine text mining methods, including sentiment analysis and topic modeling, with selected manual review of texts to posit that American narratives often depict oil as new and exciting, with associated dangers seen as tragic but thrilling. Appalachian coal, by contrast, is portrayed nostalgically, depicted as a nearly familial presence that has betrayed its communities and no longer represents security and prosperity. Thus, while oil is hypothetical and exciting, coal is real and disappointing. Latent cultural attitudes about these and other resources can provide insights as to how Americans view ongoing deployment of energy infrastructure. Further, understanding cultural context can help direct attention to issues of high significance to communities experiencing energy development.

1. Introduction

Modern industrial energy resources are increasingly visible in our communities, on our landscapes, and in our concerns about environmental quality (see e.g. [1–4]). The effects of using modern fossil fuels are felt as climate change, other forms of pollution, economic growth and contraction, and societal change. The infrastructure of these energy systems is everywhere—from mines, wells, power lines, pipelines, power plants, refineries, and vehicles to the outlets in our homes. The stories that we tell reflect our culture and, whether consciously or not, encode our opinions, thoughts and beliefs [5–7]. Recognizing this chain of influence, we posit that the ubiquity of energy infrastructure in the United States has contributed to the introduction of latent attitudes about energy to written narratives. An analysis of these narratives, then, can reveal information about society's view of resources that continue to be deployed in communities.

This research investigates novels and narrative nonfiction aimed at nonspecialist audiences to explore how contemporary American narratives depict two major fossil energy resources with long histories in the United States: oil and Appalachian coal. We combine digital methods with an ecocritical approach [8], specifically by using resource-oriented texts to "examin[e] the importance of environmental values" [7]. Specifically, we analyze narrative treatment of two fossil fuel energy resources in recent US fiction and nonfiction, focusing on latent assumptions about oil and coal, how depictions of each resource change over the course of a narrative, the role of each resource as character or setting, and the emotional valences of description of oil and coal resources and communities. We add this investigation of how cultural understanding of oil and Appalachian coal is encoded in recent published texts, whether explicitly foregrounded in major plot elements or simply as a texture in the fabric of a narrative, to other work addressing the relationship between energy and cultural attitudes (see e.g. [9] on oil culture and [10] on environmental justice in late 19th/early 20th century novels).

Our corpus consists of 60 texts written by American authors since 2002 (15 each for coal and oil fiction and narrative nonfiction). This geographically and temporally resolved snapshot of conventional energy-related literature enables us to assess common associations with oil and Appalachian coal. Noting the observed historical influence of literature on environmental policy [11], we motivate this work by recognizing that latent assumptions about each resource might affect policy design, implementation, and evaluation in the United States, particularly related to issues like greenhouse gas controls and differential treatment of the oil-dominated transportation sector versus the

* Corresponding author.
E-mail addresses: gruberte@stanford.edu (E. Grubert), malgeehe@stanford.edu (M. Algee-Hewitt).

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coal-dominated electricity sector in the face of climate change.

1.1. The oil corpus

Understanding the recent history of the American oil industry offers a useful context for the contemporary corpus selected for this investigation. In particular, recognizing the importance of high volume, multi-stage hydraulic fracturing of horizontal wells and deepwater offshore drilling to recent US oil production is relevant for understanding the corpus. These two developments have changed the industry rapidly and recently, most notably by substantially expanding US oil production [12]. Neither offshore drilling nor hydraulic fracturing are new in the US: the first US offshore well was drilled in the late 1800s [13], Ch. 12, while hydraulic fracturing in vertical wells began in the late 1940s [14], Ch. 1. However, deployment of these concepts for what is called unconventional production—in deep water and in high volume applications to horizontal wells in tight formations, respectively—has fundamentally altered American oil production. This article speaks to this unconventional application and the changes it has effected on the physical and cultural landscape.

Both hydraulic fracturing and offshore drilling are well represented in the corpus: crucially, each is associated with both economic security and environmental concern. The rapid increase in American oil production during the period represented by the corpus means that the US' dependence on foreign countries for oil has changed substantially from the beginning of the corpus period to the present—a relevant change in a country where the oil crises of the 1970s [15] are still within living memory for many adults. Also, importantly, both hydraulic fracturing and offshore drilling have been matters of public concern and fear. For hydraulic fracturing, this concern has manifested largely in the form of environmental concerns related to water contamination and other issues [16]. Both safety and environmental concerns about offshore drilling were amplified by the dramatic 2010 Gulf of Mexico BP offshore oil spill on the Deepwater Horizon rig after a blowout at the Macondo prospect killed 11 and became one of history's largest oil spills [17,18].

While hydraulic fracturing and offshore drilling emerged in response to the same economic conditions, namely the rise in oil prices starting around 2000 [19], the two technologies are personalized to different degrees. That is, the connection between resource extraction and what it means for an individual is quite different. Hydraulic fracturing has led to a proliferation of wells that are near people, frequently visible, and often associated with individual wealth creation. Those who own land and mineral rights relevant for development often reap large financial rewards, resulting in a phenomenon sometimes called "shaleionaires" referring to situations where individuals suddenly become millionaires from exploitation of oil or natural gas shale resources (for examination of this phenomenon in gas fields, see e.g. [20]). Many concerns are therefore local, including increased traffic, changes to community character, and worry about water and air quality effects [21]. Similarly, communities near offshore drilling activities evidence concerns about issues like oil spills and worker safety [22,23]. Communities with people who work offshore are affected by the rhythms of offshore work, where workers are often gone, then home, for weeks at a time [24,25]. However, offshore drilling results in wells that are far bigger, far more expensive, and far less likely to create financial windfalls for individuals than wells enabled by hydraulic fracturing.

1.2. The coal corpus

In contrast to the recent expansion of oil production in the US, the recent history of Appalachian coal has been one of decline. Appalachian coal production has fallen by about 40% since 2000 [26]. Demand for high quality coal for steelmaking produced a mini-boom in Appalachia in 2008, but this boom was a short-lived precursor to the rapid 30% drop in production observed since 2008. Layoffs and bankruptcies have followed.

Appalachia has a long history with coal, including disputes about land tenure, environmental damage, and labor activism [27–31] and more recent environmental activism such as 2009's Mountain Justice Summer, centered on mountaintop removal coal mining [32,33]. This deeply place-rooted and often activist history is present in cultural memory through heritage designations and reenactments [31]. The long and contentious history of collective action in Appalachian coal communities is an important point of difference with the history of American oil production, where unions and strikes have existed but are much less central to oil's narrative. This difference is perhaps related to oil's shorter global history, US mineral ownership practices, and realities of infrastructure scale that allow individuals to strike out on their own and occasionally succeed; this is something that is not really possible in the coal industry.

In the selected corpus, destruction of place relationships is an overarching theme in coal depictions, focused on two major past-oriented pathways: the disappearance of jobs leading to community decline and the highly visible environmental destruction associated with mountaintop removal. Both are consequence-oriented topics associated with lived experience of economic and environmental harm. Focus areas in individual texts include specific (and usually negative) events, like massacres associated with union busting or the opening or closure of a particular mine. Notably, the ostensibly technology related topic of mountaintop removal mining, a relatively new technique for coal extraction in Appalachia, manifests in the corpus as an environmental justice and social upheaval topic, not as a technological topic. Mountaintop removal texts in the corpus tend to focus on consequences rather than opportunity.

2. Methods

2.1. Corpus selection

The corpus of contemporary American oil- and coal-related texts is nonrandomly selected based on triangulation from compiled libraries of Appalachian fiction, bibliographies of industry narratives, award-winning works addressing oil or Appalachian coal, and texts recently encountered by the authors as part of a broader study of attitude formation in energy communities. This core is supplemented by a broad search of Amazon's Kindle e-book library for narratives whose titles and short descriptions include references to terms like "oil" and "coal": this expands the corpus to include less acclaimed works, including romance novels, self-published works, and others. While the corpus is nonrandomly selected, the size of the corpus was chosen to be sufficiently large that further expansion in all four subcorpora—oil fiction, oil nonfiction, coal fiction, and coal nonfiction—would be challenging given search constraints of publication after 2000 (in practice, the corpus reflects texts published in 2002 and later), US authorship, and narrative format. As text mining techniques are often adept at identifying authorship (e.g. [34–36]), sometimes to the exclusion of other characteristics of the text [37], the corpus was also selected to avoid author replication. Care was taken to ensure that each subcorpus is not dominated by a single genre: for example, thrillers that reference oil are relatively common. Finally, texts were examined to ensure that either coal or oil is important to the overall narrative.

The final corpus includes 60 narrative texts published since 2002 by American authors, divided into four subcorpora of 15 texts each, categorized as American oil-related fiction, American oil-related nonfiction, Appalachian coal-related fiction, and Appalachian coal-related nonfiction (Table S1). Oil-related texts are overall newer than coal-related texts, with the earliest included publication dates in 2006 (nonfiction) and 2008 (fiction) for oil compared with 2004 (nonfiction) and 2002 (fiction) for coal. Four oil texts were published in 2016, versus none for coal. This discrepancy possibly reflects search bias, but