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Regional newspaper coverage of shale gas development across Ohio, New York, and Pennsylvania: Similarities, differences, and lessons

Olivia Ashmoore[a], Darrick Evensen[b,*], Chris Clarke[c], Jennifer Krakower[a], Jeremy Simon[d]

[a] Oberlin College, Department of Environmental Studies, USA
[b] Cardiff University, School of Psychology, Tower Building, 70 Park Place, Cardiff, CF10 3AT, Wales, UK
[c] George Mason University, Department of Communication, USA
[d] Oberlin College, Department of Psychology, USA

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ABSTRACT

In communities experiencing shale gas development, the local media are an important information source on potential impacts of development; their coverage generates and spreads social representations of this issue. We examine representations of natural gas development through a content analysis of six regional newspapers in the northern United States (n = 1,958 articles) – two each in Ohio, New York, and Pennsylvania. Previous research showed similarities between the New York and Pennsylvania newspapers; differences emerged in nearby Ohio's coverage. In Ohio, similar percentages of articles mentioned economic impacts as in Pennsylvania and New York, but significantly fewer articles mentioned environmental or social impacts. Furthermore, valence of economic and social impacts was notably more positive in Ohio. This analysis highlights nuances inherent in regional discourse about shale gas development. In turn, these differences have implications for: (1) how politicians, journalists, activists, and researchers can better communicate about shale gas development, (2) policy/regulation of development, and (3) future research on social representations of emergent forms of energy extraction. We suggest the need, in social science research on energy development, to examine societal-level (not merely individual) influences on perceptions and to account for nuances inherent in regional variation – infrequently manifest in national sample studies.

1. Introduction

> 'Four hostile newspapers are more to be feared than a thousand bayonets.'
> – Napoléon Bonaparte

Shale gas development via high-volume slick-water horizontal hydraulic fracturing (often called simply 'fracking') has recently emerged as a major, controversial issue that permeates everyday conversations globally [1].[1] Notable legislation governing this form of energy extraction has been promulgated in the European Union, several European member states, Canada, and the United States. China, Russia, South Africa, Argentina, Algeria, Australia, and other nations are estimated to have extensive shale gas resources and have been considering large scale development [2]. In the United States, natural gas extracted from shale formations comprised 23% of domestically produced natural gas in 2010; by 2035, it is anticipated to contribute 49% of domestic gas production. Due to substantial shale gas development in the United States since 2007 (and recent authorisation to construct additional liquefied natural gas export capacity), the US expects by 2017 to be a net natural gas exporter [3].

As nations and sub-national entities (e.g., states and provinces responsible for policy on shale gas development) consider whether and how to engage in such development, it is useful to know what information is available to members of the public on this topic. Public perceptions and support/opposition can play a powerful role in shaping what policy options related to shale gas development emerge as viable and, indeed, whether development occurs at all. Whilst understanding content of information sources on shale gas development cannot inform us directly about people's specific

* Corresponding author.
E-mail address: evensend@cardiff.ac.uk (D. Evensen).

[1] *Note:* We use the term 'shale gas development' throughout this article to refer to the set of processes and associated effects that attend this form of energy extraction/development. Whilst no term is perfect, for nuanced discussions of why to avoid use of 'fracking', please see [55,65].

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views on development, content analysis of commonly used information sources can provide a good idea of the topics/issues people may think about when they consider shale gas development [4]. Furthermore, news media are recognised as an important source of information on emerging technologies, of which shale gas development is an example [5–7].

Knowledge of key information sources available to the public on the topic of shale gas development offers insight into how this issue is represented socially, in public discourse. Our research relies on social representations theory, which asserts that representations, particularly on contentious issues, emerge via public discourse and then are internalised within individuals. To the extent that representations of shale gas development are socially-derived (i.e., emerge through processes occurring at the societal-level, rather than through individual cognitions), communal information sources on this topic could be a powerful agenda setting force that shapes conversation on this issue.

Although coverage of shale gas development occurs primarily at the national level in some nations (e.g., the United Kingdom [8]), much information shared on this issue in the US is circulated at a local level. For example, a survey with 1200 respondents from the Marcellus Shale region in NY and PA identified local newspapers (as distinguished from national newspapers) as the single most used source for information on this issue from among fifteen potential sources (including all major forms of mass media, Internet, and communication with family and friends). Fifty-nine percent of respondents reported reading/hearing about this topic 'often' from local newspapers [9]. A second random sample study of 6000 residents in the Marcellus Shale region in NY and PA revealed that mass media (i.e., newspaper, television, and/or radio, but excluding Internet) was the most frequently used source for information on shale gas development [10]. Twice as many respondents indicated that mass media provided 'a great deal of knowledge' on shale gas development, compared to every other information source, save 'neighbors, friends, and relatives'.

Herein, we report and evaluate the results of a content analysis of regional newspaper coverage of shale gas development across three US states that overlay the Marcellus Shale/Utica Shale formations (New York [NY], Ohio [OH], and Pennsylvania [PA]). Through this analysis, we examine social representations (i.e., common sense, as opposed to scientific/technical, portrayals) of shale gas development. Results from the NY and PA content analyses have been reported previously [11]. This research builds upon the previous research by allowing for triangulation between the three states – revealing nuances in representations in regional discourse. Whereas the NY and PA coverage was similar in many ways, in this study we cast light on how coverage from newspapers in two moderately-sized cites in eastern OH differs in meaningful ways from coverage from two newspapers in similarly-sized cities in southern NY and two in northern PA.

Unlike many nations where shale gas development is managed predominantly at a national level and leasing of mineral rights occurs in major deals brokered between industry and the national government, regulation of shale gas development is far more localised in the US. Each state in which shale gas development occurs has different regulations, different localised discourse about the pros and cons of development, and different politics shaping these conversations [12]. Additionally, unlike many other nations, shale gas development has already occurred to a substantial extent in the US; therefore, different experiences with extant development across regions/states may shape the discourse and representations of development uniquely in each area.

1.1. Shale gas development in New York, Pennsylvania, and Ohio

Within the three bordering states in our study, shale gas development began first in Pennsylvania. The boom in leasing commenced in PA in 2006. As of January 2015, 7788 active wells existed in PA [13]. Pennsylvania, particularly the north-eastern and south-western portions of the state, has seen the greatest amount and duration of shale gas development of any state in the north-eastern portion on the US. Much of this focus has been due to the geologic and economic viability of the resource there. The majority of the Marcellus Shale resides underneath PA. Whilst the Utica Shale, which underlies PA, NY, and OH at a greater depth than the Marcellus Shale, is also a viable shale gas play, industry focus has been on the former play at least in this first decade of development (Fig. 1).

Local/regional opposition to shale gas development does exist in PA, but not to the extent that it is manifest in NY. Organised opposition from numerous environmental, public health, and social groups in NY contributed to NY's lengthy environmental and public health review of impacts associated with shale gas development (2009–2015) and the Governor's eventual proclamation, through his state Department of Environmental Conservation, that high volume hydraulic fracturing would not be permitted in NY [14]. Over 200,000 public comments to the Department of Environmental Conservation informed this decision. Despite the eventual ban on shale gas development in NY, much leasing of land to gas companies for potential exploration and development did occur in NY along its southern border in 2008, before high volume hydraulic fracturing was first under a de facto moratorium and then banned.

Ohio first passed legislation governing oil and gas development in 2006 [15]. From the start of unconventional shale gas development through 11 July 2015, the ODNR issued 2018 permits horizontal wells in the Marcellus and Utica Shale formations; 1560 wells were drilled. One notable difference between OH and NY/PA in the myriad processes associated with shale gas development is that Ohio has 202 active Class II underground injection wells, permitted by the US Environmental Protection Agency [16,17]. These wells are used for disposal of brine, flowback, and produced water that comes up the well bore during shale gas extraction. The number of class II wells in OH is far greater than the number of such active wells in NY and PA (e.g., the US EPA reports only seven active class II injection wells in PA [18]. Indeed, much of the wastewater generated in shale gas development in PA is transported to OH for disposal [19]. Virtually all of the active injection wells are located in eastern Ohio. The ODNR and independent scientific research has confirmed that these wells can be and have been responsible for induced seismic events (i.e., human-created earthquakes) [20].

Earthquakes have been increasingly prevalent in OH, particularly in north-eastern portion of the state, in the last few years since shale gas development commenced there. Particularly in the area surrounding Youngstown, OH, several 2.0 magnitude or higher (up to 4.0 magnitude) earthquakes have been recorded and linked by government scientists to disposal of wastewater from gas development [21]. The ODNR has placed restrictions on the process of hydraulic fracturing itself and the injection of wastewater into Class II underground injection wells due to these earthquakes [15].

By many metrics the three states and six sample areas in our study are quite similar. They are all contain small to moderately-sized cities surround by regions with a historical focus on agriculture and/or resource extraction. They have all benefited from an industrial presence that has waned in recent years; they all are struggling economically. These six cities are located in the northern portion of the geographic and cultural region known as Appalachia. They each overlie the same two shale gas formations and are located relatively close to one another (at least by US standards) in the north-eastern portion of the nation; there are no major regional cultural differences between these areas.