



Original research article

Comparing the relationship between knowledge and support for hydraulic fracturing between residents of the United States and the United Kingdom

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ABSTRACT

Our work examines the relationship between knowledge/familiarity with shale gas development in a comparative context. The United States (US) and United Kingdom (UK) represent very different cases of shale gas development, with development relatively mature in the US whilst, no extraction of shale gas has yet commenced in the UK. Comparing results from two national level survey efforts in 2014, we find higher levels of knowledge about the shale gas industry in the UK than in the US, as well as higher levels of support in the US (opposition levels were similar, but US respondents were much less likely than UK respondents to say that they did not know whether they supported or opposed development). With respect to the relationship between knowledge and support, increased knowledge in the UK is associated with increased support, while knowledge was unrelated to support in the US. We anchor these results within the information deficit model of science, suggesting that concentrated media and governance in the UK have played an important role in producing the demonstrated effects.

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1. Background

Our work examines the relationship between knowledge/familiarity with shale gas and attitudes towards shale gas industry development in a comparative context. The United States (US) and United Kingdom (UK) represent very different cases of shale gas development. Shale gas development is a relatively mature industry in the US, with extraction via hydraulic fracturing (“fracking”) occurring in many shale gas plays (e.g., the Marcellus in the Northeast, the Barnett in Texas, the Bakken in North Dakota, and others). In direct contrast, although the UK does produce a small amount of onshore gas from other reservoir rocks, no extraction of shale gas has yet commenced; fewer than ten test wells (9 to be exact) have been drilled to date in the UK (<http://frack-off.org.uk/extreme-energy-fullscreen/>).¹ Despite the lack of actual shale gas development, dialogue about shale gas extraction

has been no less lively in the UK (e.g. [4,11,56] than in the US [14,2],

Much of the conversation about shale gas development in the UK has tended to focus broadly on whether it will obtain positive or negative impacts and why (as opposed to how to *manage* specific aspects of development). This conversation, thus, points to whether development should or should not occur [4,25,52]. In the US, mass media discourse and community conversations often focus more frequently on nuances of how to *deal with* perceived positive and negative outcomes [45,46] of development than on whether to encourage or resist it. Because the evolution of shale gas development is still relatively early, the UK may have a great deal to learn from the US when considering whether and how to approach shale gas development, although several key differences need to be considered that reflect the different contexts in which development is occurring and/or may occur.

There exist important contrasts between the US and the UK that suggest the need for comparative analysis. These contrasts begin with private, dispersed vs. nationally concentrated ownership of mineral rights. In much of the US, rights to subsurface resources are owned by the landowner. Especially in the Northeast US, where private land is relatively more abundant than the west, this means that it is quite common for individual private landowners to own

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¹ The website is for an activist group, but it is the preferred source of information for the government's Department of Energy and Climate Change (DECC) on this topic.

the mineral rights. As such, the potential for individual landowners to potentially profit economically from shale gas development is dramatic (see Kinnaman [27] for a cogent review). This profit potential is especially salient in contexts of persistent rural poverty. ‘Split estates’ (where the current or past landowner has sold the subsurface rights) are also relatively common [1], especially in the South and Midwest. There also has been substantial development on government land—these government bodies then own the mineral rights in these contexts, and may enact additional regulations [35]. This is especially common in the western US, which is proportionately more dominated by public lands.

The situation is comparatively much simpler in the UK: all mineral rights are vested to the Crown: although individual landowners may still receive some revenues from access fees, their potential economic returns are not of the magnitude found in the US. This key difference can affect views of energy development, as landowners in shale gas extracting regions within the US potentially have much to gain through leasing their drilling rights [7], thus potentially polarizing discourse and also resulting in greater framing of the issue in the US of one as potentially enhancing the well-being of rural people and communities in shale gas regions (e.g. [6,10]). While these economic benefits are far from agreed-upon [39,34], the point we wish to emphasize here is that the *potential* for these benefits has affected the discourse surrounding shale gas development [19] in a way that differs from the UK.

This difference in ownership also means that mineral rights are leased in a highly decentralized manner in the US [16,53] with myriad individual landowners (or coalitions of landowners, see Jacquet and Stedman [24] making decisions across time and space. The opposite occurs in the UK, where leasing happens at the national level and is conducted by the government via awarding of licenses covering vast areas. This latter point will be re-engaged below. Accompanying and complementing this decentralized leasing in the US is fragmented governance [58]. In the US, states retain the majority of control over regulation; some have granted municipalities varying levels of oversight over development (e.g., Pennsylvania) while others have retained all governance capacity centrally (e.g., Ohio). In the UK, with the exception of devolved powers to the Scottish Parliament, Parliament in Westminster has the ultimate authority over regulation.²

Governance has further shaped the stage on which shale gas-related discourse has played out. As with ownership and governance, discourse has occurred much more at a national level in the UK compared with the US [11,56]. The plurality and diversity of regulations in the US have fostered much more regionally-centered discourse in areas exposed to development or with the potential for development. Also contributing to this relationship is the nature of the media: the print media in the UK is overwhelmingly national, compared to viable local/regional print media in the US. Coupling this with the potential for rural development impacts of shale gas development has resulted in shale gas emerging as a very salient local/regional issue by local/regional/rural media [14] in the US.

In contrast, Williams et al. [56] suggest that UK institutional actors have helped to create a more centralized discourse “...in which the policy approach is defined through a deficit model of public understanding of science and in which a technical approach to feasibility and safety is deemed as sufficient grounds for good [centralized] policymaking.” They suggest (p. 4) that this “supports a policy story-line in which the sole legitimate barriers to achieving ‘real public support’ are seen to be a failure on the part of the public to recognise the benefits of fracking and to be reassured by institutional commitments to effective risk assessment and man-

agement.” In this vein, Whitmarsh et al. [54] (420) note that “The Royal Society [38] concludes the safety and environmental risks of hydraulic fracturing are low and manageable through best practice and enforcement of UK regulations. They also recommend understanding public acceptability of shale gas extraction and use in the context of energy, environmental and economic policies be considered a priority for UK research.”

In the UK, the science underlying hydraulic fracturing is seen as essentially sound; what is lacking is public recognition, understanding, and acceptance of this well-established, centrally produced science. The implicit (at times explicit) framework here is that greater understanding will promote greater acceptance. Whitmarsh et al. continue, stating that the Royal Society also prioritizes understanding and fostering public acceptability of shale gas extraction and use. Similarly, the International Energy Agency concludes shale gas operators require a ‘social license to operate’ (see also O’Hara et al. [32]). Specifically, one key goal of the UK Office of Unconventional Gas and Oil (OUGO) is to ‘support public engagement’, described as ‘helping people understand the facts about unconventional gas and oil production and what it could mean if it takes place in their area’ [12]. Williams et al. [56] continue (p. 4): “The UK Prime Minister David Cameron adopted this rhetoric when he suggested that ‘[i]f neighbourhoods can see the benefits – and are reassured about its effects on the environment – then I don’t see why fracking shouldn’t receive real public support’ [8]. Cotton et al. [56] note that the combination of central government rhetoric and growing grassroots activism makes shale gas a matter of national public policy debate, and notes Cameron’s emphasis [8] in the Telegraph newspaper, stating: ‘Fracking has become a national debate in Britain—and it’s one that I’m determined to win.’

2. Literature review

Among the myriad comparisons between the US and the UK, which we could address, we focus in particular on the relationship between familiarity/knowledge about shale gas and support/opposition for development of the industry.

2.1. Knowledge and support for shale gas: comparative studies

There is a well-established precedent for exploring the relationship between knowledge and support for shale gas development and how that relationship varies across contexts. Within the North American context, there has been a robust body of work comparing perceptions of shale gas across states/provinces [5,29,30,46] and within states [23,28,49]. Our study in particular builds upon previous work (e.g. [46,6]) that compared views of unconventional gas development across two US states within the Marcellus Shale region: New York, where there remains a statewide ban on drilling, and Pennsylvania, where drilling has been proceeding for a decade or more. The study (a mail survey) focused only on residents within the Marcellus shale region itself. Stedman et al. [46] found (p. 386) “Despite nearly a decade of gas development in the Marcellus Shale region of Pennsylvania and the associated media coverage, respondents from both states generally reported knowing relatively little about the potential impacts of gas drilling. Moreover, the response patterns of Pennsylvania and New York residents did not differ significantly from one another in their self-assessed knowledge.” Respondents in this study also expressed that they knew relatively little about particular elements of development, such as drilling procedures, legal implications of leasing, government regulations, environmental impacts, economic impacts, and other topics. Again, the authors found that Pennsylvania and New York respondents did not differ in their self-assessed knowledge, despite the presumed differences in exposure to the industry. Pennsylvania respondents

² Wales is also seeking authority to self-regulate shale gas development.

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