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Attitudes toward hydraulic fracturing: The opposing forces of political conservatism and basic knowledge about fracking

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ABSTRACT

Hydraulic fracturing has become a contentious issue around the globe. In the present study, using a sample of American adults ($n = 412$), the role of political orientation (conservative vs. liberal) and basic knowledge about fracking on fracking risk perception attitudes, fracking economic attitudes, energy reliance attitudes, trust of energy information sources, and preferred dwelling distance from energy operations was investigated. Basic knowledge about hydraulic fracturing as a possible moderating mechanism was also explored. Correlational and regression results revealed that political ideology and basic fracking knowledge are key predictors of fracking and energy source attitudes, and that the nature of the relation between ideology and fracking risk perceptions, fracking economic attitudes, reliance on natural gas, wind and solar, and distrust of government agencies, are influenced by an individual's basic knowledge about fracking.

1. Introduction

Policies on, and attitudes toward, gas and oil hydraulic fracturing (or fracking) vary considerably from place to place, and person to person ('hydraulic fracturing' and 'fracking' are used interchangeably). On May 15, 2015, for example, Governor Greg Abbot of Texas signed a law prohibiting cities from banning fracking within their boundaries (Malewitz, 2015), arguing that it will help protect private property as well as economic recovery. The states of Maryland and New York, in contrast, have banned fracking (Cama, 2015; Kaplan, 2014), citing environmental and health risks. Germany does not allow fracking within its territory, due to its potential environmental and health risks; the United Kingdom government – highlighting the potential economic benefits of fracking – has lifted a ban on fracking (Smith-Spark and Boulden, 2013; Tost, 2014). With high economic, health, and environmental stakes documented by the opposing sides (see Kester et al., 2015), fracking has become one of the most contentious environmental issues around the globe. Referring to one step in the process of drilling for natural gas from shale rock, hydraulic fracturing involves injecting high-pressure water, sand, and other chemicals into the rock to 'fracture' it and release natural gas (or shale gas). According to the Environmental and Energy Study Institute, there are two main types of fracking or drilling techniques: Vertical and horizontal. Vertical, or conventional fracking techniques, refers to in-depth drilling. Horizontal fracking or drilling, representing a more recent technique, allows drilling to take place laterally. While horizontal fracking covers a larger territory by conducting high volume fracking, it also uses "70–300 times more fluid than previous methods" (see e.g., Considine et al., 2010; U.S. Energy Information Administration (E.I.A.), 2012). Although fracking has been used since the late 1940s, its prevalence around the globe has risen dramatically with drilling sites being constructed increasingly closer to people's dwellings (see Adgate et al., 2014; U.S. Energy Information Administration (E.I.A.), 2015; Gold and McGinty, 2013; Witter et al., 2013). These changes in fracking prevalence, proximity, and technology have prompted research on fracking outcomes and public opinion of fracking.

Mirroring this polarity of consequences, public opinion is also mixed, with some researchers noting an ideological divide (see Kester et al., 2015). What affects public opinion about fracking, however, is largely unknown. For example, it is possible that political conservatives and liberals possess different degrees of knowledge about fracking (as they do, for example, about health care, Gross et al., 2013) or hold divergent risk perspectives on the practice. Further, knowledge about fracking might also affect the

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influence of political ideology on attitudes. To address these important questions, we investigated the relations between political ideology and basic knowledge about fracking with: fracking attitudes, trust in authorities, and preferences for reliance on and desired dwelling distance from various energy sources.

1.1. Benefits and drawbacks of hydraulic fracturing and other energy sources

Harvesting unconventional oil and natural gas (UNC) comprises several steps from well-development to production. Hydraulic fracturing is one step in this larger process. Recently, in an extensive review of over 100 studies published in the last decade, Sovacool (2014) identified the main benefits and drawbacks of hydraulic fracturing. In his review he noted that hydraulic fracturing used to extract shale gas is associated with many negative outcomes including high financial costs to operate, accidents and leakage, negative environmental impact such as water, air, and radiation pollution that affect peoples' health and climate change, reducing reliance on renewable energy sources because of shale gas' comparatively low cost, inciting resistance from a concerned public, heightening risk of earthquakes, and economic instability because of a multitude of factors (e.g., substantial production costs for quickly depleting wells, etc.). Shale gas, however, also offers energy supply security, is less costly to produce and cheaper for consumers, has less of a negative impact on the environment than oil and coal, and presents several economic benefits (e.g., jobs, taxes) (see Sovacool, 2014; Table 8 for a summary; for additional studies and reviews on the effects of hydraulic fracturing see Adgate et al., 2014; Bamberger and Oswald, 2012; Considine et al., 2010; IHS, 2012; Rabinowitz et al., 2015; Webb et al., 2014; Witter et al., 2013).

Other sources of energy – whether traditional or more recent – also have benefits and drawbacks. Coal and oil, for example, have large and diverse economic benefits (National Mining Association, 2014), but have been criticized for posing serious health and environmental risks (Aneja et al., 2012; Fernandez-Navarro et al., 2012; Hendryx et al., 2008; Hendryx, 2013). Nuclear energy also has economic advantages (Nuclear Energy Institute (NEI), 2014), but many people remain concerned about its potential health and environmental costs, especially in the wake of the accident in Fukushima, Japan (Butler et al., 2011). Renewable energy sources – such as wind – do not have (at least at present) the economic benefits that oil or gas can offer (Adgate et al., 2014; Sovacool, 2014), but comparatively speaking, these methods confer reduced environmental and health risks (Ontario Ministry of Health and long-Term Care, 2010; Knopper et al., 2014; McCunney et al., 2014).

In summary, traditional and renewable energy sources pose benefits and drawbacks in terms of economic, social, health, and environmental impacts. While the present study focuses primarily on fracking, the relations between political ideology and attitudes towards other sources of energy are also examined.

1.2. An ideological divide? Predicting attitudes toward energy sources

Energy source attitudes are intimately connected to people's politics (Boudet et al., 2014; Davis and Fisk, 2014; Karlstrøm and Ryghaug, 2014; Kovacs et al., 2010; O'Hara et al., 2014; see Kester et al., 2015 for a discussion). 'Politics' encompasses people's political ideologies (i.e., political attitudes and beliefs), political identification (i.e., politically liberal or political conservative), and party affiliation (e.g., Democrat, Republican, Independent). Fundamentally, political conservatives are resistant to social change, preferring tradition; in contrast, political liberals prefer social change (Jost et al., 2008, 2003). These core ideological differences are evident in partisan divides related to energy sources in the U.S. According to a Pew Research Centre poll in 2011, for instance, 83% of liberal-leaning (vs. 53% of conservative-leaning) Americans favoured contributing more funding to research on alternative and newer sources of energy like wind, solar, and hydrogen. Conversely, 78% and 54% of conservative-leaning Americans (vs. 46% and 30% of liberal-leaning Americans) favoured traditional sources of energy like mining and drilling, and nuclear power, respectively. Hence, consistent with core ideological differences, liberals are more likely to support comparatively novel, less familiar renewable energy sources, consistent with their inclination for social change. Conservatives, on the other hand, tend to be opposed to newer technologies, preferring conventional energy technologies, consistent with their inclination for the status quo.

Public opinion on hydraulic fracturing is similarly apportioned along ideological lines. In a nationally representative sample, Boudet et al. (2014) noted that identifying as politically conservative (vs. liberal) predicted greater support for hydraulic fracturing. Davis and Fisk (2014) likewise found that identifying as Republican related to support of hydraulic fracturing. Further, a recent survey by the PEW Research Centre in November 2014 revealed that 62% of Republicans (vs. 29% of Democrats) supported increased fracking. Thus, political liberals predominantly hold unfavourable attitudes toward fracking whereas conservatives' attitudes are favourable (see also O'Hara et al., 2014; Kester et al., 2015 for a discussion). It is important to note that much of the research on politics and fracking attitudes has relied on single-item measures of support or opposition to fracking (e.g., Boudet et al., 2014) rather than comprehensive and nuanced indices of fracking attitudes, such as risk perceptions of fracking. Therefore, in the present research, we utilise a comprehensive multi-item measure of fracking attitudes.

Peoples' energy source opinions are likely connected to information they have gathered, with some information being deemed trustworthy and other information untrustworthy. Assessments of trust are related to political ideology. Political conservatives have become less trusting of scientists over time, whereas liberals' trust of scientists has remained constant (Gauchat, 2012). Trust of the government is dependent on who is in power; people are more likely to trust the government if the party they support is in power, but less likely if the party they do not support is in power (Keele, 2005). As an example, with respect to energy specific information, Michaud et al. (2008) reported that Republicans were less likely than Democrats to believe that contact with raw petrol poses health risks, and less likely to believe environmental scientists claiming that drilling is risky; conversely, Democrats (vs. Republicans) were less likely to believe claims from the oil industry. These findings are aligned with earlier work showing that a key feature of political conservatism is a "... central importance of business and industry in society" (Kerlinger, 1984, p. 17). One would expect, therefore, that conservatives would exhibit high trust in the industry, and diminished trust in government agencies and public institutions (universities); liberals, in contrast, should manifest counter trends: Exhibiting high trust of government and public institutions, and limited trust of industry.

1.3. Risk perception

One aspect of attitudes towards fracking is risk perception, that is, how risky one perceives hydraulic fracturing to be. Researchers (e.g., Hanoch et al., 2006; Slovic, 1987) have argued that risk perception is a key factor in willingness to engage in a wide spectrum of behaviours. Investigators, for instance, have reported