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The Power Behind the Controversy: Understanding Local Policy Elites' Perceptions on the Benefits and Risks Associated with High Voltage Power Line Installation in the State of Arkansas

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Abstract

Following a proposal for the installation of high voltage power lines in northwest Arkansas, a controversial policy debate emerged. Proponents of the transmission line argue that such an installation is inevitable and necessary to efficiently and reliably support the identified electric load in the region. Opponents claim that the lines will degrade the natural environment and hamper the tourism-based local economy in affected regions, notably in Ozark Mountain areas. This study seeks to understand how local policy elites perceive the benefits and risks associated with proposed transmission lines, which is a critical step in comprehending the formation and changes of related government policies. First, based upon the dual process theory of judgment, this study systematically investigates the triadic relationships between (a) more profound personal value predispositions, (b) affects and feelings, and (c) perceived benefits and risks related to the proposed installation of high voltage power lines among local policy elites in the state of Arkansas. Next, this study focuses more specifically on the role of value predispositions, specific emotional dimensions of affect heuristics, and perceptions pertaining to high voltage power line risks and benefits. Using original data collected from a statewide Internet survey of 420 local leaders and key policymakers about their opinions on the related issues, other factors claimed by previous literature, including trust, knowledge level, and demographic characteristics are considered. Analytical results suggest that grid-group cultural predispositions, as deeply held core values within local policy elites' individual belief systems, both directly and indirectly – through affective feelings – shape perceived utility associated with the installation of high voltage power lines. Recognizing that risk perceptions factor into policy decisions, some practical considerations for better designing policy addressing controversial issues of this nature.

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Dedication

I dedicate this work to my amazing family who has lovingly supported me through this process. I am thankful for Annamarie Prevatte, who takes time to explore ideas and provides me with inspiring and creative outlets when I need those most and for Andrew Collins for checking on me regularly and reminding me that the pursuit of knowledge is worthwhile and commendable. I also want to thank Nick Bower and my parents, Jeff and Amy Robinson and Paul and Kay Moyer, for carving out brief but valuable moments together when time was limited.

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I. Introduction

A. Introduction to Electric Transmission and Controversial High Voltage Power Lines

Whether attempting to explain policy choices or proposing new approaches to policy making, perceptions of risk, and particularly those of policy elites[1], are important to understand; as such perceptions have the potential to influence future policy decisions, actions, and the greater sociopolitical context of policymaking practices. In the milieu of the political controversy embedded into energy policymaking process, particularly with regard to the issues surrounding expansion of the electric power supply infrastructure, this study seeks to understand how values and emotions may influence local policy elites' perceptions of the benefits and risks associated with high voltage power line (HVPL) installations in Arkansas. A brief introduction to the complex system of electricity delivery is helpful in comprehending the various implications of controversy over HVPL installations.

Because electricity cannot be stored, delivery based upon demand is managed by a complex network of electric grids known collectively as the national energy grid that are carefully coordinated by the North American Electric Reliability Corporation (NERC) and overseen by the Federal Energy Regulatory Commission (FERC) and the U.S. Department of

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[1] Skrentny (2006) defines "policy elites" as "state actors with some influence over the direction, shape, and timing of policy making" (p. 1765). Several other studies utilize this term "policy elites" under the implicit assumption of shared scholarly understanding, while not providing any explicit conceptual definition (See, for instance, Cook (Cook, Barabas, & Page, 2002), Liu (Liu, Lindquist, Vedlitz, & Vincent, 2010a) and Jenkins-Smith (Jenkins-Smith, Silva, Gupta, & Ripberger, 2014)). Based upon Skrentny's definition and the implicit usages employed in other research, we refer to "policy elites" as policy actors who hold various political resources to be utilized to exert potential influence in various phases of policy process, including agenda setting, policy analysis, policy formulation, policy implementation, and policy feedback. Accordingly, "local policy elites" are referred to as those policy elites who are potentially involved in various phases of policy process at the local level, including city mayors, city council members, city clerks, city government officials, chamber of commerce members, etc.

Energy in the United States (Bosselman, Eisen, Rossi, Spence, & Weaver, 2010). Interruptions in electrical power result in significant economic loss. Severe weather poses the largest threat to reliable power ("Economic Benefits of Increasing Electric Grid Resilience to Weather Outages," 2013). Nearly 700 widespread power outages due to severe weather occurred between 2003 and 2012. Loss of power due to severe weather closes schools and businesses, impedes necessary services and even contributes to loss of life which amount to between $18 and $33 billion every year while more significant weather events like Hurricane Sandy (2012) are estimated to cost closer to $52 billion ("Economic Benefits of Increasing Electric Grid Resilience to Weather Outages," 2013). The consequences of climate change is expected to increase the frequency and intensity of weather related events in the near future rendering the security and reliability of the national energy grid a national priority ("Economic Benefits of Increasing Electric Grid Resilience to Weather Outages," 2013).

In addition to the threat of severe weather, the aging of the national energy grid increases the chances of power interruptions, delays, and cascading power failures. The nation's HVPLs are more than 25 years old and, dissipating more energy, constrains electric supply during periods of demand (Fesmire, 2007). The installation of additional HVPLs will increase the capacity of electric transmission and create flexibility allowing electric to be rerouted around compromised areas of the national energy grid ("Economic Benefits of Increasing Electric Grid Resilience to Weather Outages," 2013).

With the stability of the national energy grid dependent to some extent on the installation of HVPLs, controversy surrounding their installation poses a significant economic threat. At the state and local level, controversy in regions where new HVPLs have been planned, impede upgrades. Just such a controversy erupted in Arkansas in 2013 when an application filed with the

Arkansas Public Service Commission for a Certificate of Environmental Compatibility and Public Need ("Arkansas Public Service Commission Docket 13-041-U," 2013) sparked a controversial policy debate resulting in delays to planned HVPL installation, proposed legislation aimed at restricting the placement of future lines in the state of Arkansas, and eventually complete withdraw of the application for installation.[2]

B. Defining Elements of the Controversy in the State of Arkansas

This inquiry begins by presenting the facts surrounding the debate and defining the variations in perceptions as expressed in the public record. The Southwest Power Pool (SPP) is the NERC's regional entity for the southwest United States and includes Arkansas, Kansas, Louisiana, Mississippi, Missouri, Nebraska, New Mexico, Oklahoma, and Texas. The SPP operates 370,000 miles of service territory and over 48,000 miles of transmission lines to serve more than 15 million people ("Southwest Power Pool Strategic Plan," 2010). In 2008, SPP mandated the installation of a 48 mile 345 kV transmission line for northwest Arkansas, part of an $8.1 billion planned upgrade to the grid for the 2000-2011 planning cycle ("Southwest Power Pool Strategic Plan," 2010). Proponents argue that HVPL installation is inevitable to efficiently and reliably support the identified electric load in the region, while opponents emphasize the risks associated with the installation, claiming that the lines will degrade the natural environment and hamper the tourism-based local economy in the Ozark mountain area and impose alleged negative impacts on human health.

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[2] It is noteworthy that similar disputes over HVPLs have emerged in other areas of the United States. The Susquehanna-Roseland project in New Jersey, Dominion Power-James River project in Virginia, Rock Island Clean Line project in Iowa, Luzerne–Wayne project in Pennsylvania, Palo Verde-Devers project in Arizona and California, Lassen County-Santa Clara project in California, Northern Pass project in New Hampshire and Canada, and the Fredericksburg-Lampasas project in Texas are a few of the controversies that have made headlines since 2009.

The debate surrounding proposed HVPL installation in Arkansas highlights the perceived benefits and risks at both the collective and individual levels. At the collective level, an updated national energy grid, part of the continental energy network, is important to national security and the national economy. Smaller regional energy grid networks provide energy to the businesses and residences of several states that affect millions of people. On the other hand, large-scale environmental changes to accommodate new and upgraded lines may threaten national parks and regional and local industries, especially when local economy is based on tourism. Another concern is related to large-scale health risks derived from the use of pesticide to clear trees and plants surrounding power lines, which can result in contamination of sources of groundwater and drinking water. At the individual level, a reliable energy supply provides expected convenience and is necessary to support existing lifestyles and economic benefits, but the resulting infrastructure can lower individual property values and emit electromagnetic fields (EMFs), exposing individuals in proximity of HVPLs. As such, individuals' perceived utility relating to HVPLs may vary with their perceptions of the associated benefits and risks.

The various aspects of these benefits and risks are reflected in the recent policy debate on the proposed HVPL installation in Arkansas. In 2013, the Southwest Power Pool, for instance, claimed that proposed benefits of HVPL installation in the Ozark Mountain area include a stable and reliable energy supply that reduces the cost of brownouts and blackouts or loss of power due to supply interruption and cuts the cost of generation through efficient transmission ("Transmission Planning," n.d.). The SPP further argued that the HVPL installation is proposed to provide new economic opportunities, create jobs, connect future renewable energy sources to the national grid, and use land efficiently ("Transmission Planning," n.d.). By contrast, publically expressed concerns associated with the proposed HVPL installation in Arkansas include

"impacts to wildlife, possible groundwater pollution if herbicides are used to keep power lines clear, visual pollution and decreased property values" as well as degradation of the scenic beauty that supports northwest Arkansas' tourism-based economy and alleged health risks associated with EMF exposure (Gillette, 2013).

C. Literature Review: Setting a Theoretical Framework
Theoretical traditions in the risk perception literature provide a framework for explaining the individual's variation in perceived benefits and risks associated with the HVPL, which provides direct application in understanding related perceptual differences among local policy elites in the state of Arkansas, a primary concern of this research. Previous studies have identified various factors that influence the benefit-risk perceptions across a multitude of risk domains, including psychometric characteristics of risk (Slovic, 1987), individual demographic characteristics (Flynn, Slovic, & Mertz, 1994), level of knowledge on a risk (or on the source of a risk) (Michael Siegrist & Cvetkovich, 2000), level of trust toward the sources of the information relevant to a risk (Michael Siegrist, Cvetkovich, & Roth, 2000), cognitive heuristics, such as affect or feelings (Kahneman, 2003; J. Lerner & Keltner, 2001; Slovic, Finucane, Peters, & MacGregor, 2004, 2007; Tversky & Kahneman, 1974), and values, notably cultural predispositions (Douglas & Wildavsky, 1982). In the sections that follow, these theoretical approaches are introduced. Relevant to understanding Arkansas local policy elites' HVPL benefit-risk perceptions, the theoretical postulations introduced are centered around the triadic relationship between intrinsic value predispositions, general affective feelings and specific emotions, and HVPL benefit-risk perceptions, based upon dual process theory of judgment (Kahneman, 2003; Slovic et al., 2004).

Demographics, Knowledge and Trust

Previous research suggests that individuals' demographic characteristics, notably gender and race, can influence their risk perceptions. Known as "white male effect," some studies report that males perceive consistently lower levels of risk associated with environmental health threats than females (Flynn et al., 1994), and white individuals tend to indicate lower levels of risk than non-white individuals across a variety of risk domains (Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000). The gender difference in risk perceptions is not confined to the judgment among the general public. When examining scientists, who are generally assumed to hold a relatively sophisticated level of scientific knowledge and expertise, (Barke, Jenkins-Smith, & Slovic, 1997) findings show male scientists' perceived nuclear risk is substantially lower than female scientists'. One of the explanations for these empirical findings is that, in comparison with their counterparts, "white males" (in the United States context) share a unique value identity rooted on individualism and hierarchism, which translates into risk-taking attitudes when assessing potential benefits and risks of the utilization of science and technology in a way that reinforces their own philosophical convictions of being more positive about the resilience of the ecological system while advocating market-oriented entrepreneurship (Kahan, Jenkins-Smith, & Braman, 2010). Likewise, when examining local policy elites' personal assessment of benefits and risks regarding the HVPL installations in the state of Arkansas, one would expect to find discernible variations in the manner in which such an assessment is made among individuals of varying demographic characteristics.

Another theoretical perspective comes from the assertion that individuals' levels of knowledge regarding subtleties of the sources of risk and danger are essential to understanding why people perceive related benefits and risks differently, as well explained by Wildavsky and Dake (Wildavsky & Dake, 1990). The main thesis of this claim, the so-called "knowledge theory

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of risk perception," is that those who are more knowledgeable about potential hazards can make informed judgments and evaluate related risks and threats more objectively and accurately in most cases, when compared to those who are less knowledgeable. This "knowledge thesis" has been systematically investigated by previous studies that mainly discuss the variations of risk perceptions between "experts" vs. "lay public", where the former is generally assumed to be more knowledgeable than the latter. The empirical findings rooted on this knowledge thesis, however, show mixed results. Some studies found that there exist significant differences in risk assessment between "experts" and "lay public" across various risk domains, including chemicals (Kraus, Malmfors, & Slovic, 1992), biotechnology (Savadori et al., 2004), and nanotechnology (Michael Siegrist, Cousin, Kastenholz, & Wiek, 2007a). Other studies, by contrast, claim that there is little evidence to support the argument that experts' risk judgment is different from lay peoples', a conclusion derived from the examination of several earlier empirical studies that are suspected to suffer some methodological validity issues (Rowe & Wright, 2001). As such, individuals' level of knowledge on state energy issues may be a contributing factor in explicating variations in the HVPL benefit-risk judgments among Arkansas local policy elites.

Trust has also been reported to influence public responses to various technological risks (Michael Siegrist, 2000; Michael Siegrist, Cousin, Kastenholz, & Wiek, 2007b) especially when individuals do not retain sufficient resources necessary to make informed decisions (Michael Siegrist et al., 2000). Conceived as social trust, Siegrist et al. (Michael Siegrist, Gutscher, & Earle, 2005) broadly define individuals' trust as their "willingness to rely on those who have the responsibility for making decisions and taking actions related to the management of technology, the environment … or other realms of public health and safety" (Michael Siegrist et al., 2000, p. 354). Siegrist and Cvetkovich (M. Siegrist & Cvetkovich, 2000) further argue that the role of

trust in risk perceptions is often concomitant to the level of knowledge and found that there are significant correlations between social trust and judgments of risk when individuals possess little knowledge about the sources of risk but found no correlation when individuals hold sufficient knowledge. Considering the uncertainties and complexities involved with matters related to energy issues, particularly those surrounding HVPLs, understanding the degree to which Arkansas local policy elites are willing to rely upon and regard as trustworthy the policy-relevant information provided by the scientific community when seeking a proper characterization of HVPL-related issues and making informed policy decisions is of critical importance in applying this conceptual characterization of trust in explicating benefit-risk perceptions in this context.

Previous studies discuss various aspects of HVPL risks ranging from EMF exposure (MacGregor, Slovic, & Morgan, 1994; Morgan et al., 1985) to effects on property valuation (Sims & Dent, 2005) to the resulting stigma's impact on health policy (Gregory, Slovic, & Flynn, 1996; Kleinerman et al., 2000). With particular regards to the potential health risks associated with HVPLs, much previous research, for instance, suggests that there is no scientific evidence that verifies the relationship between exposure to EMFs from HVPLs and childhood leukemia (Kleinerman et al., 2000) or breast cancer in women (Davis, Mirick, & Stevens, 2002). Accordingly, one can suspect (*ceteris paribus*) that those Arkansas local policy elites who tend to trust information provided by scientists and academics would perceive lower levels of potential health risks and, therefore, perceive more benefits than risks when judging the overall utility of HVPL installations when compared to those who do not trust this information source.

Dual System Processing
While aforementioned risk perception studies imply cognitive based models that focus on demographic characteristics, knowledge, and trust, the dual process theory of judgment more explicitly explains cognitive function that is both intuitive and deliberate, which is suited to

explain differences in judgments under conditions of uncertainty (Kahneman, 2003). The

essential claim of the dual process theory is that individual judgment is consequentially related to

two modes of mental processing, "experiential" system and "analytic" system (Slovic et al.,

2004). The mental processes of the former system of cognition, also called "System One," are

usually "fast, automatic, effortless, associative, implicit (not available to introspection), and often

emotionally charged", whereas the latter system of cognition, also known as "System Two,"

engages the mental processes that are "slower, serial, effortful, and more likely to be consciously

monitored and deliberately controlled" (Kahneman, 2003, p. 697). This research assumes that

local policy elites' judgment is defined by dual process theory.

<u>Affective Feelings and Specific Affective Emotions</u>
Affect based reactions used by the experiential (Slovic et al., 2004) or intuitive System One

mode (Kahneman, 2003) are based in emotions and feelings which form the core of an attitude,

becoming the main determinant of many judgments and behaviors (Kahneman, Ritov, Schkade,

Sherman, & Varian, 2000). Affective feelings possess a "positive" or "negative" quality and

affective reactions are often the first reactions to uncertainty, "serving as orienting mechanisms

helping us to navigate quickly, efficiently through a complex, uncertain, and sometimes

dangerous world" (Slovic et al., 2004, p. 312). Functioning as a heuristic, they "often arise prior

to cognition and play a crucial role in subsequent rational thought" (Leiserowitz, 2006, p. 47).

Previous studies have found that affect influences judgment in direct and unexpected ways.

When information is provided under time pressure to evoke affective evaluation, benefit and risk

perceptions are influenced inversely (Finucane, Alhakami, Slovic, & Johnson, 2000). This

inverse relationship means that a comprehensive understanding of individuals' risk perceptions

must consider both perceived benefits and risks.

A growing body of research suggests that valence only-based approaches (positive feelings versus negative feelings) to investigating the influence of affect on decision making and judgment fails to capture the nuanced distinctions that specific emotions hold (Finucane, Alhakami, et al., 2000; J. S. Lerner, Gonzalez, Small, & Fischhoff, 2003; J. S. Lerner & Keltner, 2000; G. F. Loewenstein, Weber, Hsee, & Welch, 2001; G. Loewenstein & Lerner, 2003). Research based in appraisal-tendency theory suggest that judgments resulting from affective emotions with similar negative valance on the sources of risk, such as fear and anger, can generate subtly different perceptional responses (J. Lerner & Keltner, 2001; J. S. Lerner et al., 2003; J. S. Lerner & Keltner, 2000) by systematically shaping perceptions that agree with underlying appraisal structures (J. S. Lerner & Keltner, 2000). Fear can raise and evoke "appraisals of uncertainty and situational control" (J. S. Lerner et al., 2003, p. 144) intensifying the perceived threat resulting in more pessimistic assessments of risk (J. Lerner & Keltner, 2001; J. S. Lerner et al., 2003). Anger, associated with "appraisals of certainty and individual control" (J. S. Lerner et al., 2003, p. 144) produce more optimistic assessments of risk actually reducing feelings of threat (J. Lerner & Keltner, 2001).

Another interesting aspect of the relationship between affect and judgment is revealed as even the most prevalent emotions of fear and anger have been found to have less pronounced influence in collectivist cultures when compared to individualistic cultures (Suh, Diener, Oishi, & Triandis, 1998). It seems that a cultural foundation is at least partially responsible for the relationships between affect and perceptions of risk and benefit (Song, Silva, & Jenkins-Smith, 2014). As such, grid-group cultural theory (Douglas & Wildavsky, 1982) is used to explain the variations in benefit-risk perceptions among Arkansas local policy elites.

<u>Value Predispositions and Grid-Group Cultural Theory</u>

Grid-group cultural theory (CT) of risk perception is based on the original work of Mary

Douglas, a social anthropologist who studied culture by analyzing social choices surrounding

social conflict and public debate (Douglas, 2002). Related to its beginnings in anthropology, the

idea of social constructions has been applied to explaining individual variation in perceptions of

various risks (Jenkins-Smith, Silva, Gupta, & Ripberger, 2014; Jones & Song, 2014a; Ripberger,

Song, Nowlin, Jones, & Jenkins-Smith, 2012; Song et al., 2014). CT suggests that cultural values

or "cultural biases" are shared through "social relations" to support socially constructed systems

or "ways of life" that reflect general attitudes and worldviews (Thompson, Ellis, & Wildavsky,

1990). Such biases influence individuals' behavior and guide "selective attention to risk and

preferences among different types of risk taking" (Thompson et al., 1990, p. 62). Organized

based upon the extent to which individuals follow an "explicit set of institutionalized

classifications" (grid) and the extent to which individuals are bound to their social "group"

(Thompson et al., 1990, p. 6), four primary "cultural worldviews" (i.e., egalitarianism,

individualism, hierarchism, and fatalism) form an ideal typology.

CT suggests that the diversity of cultural biases which structure the four primary cultural

worldviews function together as a system. Each worldview is "contradistinct" to the others

allowing individuals of one worldview to rely on the distinctions in other worldviews to

reinforce their own cultural biases (Thompson et al., 1990, p. 98). This results in individuals with

unique worldviews each identifying distinct risks that threaten their way of life. This dynamic

imbalance forms a critical system that maintains long term stability (Douglas & Wildavsky,

1982) where a system "in which ways of life are nicely balanced is less prone to being surprised

and will have a wider repertoire to draw from in responding to novel situations" (Thompson et

al., 1990, p. 96).

Prototypical egalitarians are strongly bound to their social group but lack differentiation in their roles within the group (low grid-high group). Fairness and equitable distribution are highly valued. Egalitarians tend to experience high levels of risk particularly when it involves "technological development and economic growth" and distrust authority which reinforces group cohesion (Thompson et al., 1990, p. 6). Prototypical individualists are bound by neither rules nor social groups (low grid-low group) and often see "risk as opportunity" with preferences for a libertarian society (Thompson et al., 1990, p. 7). Individualists are exempted from external control and tend to believe that the best path for society is to allow everyone, even the disadvantaged, to compete, succeed, and fail as individuals. Prototypical hierarchs value social order maintained through institutional and social rules (high grid-high group). High levels of risk are often acceptable but reliance is placed on experts to set the right course for society. Loyalty, clear rules, and clearly defined positions and responsibilities are valued. Hierarchs tend to believe that success is attainable by following authority and those who would break the rules should suffer strong, swift punishment. Prototypical fatalists are excluded from social groups yet bound by social constructs (high grid-low group). With little individual autonomy, fatalists see themselves as at the mercy of fate and tend to be skeptical about their own ability to control the situations they face.

The resulting elaborate interrelationships between these different cultural worldviews form a "behind-the-scenes" economic system where wealth creation is the focus of hierarchs and individualists while egalitarians value equal economic distribution (Thompson et al., 1990, p. 61). CT suggests that each worldview supports distinct ideas regarding nature, as well. Egalitarians postulate that nature is fragile and easily damaged, believing that it must be managed carefully to avoid complete collapse which means experimentation is generally

forbidden. Individualists believe nature maintains equilibrium that minimizes the need for

management and allows pursuit of the "best possible" outcomes, even if trial and error are

required. Hierarchs subscribe to a view of nature as robust, tolerant and quite forgiving, but

maintain that strict regulation is required to guard against the occasional event that upsets natural

equilibrium. Hierarchs desire certainty and predictability "generated by experts" (Thompson et

al., 1990, p. 27). Fatalists subscribe to a view of nature that is capricious wherein everything

depends upon chance.

D. Research Focus

The goal of this research is explain the variation in local policy elites' perceptions of utility

associated with HVPL installation. The first step in this inquiry investigates the triadic

relationship between (a) culturally biased value predispositions, (b) general affective feelings,

and (c) perceived benefits and risks associated with HVPL installations for policy elites in the

state of Arkansas. Next, a deeper look at the relationship between (a) value predispositions, (b)

specific emotional dimensions of affect heuristics and (c) perceptions of benefits and risks

explores potential causal mechanisms at work. The perceptions of local policy elites is of

particular interest and holds unique value for comprehending the formation and changes of

related government policies due to their knowledge of, and potential influence over, related

policies (Zaller, 1992) and policymaking process (Liu, Lindquist, Vedlitz, & Vincent, 2010b).

A theoretical framework was relied on to guide the inquiries, discussions and conjectures

presented here. Theory also informed the variables and measures chosen and analytical strategies

taken. Both steps of the inquiry uses original data collected from a 2013 statewide Internet

survey of 420 local leaders and key policymakers in Arkansas. Presentation and interpretation of

analytical results focuses on testing the hypotheses posed. Conclusions offer some practical and

theoretical implications of this research that may contribute to better policies aimed at addressing

controversial issues of this nature and offer to build upon the existing body of risk perception research.

II. Research Data, Variables, and Measures

A. Survey Data

An anonymous statewide Internet survey of 420 local policy elites was conducted in the state of Arkansas between March and August 2014. The survey was originally distributed to approximately 2,471 potential survey participants including city leaders, key policy makers, and Chamber of Commerce members in more than 50 major cities[3] in the state of Arkansas including areas near the proposed routes of installation for HVPL. Potential survey participants received an invitation email with a brief description of the survey and an embedded survey link to take the voluntary survey constructed of 36 substantive questions and approved by the university Institutional Review Board. Some policy elites may have received a personal invitation from a recognized community leader asking for their participation. Survey questions generally focused on Arkansas energy policy issues regarding HVPL installations and city level sustainable energy measures as well as cultural worldviews, affective feelings, knowledge on Arkansas energy issues, trust on information sources, and some standard demographic characteristics, which will be elaborated in the following sections.

Policy Elites

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[3] These include Little Rock, Fort Smith, Fayetteville, Springdale, Jonesboro, North Little Rock, Conway, Rodgers, Pine Bluffs, Bentonville, Hot Springs, Benton, Texarkana, Sherwood, Jacksonville, Russellville, Bella Vista, Cabot, Van Buren, Maumelle, Siloam Springs, Harrison, Magnolia, Arkadelphia, Batesville, Hope, Greenwood, Osceola, Lowell, Beebe, Morrilton, De Queen, Farmington, Alma, Berryville, Walnut Ridge, Pea Ridge, Dardanelle, Ashdown, Dumas, Cherokee village, Gentry, Tontitown, Huntsville, West Fork, Mayflower, Carlisle, Centerton, Greenland, Elkins, and Eureka Springs.

Out of 420 survey participants who started the survey, a total of 374 respondents completed the survey. Table 1 shows descriptive statistics and frequency distributions of the relevant variables. used for the analysis that follows. On average, respondents were 54 years old with an estimated annual household income of between $70,000 and $80,000. Respondents were predominately White Caucasian (92%) and male (65%), and held a college (or higher) education (74%).

Table 1 Frequency Table of Policy Elite Survey Respondents (Moyer & Song, 2014)

Variable	n		Category (%)	
Affect	337	Neutral (19%)	Positive affect (30%)	Negative affect (51%)
Race	286	Non-White (9%)	Non-Hispanic White (91%)	
Gender	337	Female (35%)	Male (65%)	

B. Dependent Variables and Measures

The dependent variables used for both stages of research are Arkansas local policy elites' perceived benefits and risks regarding HVPL installations. Benefit and risk perceptions are operationalized using specific aspects of HVPL benefits and risks expressed during public comments made to the Arkansas Public Service Commission in northwest Arkansas in 2013 ("Arkansas Public Service Commission Docket 13-041-U," 2013). As presented in Table 2, a total of eleven survey items were used to measure this dependent variable. As for the benefit assessment, survey respondents were asked to rate their perceptions of various benefits associated with HVPL installations on an eleven-point scale with zero meaning not at all beneficial and ten meaning extremely beneficial. The six benefit measures, provided in random order in the survey, attempt to capture the perceived benefits and risks in economic, health-related, and environmental dimensions. Benefit measures gauge survey respondents' perceptions regarding energy supply stability and reliability, efficient energy transmission and land use, job creation, provision for renewable energy, and maintenance of necessary services during post-disaster or high energy demand periods. As for risk appraisal, survey respondents were also

Table 2 Dependent Variable and Measures (Moyer & Song, 2014)

Variable	Measure
Perceived Benefit/Risk associated with HVPL	How much benefit do you think the installation of high voltage power lines in northwest Arkansas would bring to your local government and community in the forms of energy supply stability and reliability? (0=Not at all beneficial to 10= Extremely beneficial)*
	How much benefit do you think the installation of high voltage power lines in northwest Arkansas would bring to your local government and community in the form of efficient energy transmission? (0=Not at all beneficial to 10= Extremely beneficial)*
	How much benefit do you think the installation of high voltage power lines in northwest Arkansas would bring to your local government and community in the form of new economic opportunities and job creation? (0=Not at all beneficial to 10= Extremely beneficial)*
	How much benefit do you think the installation of high voltage power lines in northwest Arkansas would bring to your local government and community in the form of provision of structure for renewable energy sources? (0=Not at all beneficial to 10= Extremely beneficial)*
	How much benefit do you think the installation of high voltage power lines in northwest Arkansas would bring to your local government and community in the form of efficient land use? (0=Not at all beneficial to 10= Extremely beneficial)*
	How much benefit do you think the installation of high voltage power lines in northwest Arkansas would bring to your local government and community in the form of necessary services maintained during post-disaster or high energy demand periods? (0=Not at all beneficial to 10= Extremely beneficial)*
	How much risk do you think the installation of high voltage power lines in northwest Arkansas would pose to your local government and community in the form of environmental degradation from clear-cutting trees for power line installation? (0=No risk to 10=Extreme risk)
	How much risk do you think the installation of high voltage power lines in northwest Arkansas would pose to your local government and community in the form of pesticide/herbicide use for securing power lines? (0=No risk to 10=Extreme risk)
	How much risk do you think the installation of high voltage power lines in northwest Arkansas would pose to your local government and community in the form of decreasing property values in affected areas? (0=No risk to 10=Extreme risk)
	How much risk do you think the installation of high voltage power lines in northwest Arkansas would pose to your local government and community in the form of threats to tourism (and/or other related industries)? (0=No risk to 10=Extreme risk)
	How much risk do you think the installation of high voltage power lines in northwest Arkansas would pose to your local government and community in the form of negative health impacts due to electromagnetic field emission? (0=No risk to 10=Extreme risk)
HVPL benefit/risk index	Index of above eleven items (α=0.92)

asked to indicate their attitude toward the risks associated with HVPLs on an eleven-point scale with zero meaning no risk and ten meaning extreme risk. The five risk measures, provided in random order in the survey include decreasing property values and threats to local industries, such as tourism, environmental degradation from clear cutting trees or pesticide and herbicide use, and negative health impacts due to electromagnetic field emission. Finally, a composite HVPL benefit/risk index was created by reverse-coding the aforementioned six benefit measures and taking the mean of a total of eleven (reverse-coded) benefit and risk measures (Cronbach's α=0.92). This benefit/risk index ranges from zero to ten, with high scores representing high risk and low benefit.

C. Primary Independent Variables and Measures
The purpose of this research is to explore the triadic relationship between (a) culturally biased value predispositions, (b) general affective feelings and specific emotions, and (c) perceived benefits and risks associated with HVPL installations for policy elites in the state of Arkansas. The first stage of this research focuses on the relationship between values, general affective feelings and benefit-risk perceptions and is covered in section 3. The second stage probes deeper into this triadic relationship by exploring values, specific emotional dimensions of affect heuristics and benefit-risk perceptions which is covered in section 4. The primary independent variables important to both stages of this research consist of culturally biased value predispositions derived from four distinctive cultural worldviews. Value predispositions were operationalized using three survey questions corresponding to each worldview for a total of twelve culturally nuanced statements (provided in random order in the survey) rated one to seven, with one indicating that the respondent strongly disagrees and seven indicating strong

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Table 3 Primary Independent Variables and Measures (Moyer & Song, 2014)

Variable	Measure
Egalitarianism	Society works best if power is shared equally. (1=Strongly disagree to 7=Strongly agree)
	It is our responsibility to reduce differences in income between the rich and the poor. (1=Strongly disagree to 7=Strongly agree)
	What society needs is a fairness revolution to make the distribution of goods more equal. (1=Strongly disagree to 7=Strongly agree)
Egalitarianism index	Index using factor score of above three items (α=0.78)
Individualism	We are all better off when we compete as individuals. (1=Strongly disagree to 7=Strongly agree)
	Even the disadvantaged should have to make their own way in the world.(1=Strongly disagree to 7=Strongly agree)
	Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own. (1=Strongly disagree to 7=Strongly agree)
Individualism index	Index using factor score of above three items (α=0.67)
Hierarchism	Society is in trouble because people do not obey those in authority. (1=Strongly disagree to 7=Strongly agree)
	The best way to get ahead in life is to do what you are told to do to the best of your abilities. (1=Strongly disagree to 7=Strongly agree)
	Society would be much better off if we imposed strict and swift punishment on those who break the rules. (1=Strongly disagree to 7=Strongly agree)
Hierarchism index	Index using factor score of above three items (α=0.68)
Fatalism	For the most part, succeeding in life is a matter of chance. (1=Strongly disagree to 7=Strongly agree)
	No matter how hard we try, the course of our lives is largely determined by forces beyond our control. (1=Strongly disagree to 7=Strongly agree)
	Most of the important things that take place in life happen by random chance. (1=Strongly disagree to 7=Strongly agree)
Fatalism index	Index using factor score of above three items (α=0.72)
Affect heuristic	0=Neutral; 1=Positive affect; 2=Negative affect

agreement as presented in Table 3. Factor analysis (with the *varimax* rotation method) was

conducted using these 12 cultural theory measures and, as a result, four latent factors, which

parallel with the four distinctive dimensions of the cultural worldviews, were identified with three related cultural theory measures loaded high (i.e., factor loading greater than 0.5) on each factor while loaded low on remaining unrelated factors. Based upon this factor structure, factor scores for each of four latent dimensions (representing each of four cultural orientations) were calculated and used as an index for measuring each cultural orientation. Cronbach's α scores for three survey items (constituting each cultural theory index) range from 0.67 to 0.78, which indicates that the related survey measures are reasonably reliable.

As mentioned previously, other important independent variables which will be referred to as secondary independent variables for the sake of clarity include 1) general affective feelings which will be defined in section 3 and 2) specific emotions which will be further defined in section 4.

D. Control Variables and Measures
Several additional variables have been claimed by previous studies to exert influence on benefit and risk perceptions. These include trust, knowledge, and demographic characteristics which serve as control variables for this research. As presented in Table 4, trust was measured by asking respondents to rate scientists and academics as sources for trustworthy information about energy policy issues, such as sustainable energy and high voltage power lines, on an eleven-point scale ranging from zero for not at all trustworthy to ten for completely trustworthy. In order to measure respondents' level of knowledge on various energy issues, respondents were asked to provide correct answers to eight true-false questions regarding various energy issues in the state of Arkansas. Then, a knowledge index was generated, which is essentially the number of total correct answers for the given questions, with zero indicating a low level of knowledge and eight indicating a high knowledge level. Information on respondents' demographic characteristics including race (coded 1 for Non-Hispanic Whites and 0, otherwise), gender (coded 1 for Male

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Table 4 Control Variables and Measures (Moyer & Song, 2014)

| Variable	Measure
Level of knowledge of energy issues	Most scientists and energy experts agree that the estimates for natural gas reserves in the U.S. have increased since 2001. (0=False; 1=True*)
	Coal-fired electric power plants in Arkansas supply almost three quarters of the state's electricity. (0=False*; 1=True)
	There has been a state decision on the prospective placement of high voltage power lines in Northwest Arkansas. (0=False; 1=True*)
	A state legislation has been proposed to prevent the prospective installation of high voltage power lines in either Arkansas or Missouri. (0=False; 1=True*)
	Independent power producers provide about a quarter of net electricity generation in Arkansas. (0=False; 1=True*)
	Arkansas recently ranked 17th in the nation in terms of total energy consumed per capita. (0=False; 1=True*)
	Biomass supplied all of Arkansas' non-hydroelectric renewable energy resources for electricity generation in 2010. (0=False; 1=True*)
	Most scientists agree that electromagnetic fields from high voltage power lines can increase the risk of leukemia among those living in their proximity. (0=False*; 1=True)
Knowledge index	Index of above eight items (i.e., number of correct answers)
Trust	How trustworthy is information about policy issues, such as sustainable energy and high voltage power lines from Scientists and Academics? (0=Not trustworthy to 10=Completely trustworthy)
Race	1=Non-Hispanic White
Gender	1=Male
Age	Age in years
Education	Level of education (1=Elementary through some high school to 7=Doctorate (of any type))
Income	Total estimated annual household income (1=less than $50,000 to 4=$150,000 or more)

and 0, otherwise), age (age in years), education (a seven-point scale with higher rating

representing higher education level) and income (a four-point rising scale) were also collected.

III. Understanding Local Policy Elites' Perceptions on the Benefits and Risks Associated With High Voltage Power Lines in the State of Arkansas

A. Theoretical Conjectures Regarding Values, General Affective Feelings, and Benefit-Risk Perceptions

As introduced earlier, the first stage in this inquiry lies in the examination of the triadic

relationship between (a) personal value predispositions, (b) general affective feelings, and (c)

perceived benefits and risks related to HVPL installations among local policy elites in the state

of Arkansas. Drawing from the theoretical discussion provided earlier, the primary theoretical

conjectures of this research are proposed and will be systemically tested in the following

empirical analysis. In general, as the dual process theory of judgment suggests, it is postulated

that general affective feelings and cultural value predispositions work together to shape Arkansas

local policy elites' benefit-risk perceptions on HVPL in distinct ways. More specifically, because

affective feelings are first reactions to uncertainty that guide rational judgment (J. Lerner &

Keltner, 2001) by way of associative networks (Leiserowitz, 2006), it is expected that Arkansas

local policy elites who hold negative affective feelings toward HVPL installations would

perceive higher risks and lower benefits from HVPL installations, whereas those who maintain

positive affect would recognize lower risks and higher benefits. In addition, as cultural theory of

risk perception offers, it is proposed that those elites who more strongly identify with the

egalitarian worldview would perceive higher risks and lower benefits associated with HVPL

installations while those policy elites with tendencies toward individualist or hierarch

worldviews would assess higher benefits and lower risks. Local policy elites who strongly relate

Figure 1 Proposed relationships between (a) personal value predispositions, (b) general affective feelings, and (c) perceived benefits and risks related to HVPL installations among local policy elites (Moyer & Song, 2014)
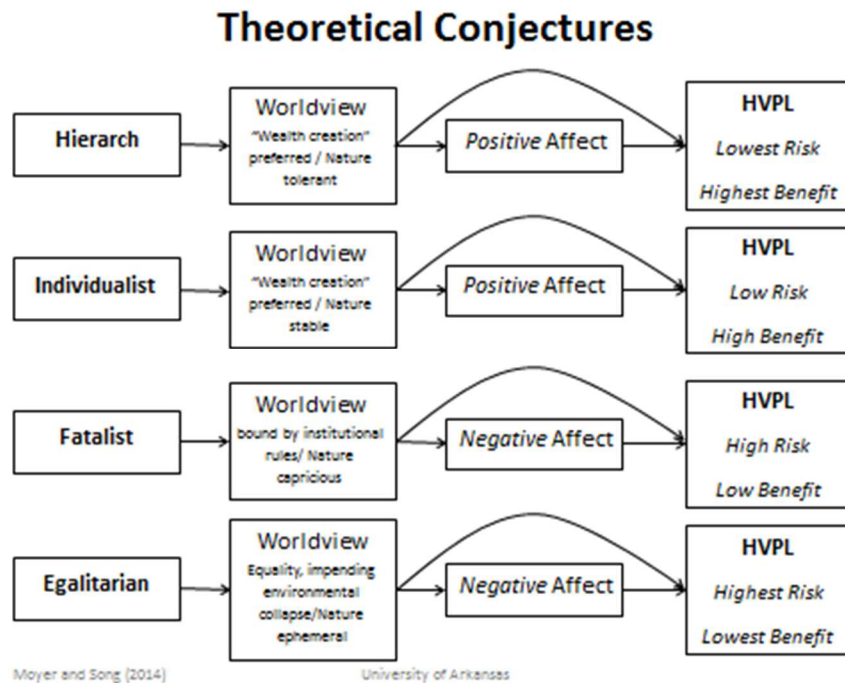
to fatalism are expected to indicate higher levels of risk and lower levels of benefits regarding

HVPL installations, although to a lesser extent than those who identify with strong

egalitarianism. The model in Figure 1 graphically illustrates the proposals above.

B. Secondary Independent Variables and Measures – General Affective Emotion
As previously mentioned, the primary independent variables reported in Table 2 measure value

predispositions. Value predispositions are derived from four distinctive cultural worldviews and

were operationalized as discussed in the introduction section.   The secondary independent

variables are holistic affective feelings which are operationalized by gauging respondents'

bearings on their general feelings towards HVPL installations in the form of categorical variable

as presented in Table 5. To start, respondents who hold neutral feelings are coded 0, those who

have positive valence are coded 1, and 2 is used for those who possess negative valence. Based

on this categorical variable, then, two dummy variables were generated to be specified in the

regression models for further analysis. For the first dummy variable, survey respondents who

hold positive affect toward HVPL installation are coded 1, otherwise responses are coded 0.

Similarly, 1 is assigned for those who revealed negative affect on HVPLs and 0, otherwise, to

create the second dummy variable.

Table 5 Secondary Independent Variables and Measures - General Affective Feelings (Moyer & Song, 2014)

Variable	Measure
Affect heuristic	On a scale from zero to ten, where one means extremely negative and seven means extremely positive, please indicate how you generally feel about the installation of high voltage power lies. (1=Positive affect, 0=Neutral to, 2=Negative affect*). *Reverse coded and recoded to nominal variables.

C. Empirical Results

As presented in Table 7, Ordinary Least Square (OLS) linear regression was used to examine the

theoretical conjectures discussed in the earlier section. Supporting previous studies, Model 1

shows that among Arkansas local policy elites, males tend to perceive lower levels of risk and

higher levels of benefits associated with HVPLs than females, as do respondents with higher

incomes. Increases in respondents' age and education correspond to higher risk and lower benefit

perceptions. Model 2 incorporates knowledge and trust measures; however, results indicate no

statistically significant influence on perceptions of utility associated with HVPLs. A possible

explanation for this could be that knowledge was operationalized using sophisticated statements

that arguably capture only highly educated respondents for this issue (see Table 4). Trust

reported here uses the trustworthiness of scientists and academics as information sources about

energy policy as a measure. A more comprehensive measure of trust may have different results.

The main concern of this study is to investigate the role of affect and values in explaining

perceptions of HVPL utility. Model 3 indicates that positive (coefficient of -1.984, $p<0.01$) and

negative (coefficient of +2.744, $p<0.01$) affective feelings, in addition to the control variables

Table 6 Descriptive Statistics (Moyer & Song, 2014)

Variable	n	Mean	St. Dev.	Min	Max
Perceived Benefit/Risk associated with HVPL	311	5.57	2.88	0	10
Egalitarianism	306	-0.01	1.00	-2.71	2.50
Individualism	306	0.00	1.00	-2.54	2.18
Hierarchism	306	0.00	1.00	-2.30	2.93
Fatalism	306	0.00	1.00	-1.78	2.97
Trust	283	6.88	1.93	0	10
Knowledge	255	3.11	1.31	0	6
Age	420	53.91	13.45	22	87
Education	287	4.56	1.4	2	7
Income	286	2.40	0.93	1	4

discussed above, explain a high degree of the variation in policy elites' utility perceptions

regarding HVPLs. These results show that those who hold positive valence on HVPL

installations tend to perceive low risks and high benefits of HVPLs, while those who possess

negative valence tend to perceive high risks and low benefits, in comparison with those who are

neutral in their emotional bearings on the matter. Furthermore, Model 4's results indicate that,

while controlling for trust, knowledge level, and demographic characteristics, policy elites who

strongly identify with egalitarian worldviews are more likely to perceive higher risks/lower

benefits (coefficient of +0.794, $p<0.01$) associated with HVPLs, while policy elites who strongly

identify with individualism (coefficient of -0.354, $p<0.05$) and hierarchism (coefficient of -0.574,

$p<0.01$) are more likely to perceive higher benefits and lower risks of HVPLs. As presented in

Model 5, the influence of value predispositions on the perceived utility of HVPLs among

Arkansas local policy elites remains significant when affective measures are added to Model 4.

In fact, value predispositions, as operationalized by CT's cultural worldviews, slightly increase the overall explanatory power of the model (compare *Adjusted* R^2 of 0.653 in Model 3 to 0.677 in Model 5 with $p<0.01$) with statistical significance.

Overall, OLS regression results suggest that in addition to demographic characteristics identified in previous studies, affective feelings and value predispositions, particularly those defined by egalitarianism, hierarchism and individualism, work together to influence benefit and risk perceptions associated with HVPLs. As conjectured earlier, results indicate that Arkansas local policy elites who experience negative feelings toward HVPLs as well as those with stronger egalitarian values are more likely to recognize the risks associated with HVPLs. Policy elites who experience more positive feelings toward HVPLs and those who strongly identify with values defined by Individualism and hierarchism are more likely to recognize the benefits associated with HVPLs. However, fatalism does not hold statistically significant explanatory power in any estimated models presented in Table 7.

Finally, because predictions based on OLS regression are limited due to estimation and functional uncertainty (King, Tomz, & Wittenberg, 2000) we utilized Bayesian posterior simulation to predict the distributions of affective influence by prototypical cultural type (Song et al., 2014) to further explore the relationships between (a) personal value predispositions, (b) affects and feelings, and (c) perceived benefits and risks related to HVPLs among local policy elites. Using benefit/risk index as the dependent variable, we further estimated a reduced form of the regression model with two dummy variables representing positive affect (coded 1 for those who hold a positive affect toward HVPLs and 0, otherwise) and negative affect (coded 1 for those who hold a negative affect toward HVPLs and 0, otherwise), respectively, and four CT

Table 7 Understanding Local Policy Elites' Perceptions on the Benefits and Risks Associated with HVPLs OLS Regression Results (Moyer & Song, 2014)

	Dependent variable: Perceived benefit/risk associated with HVPL				
	(1)	(2)	(3)	(4)	(5)
Egalitarianism	-	-	-	0.794*** (0.167)	0.412*** (0.113)
Individualism	-	-	-	-0.354** (0.159)	-0.192* (0.106)
Hierarchism	-	-	-	-0.574*** (0.163)	-0.275** (0.109)
Fatalism	-	-	-	0.128 (0.155)	0.079 (0.103)
Positive affect (1=Yes)	-	-	-1.984*** (0.341)	-	-1.846*** (0.332)
Negative affect (1=Yes)	-	-	2.744*** (0.330)	-	2.584*** (0.322)
Trust	-	0.129 (0.093)	0.021 (0.060)	-0.018 (0.090)	-0.048 (0.060)
Knowledge	-	-0.154 (0.134)	-0.086 (0.086)	-0.156 (0.126)	-0.092 (0.084)
Race (1=White)	0.851 (0.588)	0.684 (0.596)	0.699* (0.386)	1.078* (0.562)	0.901** (0.375)
Gender (1=Male)	-1.771*** (0.341)	-1.452*** (0.374)	-0.356 (0.248)	-1.200*** (0.357)	-0.293 (0.242)
Age	0.025* (0.014)	0.022 (0.015)	0.009 (0.010)	0.011 (0.015)	0.004 (0.010)
Education	0.217* (0.117)	0.227* (0.126)	0.102 (0.082)	0.064 (0.123)	0.029 (0.082)
Income	-0.934*** (0.179)	-0.933*** (0.194)	-0.325** (0.130)	-0.670*** (0.188)	-0.225* (0.128)
(Intercept)	7.317*** (0.885)	6.838*** (1.282)	5.548*** (0.894)	7.985*** (1.215)	6.195*** (0.878)
n	275	244	244	244	244
Adjusted R^2	0.177	0.159	0.653	0.264	0.677
F Statistic	12.762***	7.556***	51.882***	8.912***	40.117***

*p<0.1; **p<0.05; ***p<0.01 (*Note: Standard errors in parentheses*)

Figure 2 Bayesian Posterior Simulation Results (Moyer & Song, 2014)

(a) Perceived HVPL benefit/risk among those who hold neutral affect

(b) Perceive HVPL benefit/risk among those who hold positive/negative
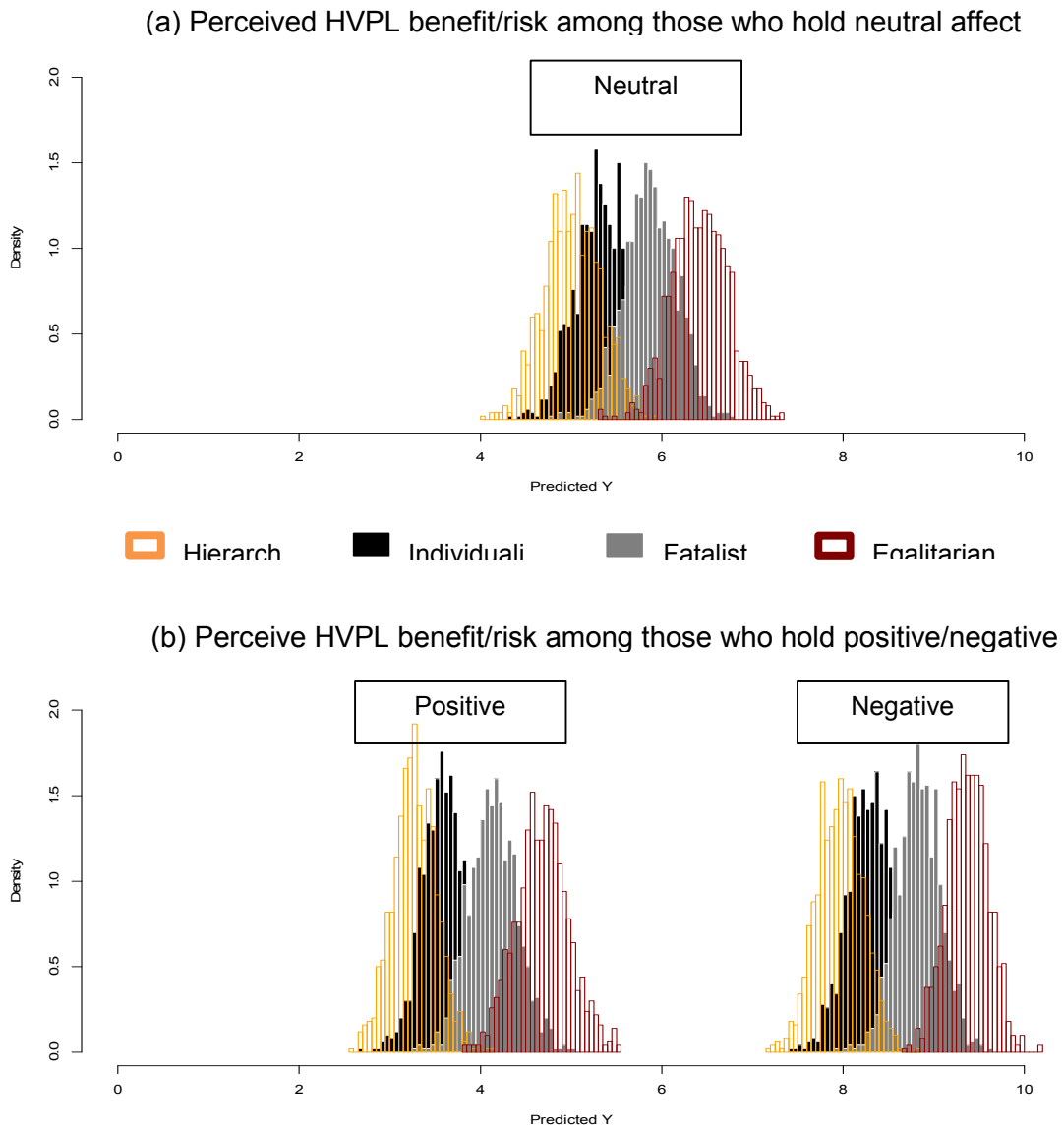
measures (i.e., egalitarianism, individualism, hierarchism, and fatalism) as explanatory variables.

Following simulation procedures suggested by King et al. (2000), we then ran 1,000 simulations

resulting in vectors of estimated regression coefficients for each and entered the appropriate

combination of values of CT index (that represent a prototypical cultural type based upon

distributional characteristics of each of the indices) and a particular affect heuristic[4] in order to obtain the distributions of predicted HVPL benefit-risk perceptions of the four different prototypical cultural types (i.e., egalitarians, individualists, hierarchs, and fatalists) among three groups of individuals with neutral, positive, and negative affect.

The distributions of predicted HVPL benefit/risk perceptions by Arkansas local policy elites with various cultural types and affective heuristics are displayed in Figure 2. The horizontal axis on the histograms represent perceived utility of HVPL installations as measured by the benefit/risk index, with a high score meaning high risk and low benefit, whereas the vertical axis represents probability density of the distribution. As for the visualization of cultural types, egalitarians are represented by the white histogram outlined in red, individualists black, fatalists grey, and hierarchs the white histogram outlined in orange, respectively. Panel (a) presents the results among those who have neutral affective response to the HVPL installations, while Panel (b) shows the results for those who hold either positive or negative emotional bearings on the issue.

In general, egalitarians and hierarchs exhibit distinctive perceptions of utility relating to HVPLs regardless of affect (minimal to no overlap in the distribution of predicted utility for egalitarians and hierarchs) as hierarchs tend to recognize consistently higher benefits and lower

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[4] For instance, Table IV shows that the mean of each CT index (i.e., egalitarianism, individualism, hierarchism, and fatalism) is approximately 0 with a standard deviation of 1. Based on this, the prototypical egalitarian was set to be one who scored 0.99 on egalitarianism index (the combined value of egalitarianism mean (= -0.01) and standard deviation (= 1)) and -1 (individualism mean (= 0) minus its standard deviation (= 1)), -1 (hierarchism mean (= 0) minus its standard deviation (= 1)) and -1 (fatalism mean (= 0) minus its standard deviation (= 1)) on indices for hierarchism, egalitarianism and individualism, respectively. Furthermore, in order to characterize one who holds neutral affect in the model, we assigned 0 for both dummy variables representing positive and negative affects. Similarly, to characterize one who holds positive affect, we allocated 1 for positive affect dummy variable and 0 for negative affect dummy variable in the model. Finally, we plugged in 0 and 1 to positive and negative dummies to represent one who holds negative affect on HVPL installation in the model.

risks while egalitarians tend to recognize higher risks and lower benefits (Figure 2 Panels (a) and (b)). The levels of HVPL utility perceived by individualists and fatalists are predicted to be located somewhere between hierarchs and egalitarians, while fatalists are expected to perceive higher risk and lower benefit compared to individualists. While we found that such differences in predicted perceived utility by cultural type is persistent across different groups of individuals who hold various emotional responses to HVPLs, generally, policy elites with negative affective feelings toward HVPLs tend to perceive higher levels of risk (and lower levels of benefits) across prototypical cultural types when compared to those with positive affective feelings toward HVPLs (Figure 2 Panel (b)). The levels of perceived risk and benefit of HVPLs by those who reveal neutral emotional response are predicted to be located in between those who hold strong positive or negative feelings (Figure 2 Panels (a) and (b)).

D. Conclusion and Discussion
Exploring the triadic relationship between personal value predispositions, affect, and the benefit and risk preferences among Arkansas local policy elites, empirical results suggest that variation in perceptions of utility can be at least partially explained by some demographic characteristics. More importantly, evidence from this study is consistent with most of the theoretical conjectures proposed supporting that affective feelings and personal value predispositions, as measured by cultural worldviews, influence policy elites' perceptions of utility toward HVPLs in distinctive ways.

Policy elites who identify with strong egalitarianism are more likely to recognize the risks associated with HVPL installation over the benefits. CT suggests that recognition of such risks may act to reinforce egalitarians' belief in the fragility of the environment and highlight concerns over distributional inequalities associated with costs connected to HVPLs. Other policy elites whose values closely align with hierarchism and individualism are more likely to recognize

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the benefits associated with HVPL installation. This choice reflects a belief that the environment is able to tolerate interference, thereby justifying the risks associated with HVPL installation and its accompanying opportunities for economic advancement. As the results of Figure 2 suggest, while policy elites with negative affective feelings toward HVPLs tend to perceive the risks, those with values affiliated with egalitarianism perceive the highest risk while policy elites with values most associated with hierarchism perceive the least amount of risk. Policy elites with positive affective feelings toward HVPLs tend to perceive less risk overall, while those holding values strongly related with hierarchism perceive the lowest risk and most benefit, compared to prototypical egalitarians.

These results suggest that further examination is needed to unpack the nuances of the relationship between values, affect and the mechanisms by which these factors influence benefit and risk perceptions which will be the goal of the next section.

IV. Policy Elites' Values, Specific Emotional Dimensions of Affect Heuristics, and Domain Specific Benefit-Risk Assessments Associated with High Voltage Power Line Installations

A. Theoretical Conjectures Regarding Values, Specific Emotions, and Benefit-Risk Perceptions

As introduced earlier, the second stage of this inquiry lies in the examination of the triadic relationship between (a) culturally biased value predispositions, (b) specific emotions, and (c) perceived benefits and risks related to HVPL installations among local policy elites in the state of Arkansas. Based on previously reported findings and illustrated in Figure 2, policy elites with negative affective feelings toward HVPLs tend to perceive the risks associated with HVPLs and those with values affiliated with egalitarianism perceive the highest risk while policy elites with values most associated with hierarchism perceive the least amount of risk (Moyer & Song; 2014). On the other hand, policy elites with positive affective feelings toward HVPLs tend to

perceive less risk overall, while those holding values strongly related with hierarchism perceive the lowest risk and most benefit, compared to prototypical egalitarians (Moyer & Song; 2014). Keeping this in mind and drawing from the theoretical discussion provided in the introduction, it is further hypothesized that specific emotions act to mediate the influence of local policy elites' culturally biased values on their perceptions of benefit and risk toward HVPL's. These theoretical conjectures are systemically tested in the following empirical analysis.

B. Secondary Independent Variables and Measures- Specific Emotions
The primary independent variables in this stage of inquiry again measure value predispositions (Table 2) but now focus on specific emotions (Table 8). Value predispositions derived from four distinctive cultural worldviews were operationalized as discussed before and again, factor analysis (with the *varimax* rotation method) was conducted to reveal four latent factors, which parallel the four distinctive dimensions of the cultural worldviews. Based upon this factor structure, factor scores for each of four latent dimensions (representing each of four cultural orientations) were calculated and used as an index for measuring each cultural orientation. Cronbach's α scores for three survey items (constituting each cultural theory index) range from 0.67 to 0.78, indicating that the related survey measures are reasonably reliable.

Specific emotional dimensions of affect heuristics including fear, anger, happiness and excitement were operationalized as respondents' indicated the intensity of specific emotions as they contemplated HVPL installations in their area and reported on an 11 point scale. To start, 0 was assigned for those who reported no feeling of each of the four specific emotions and 10 for those who reported extreme feelings of each specific emotion.

Table 8 Secondary Independent (Mediating) Variables and Measures (Moyer & Song, 2015)

Variable	Measure
Fear	With the following list of feelings please indicate how you feel as you think
Anger	about high voltage power lines being installed in your area. (0=not at all;
Happiness	10=extremely)
Excitement	

C. Empirical Results

As presented in Table 9, mediational analysis was used to examine the relationship between value predispositions, specific emotions, and benefit-risk perceptions. The dependent variables, primary independent, mediating and control variables were first standardized. Three primary approaches to exploring mediational effects include causal steps test (Baron & Kenny, 1986), a difference in coefficients test (Freedman & Schatzkin, 1992), and the product of coefficients test (Sobel, 1982). Our analysis begins with establishing conceptual links. Found to have low Type I error rates (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) our analysis is based on Baron and Kenny's work using a three step data analytic method that looks for evidence of relationships among each of the variables as illustrated in Figure 3. Step one utilizes OLS regression to test the relationship between values and benefit/risk perceptions while controlling for demographics (Sobel, 1987). Step one, reported in column c(X-->Y) verifies what has been previously reported and establishes that among Arkansas local policy elites, culturally biased

Table 9 Mediation Results (Moyer & Song, 2015) 　　　　 [*]p<0.1; [**]p<0.05; [***]p<0.01 (*Note: Standard errors in parentheses*)

X	Partial M	Y	c (X-->Y)	a (X-->M)	SE(a)	b (M-->Y)	SE(b)	ab	SE (ab)	c' (X-->Y)'
Egalitarianism	Fear		0.276 ***	0.163 **	0.064	0.491 ***	0.049	0.080 **	0.032	0.202 ***
	Anger		0.276 ***	0.271 ***	0.061	0.681 ***	0.043	0.184 ***	0.043	0.096 **
	Happy		0.276 ***	-0.092	0.064	-0.529 ***	0.048	0.049	0.034	0.229 ***
	Excited		0.276 ***	-0.010	0.064	-0.458 ***	0.051	0.005	0.029	0.274 ***
Individualism	Fear	HVPL Benefit/Risk Perception	-0.123 **	-0.061	0.062	0.491 ***	0.049	-0.030	0.030	-0.094 **
	Anger		-0.123 **	-0.118 **	0.059	0.681 ***	0.043	-0.081 **	0.040	-0.036
	Happy		-0.123 **	0.162 ***	0.061	-0.529 ***	0.048	-0.086 ***	0.033	-0.038
	Excited		-0.123 **	0.120 *	0.061	-0.458 ***	0.051	-0.055 **	0.029	-0.068
Hierarchism	Fear		-0.199 ***	-0.024	0.062	0.491 ***	0.049	-0.012	0.031	-0.186 ***
	Anger		-0.199 ***	-0.075	0.060	0.681 ***	0.043	-0.051	0.041	-0.139 ***
	Happy		-0.199 ***	0.204 ***	0.062	-0.529 ***	0.048	-0.108 ***	0.034	-0.091 *
	Excited		-0.199 ***	0.256 ***	0.062	-0.458 ***	0.051	-0.117 ***	0.031	-0.081
Fatalism	Fear		0.045	0.053	0.060	0.491 ***	0.049	0.026	0.030	0.019
	Anger		0.045	0.052	0.057	0.681 ***	0.043	0.035	0.039	0.015
	Happy		0.045	0.000	0.060	-0.529 ***	0.048	0.000	0.032	0.045
	Excited		0.045	-0.014	0.060	-0.458 ***	0.051	0.006	0.027	0.039

values influence benefit and risk perceptions in distinct ways. Step two utilizes OLS regression to test the relationship between culturally biased values, or primary independent variables, and the specific emotion mediator variables; the results are reported in column a (X-->M). Again

Table 10 Causal Chain Model of Mediation Analysis (Moyer & Song, 2015)
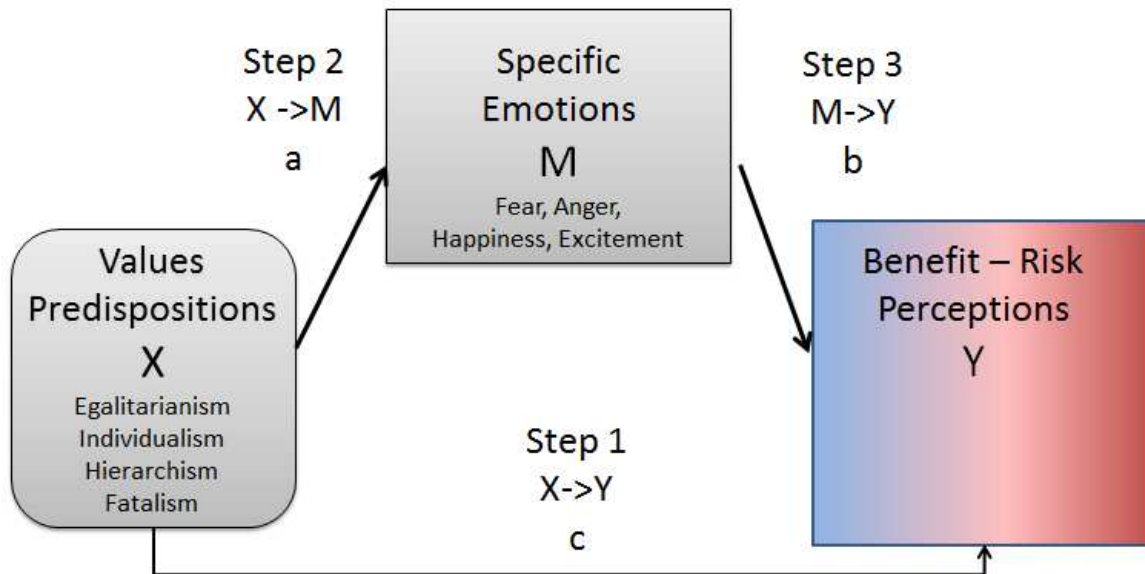
OLS regression is used in step three to test the influence of specific emotion mediators on benefit and risk perceptions controlling for the effects of cultural values by regressing the dependent variable on both the mediator and independent variable. The results appear in column b (M-->Y). Step two and three are essential to establishing that a mediation effect exists (Kenny, Kashy, & Bolger, 1998). Partial mediation is indicated here so step four was not conducted (Wu & Zumbo, 2008). Because the causal step approach does not provide a joint test of the three conditions simultaneously we (MacKinnon et al., 2002) calculate standard errors at each step and compare to a standard normal distribution. We use a product of coefficients type test derived by Sobel (1982) to determine the mediation effect and test the significance of mediation. The results of our analysis are reported in Table 9.

The results of mediation analysis indicate that conditions are prime for specific emotions to mediate the effect of three of the four cultural values tested. The extent to which specific emotions account for the overall influence of cultural values on perceived utility is calculated by multiplying the coefficients of the effects that sequentially connect the mediation paths (a x b) and is reported as the mediation effect (Sobel, 1987; Wu & Zumbo, 2008). Mediation is indicated when there is an overall direct effect that may be mediated, the independent variable is correlated with the mediator, and the mediator affects the dependent variable (Wu & Zumbo, 2008). The results of the mediation or indirect effect are reported in column ab and the calculated results of this approach are shown in Table 9. As seen in Figure 4, mediation analysis reveals a positive overall direct effect of egalitarian values on benefit-risk perceptions (+0.276, pvalue <0.001) with stronger egalitarian values resulting in stronger perceptions of risk. The effect of egalitarian values is mediated by specific emotions; primarily that of anger (mediation effect of +0.184, pvalue <0.001) but also of fear (mediation effect of +0.080, pvalue <0.05) as indicated by egalitarian values' effect on anger (+0.271, pvalue <0.001) and anger's effect on the dependent variable (+0.681, pvalue <0.001). Similarly, egalitarian values' effect on fear (+0.163, pvalue <0.05) and fear's effect on the dependent variable (+0.491, pvalue <0.001) meets the criteria indicating mediation. Figure 5 shows that individualist values have a negative overall direct effect on benefit-risk perceptions (-0.123, pvalue<0.05) with stronger individualism resulting in lower risk perceptions and higher benefit perceptions. Both positively and negatively valenced emotions are indicated as mediators including happiness (mediation effect of -0.086, pvalue< 0.001), excitement (mediation effect of -0.055, pvalue <0.05) and anger (mediation effect of -0.081, pvalue <0.05). Relationships between individualist values and excitement

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Figure 3 Specific Emotions Mediation of Egalitarianism on Benefit-Risk Perception (Moyer & Song, 2015)
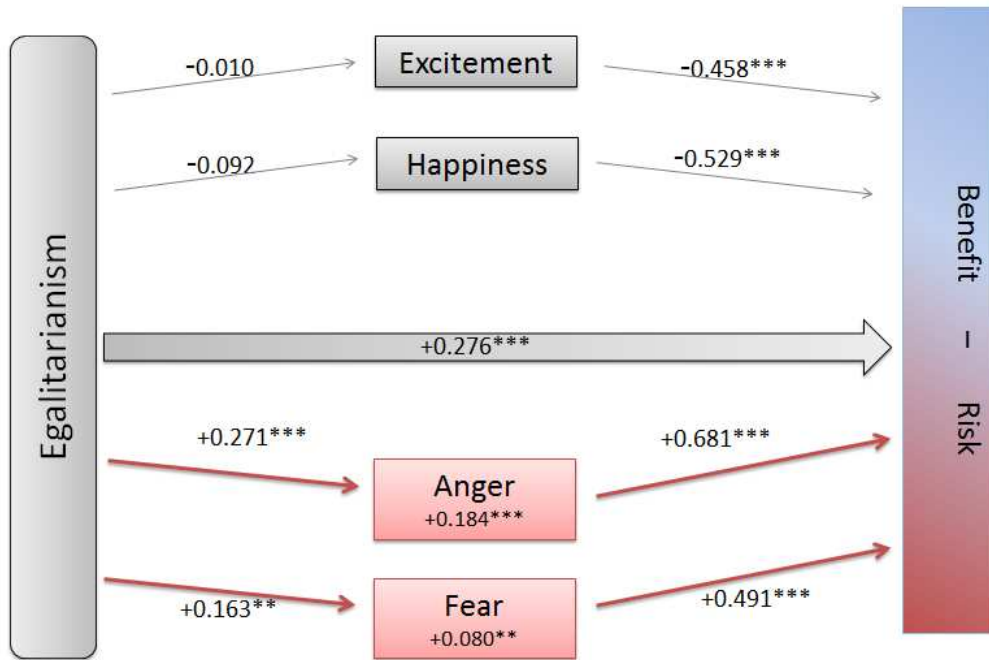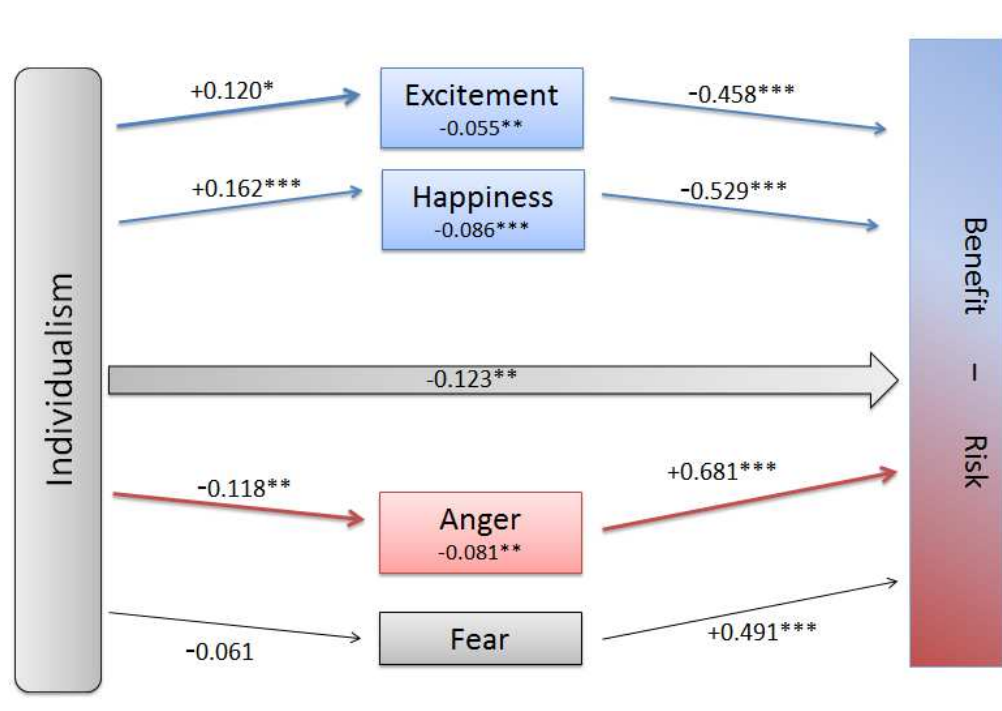

Figure 4 Specific Emotions Mediation of Individualism on Benefit-Risk Perceptions (Moyer & Song, 2015)

(+0.120, pvalue <0.01), happiness (+0.162, pvalue <0.001) and anger (-0.118, pvalue <0.05) are

all statistically significant. Step two confirms that the effect of excitement (-0.458, pvalue

Table 11 Specific Emotions Mediation of Hierarchism on Benefit-Risk Perceptions (Moyer & Song, 2015)
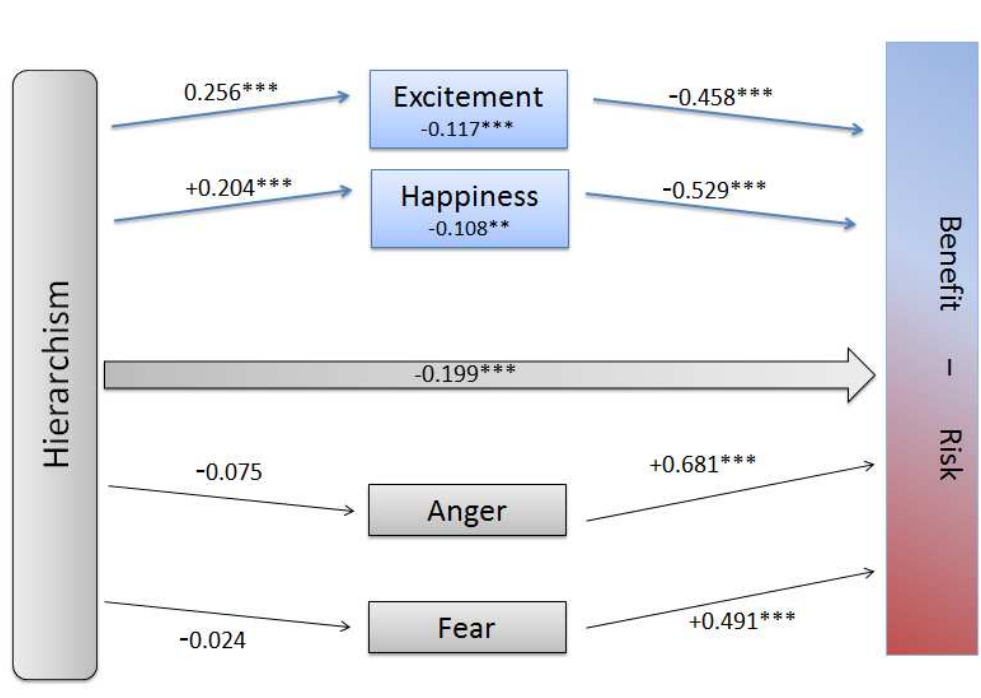
<0.001), happiness (-0.529, pvalue<0.001) and anger (+0.681, pvalue <0.001) on the dependent

variable are statistically significant as well. Hierarchism also appears to have negative overall

direct effect on benefit-risk perceptions (-0.199, pvalue <0.001) resulting in stronger perceptions

of benefit over risk as mediated by feelings of excitement (-0.117, pvalue <0.001) and happiness

(-0.108, pvalue <0.05) as illustrated in Figure 6. The effect of hierarchism on excitement

(+0.256, pvalue <0.001) and happiness (+0.204, pvalue <0.001) are statistically significant as is

the effect of excitement (-0.458, pvalue <0.001) and happiness (-0.529, pvalue <0.001) on

benefit-risk perceptions. The overall direct effect of fatalist values on benefit-risk perceptions

was not statistically significant and mediation is not indicated by the analysis.

The statistical significance of the mediation effect has been approached in various ways with the Sobel test being one of the most common (Holmbeck, 2002; Sobel, 1982, 1987; Wu & Zumbo, 2008). Statistical significance of the mediation effect (ab) is calculated here using the standard error calculation suggested by Sobel and is reported in Table 9 column SE(ab) (Sobel, 1987).

D. Conclusion and Discussion

Exploring the triadic relationship between culturally biased value predispositions, specific emotional dimensions of affect heuristics, and the benefit and risk preferences among Arkansas local policy elites, this analysis supports previously reported findings and the hypothesis proposed in this research. Culturally biased values influence perceptions of utility toward HVPL's in distinct ways and provide some insight into the mechanisms by which that occurs. Mediation analysis suggests that the effect of cultural values on perceived benefits and risks associated with HPVL installation for policy elites are mediated by specific emotions like fear, anger, happiness and excitement in very distinct ways. Theory provides further insight into this process.

Local policy elites' culturally biased values influence their perceptions of utility associated with HVPLs and the effects of these values are partially mediated by specific emotions. Policy elites who strongly identify with hierarchism place a great degree of importance on institutional structure believing that it is necessary to maintain social order. They likely rely on the complex institutional structures of the utility companies and governmental oversight surrounding HVPL installation which in their eyes, function to protect against any interference with the environment that nature could not withstand. These value predispositions cause feelings of excitement and happiness which influence their perceptions of benefit toward HVPLs. Although to a lesser extent than those leaning toward hierarchism, policy elites with

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affinity toward individualism also tend to focus on the benefits of HVPLs but for different reasons. Individualist leaning policy elites' beliefs in the stability of human nature and the environment allow them to recognize the economic advantages associated with HVPLs. Their willingness to accept risk for economic gain causes feelings of excitement and happiness. Publically voiced concerns over negatively affected property values or impact on tourism may cause some to feel anger as well but because anger is associated with appraisals of individual control, the specific emotion likely results in a more optimistic appraisal of any risk perceived resulting in overall lower benefit perceptions compared to hierarchs but higher than that of egalitarians. Policy elites who strongly identify with egalitarian values are more likely to recognize the risks associated with HVPL installation over the benefits. They are sensitive toward the environment believing that nature is fragile. Unlike hierarchs who value institutions, policy elites with affinity toward egalitarianism believe that institutions are coercive so in addition to their environmental concerns, they are also likely to focus on the distributional inequalities connected to HVPLs. These culturally biased values cause feelings of fear and anger which in turn cause those policy elites to focus on the risks associated with HVPL installation. Because the influence of these beliefs on risk perceptions is partially mediated by emotions of fear and anger, different appraisals of risk are likely. Appraisal-tendency theory suggests that fear can raise "appraisals of uncertainty and situational control" (J. S. Lerner et al., 2003, p. 144) Despite their proclivity to recognize the risks associated with HVPLs, policy elites with egalitarian tendencies who indicate more intense emotions of fear are likely to intensify the perceived threat resulting in more pessimistic assessments of risk while those who indicate anger are likely to assess risk more optimistically which may reduce the level of risk perceived. The position of policy elites holding strong fatalist values on this issue were not found to be

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statistically significant. This could be due to measurement issues or perhaps it is even an indication that fewer policy elites' tend to hold fatalist type values. More investigation is needed to provide further explanation.

Exploring the triadic relationship between culturally biased value predispositions, specific emotional dimensions of affect heuristics, and the benefit and risk perceptions among Arkansas local policy elites, we conclude that cultural values held by local Arkansas policy elites trigger specific emotions that influence their perceptions of benefit and risk with regard to HVPL installation. For those elites with an affinity for egalitarian values, fear and anger are dominating emotions that cause them to assess high levels of risk associated with HVPL. Those with more intense feelings of fear are likely to be more pessimistic than those who feel more intense anger. Policy elites with tendencies toward hierarchism experience happiness and a greater extent, excitement about HVPL installation causing them to recognize the benefits of HPVL installation. For those elites with a tendency toward individualism, feelings of happiness, excitement and to a lesser extent, anger influence their mostly positive perceptions of HVPLs.

V. Final Discussion and Conclusions

Exploration into the controversy surrounding the installation of HVPLs in northwest Arkansas provides a glimpse into one of many similar controversies relating to the expansion of a national energy grid in the United States. Energy policies geared toward energy efficiency, reliability, and sustainability involve multiple agencies and impact multiple stakeholders in complex ways that often cross geographic and institutional boundaries (John Kester & Moyer, 2015). While previous studies have focused on public risk perceptions relating to perceived health threats associated with HVPLs and often focus on public opinion, this study explores the triadic relationship between culturally biased value predispositions, both valenced and specific

affective emotions, and the perceived benefits and risks related to HVPLs among local policy elites. This analysis reveals that consideration should be given to the values and affective emotions of policy elites to explain their variation in perceptions surrounding HVPLs.

Most likely to recognize the greatest benefit of HVPLs are policy elites who hold strong hierarch type values. They tend to respect the institutional structure surrounding HVPL installation so long as they feel it is sufficient to maintain a balance for an environment that is tolerant and a society that requires structure. Their perceptions are mediated by emotions of excitement and happiness. Also recognizing benefits relating to HPVLs, policy elites with strong values of individualism likely focus on any economic advantages connected to HVPLs. Believing that nature will always find a balance, they are not concerned with the impact of HVPLs on the environment. Perceived risks are likely related to a potential for HVPLs to pose negative economic results, such as the publically expressed concern for individual property values. The influence of individualism on benefit-risk perceptions are mediated by excitement, happiness and anger. Likely to recognize the most risk relating to HVPLs are policy elites who strongly identify with egalitarian values and who indicate feelings of fear. Beliefs that nature is fragile are partially mediated by feelings of fear and anger resulting in perceptions of risk. Policy elites indicating feelings of anger are likely to have a more optimistic appraisal of the risk HVPLs represent.

This research not only contributes to an understanding of how policy elites in Arkansas form perceptions with regard to HVPLs but offers promising evidence for the existence of an underlying causal mechanism at work in perception formation which may be applicable to other controversial areas. The practical implications for this research offer tools to gain a deeper understanding of policy elites' attitudes which promises valuable insight into future national,

state, and local energy and environmental policies. Regarding the controversies associated with HPVL installation, this research has the potential to facilitate more effective communications. From a theoretical perspective, while previous theories in public policy have identified cultural values as an important factor to be considered when examining the policy process, up to this point none have directed much attention to the role affect and emotions play in the complex policy process. This research hints at a research area with potential for further inquiry and expansion. Further inquiry into how other potential mediating factors influence benefit and risk perceptions is needed but the results of this study focus attention on the importance of value predispositions and specific emotions that should be considered when examining policy elites' attitudes on controversial issues of this sort.

Studies support that the "emotional core of an attitude" is intuitive and subject to error (Kahneman, 2003, p. 710) while culturally shared beliefs and social relations are enduring systems that resist change. Recent studies using culturally targeted framing suggests that this has the potential to facilitate more effective communications regarding policy (Jones & Song, 2014b). This area poses an intriguing opportunity for extended analysis.

VI. References

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VII. Appendix

February 18, 2014

MEMORANDUM

TO: Geoboo Song
               John Kester III
               Rachael MOyer

FROM: Ro Windwalker
               IRB Coordinator

RE: New Protocol Approval

IRB Protocol #:   14-02-483

Protocol Title: *2014 Arkansas Public Policy Survey*

Review Type: ☒ EXEMPT   ☐ EXPEDITED   ☐ FULL IRB

Approved Project Period: Start Date: 02/18/2014 Expiration Date: 02/17/2015

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 800 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

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