

THE FORMATION OF CLIMATE CHANGE BELIEFS AMONG YOUNG ADULTS IN
APPALACHIAN KENTUCKY: A CONSIDERATION OF THE ROLE PLAYED BY
ECONOMIC RISK PERCEPTION

A Thesis

Presented to

the Faculty of the Caudill College of Arts, Humanities, and Social Sciences

Morehead State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Rebecca Johnson

December 6, 2018

ProQuest Number: 13424124

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 13424124

Published by ProQuest LLC (2019). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

Accepted by the faculty of the Caudill College of Arts, Humanities, and Social Sciences,
Morehead State University, in partial fulfillment of the requirements for the Master of Arts
degree.

Verdie Craig
Director of Thesis

Master's Committee: _____, Chair
Verdie Craig

Suzanne Tallichet

Timothy Hare

Date

ANALYSIS OF THE FORMATION OF CLIMATE CHANGE BELIEFS AMONG YOUNG
ADULTS IN APPALACHIAN KENTUCKY: A CONSIDERATION OF THE ROLE PLAYED
BY ECONOMIC RISK PERCEPTION

Rebecca Johnson
Morehead State University, 2018

Director of Thesis: _____
Verdie Craig

The study of climate change beliefs is a growing subject of interest among social researchers as increasing scientific knowledge points to climate change having world-wide consequences that require world-wide mitigation efforts. Previous research is split between how individuals form climate change beliefs, with some theorizing that climate change beliefs are formed by a rational consideration of risk, and others arguing that social identity group dynamics play a larger role. The goal of this project is to determine if economic risk stemming from financial connection to the coal industry is shaping the climate change beliefs of Appalachians or if cultural identity plays a role. I surveyed a group of students at a university in Appalachia about their climate change beliefs and personal/familial financial dependence on the coal industry. The frequencies of beliefs about the existence, cause, and effects of climate change among Appalachians who were connected to the coal industry were compared to those of Appalachians

who were not connected to the coal industry. These relationships were then tested for statistical significance. The main finding was that there was no significant relationship between financial connection to the coal industry and the climate change beliefs of young adult Appalachians.

Accepted by: _____, Chair
Verdie Craig

Suzanne Tallichet

Timothy Hare

Table of Contents

Chapter 1: Introduction 1

Chapter 2: Literature and Theory 5

Chapter 3: Methodology 26

Chapter 4: Results 30

Chapter 5: Discussion and Conclusion 39

References 47

Appendix 50

APPALACHIAN CLIMATE CHANGE BELIEFS

Chapter 1: Introduction

The subject of climate change beliefs is a relatively new but important topic of study for social scientists as an increasing multitude of scientific evidence points to climate change being an oncoming global problem of the most dangerous variety. Despite this evidence, some Americans still do not believe in climate change, do not believe that humans are causing it, do not believe that it will have consequences on themselves, nor that alternative energy sources should be developed. One part of the country where these beliefs are common is Appalachia. Yet, the beliefs of Appalachians have gone largely unstudied beyond research that simply established them as being more likely to not believe in climate change.

Early research on climate change beliefs focused on cataloging and describing beliefs, and then turned to finding common indicators of those beliefs (such as political affiliation). Recently, researchers have been looking deeper into the formation of climate change beliefs. Two theoretical camps have emerged with some researchers pointing to the evaluation of risk as the motivation for taking on certain beliefs about climate change, and others highlighting the roles played by identity, culture, and social groups in the belief formation process.

As noted above, it is a well-established conclusion that Appalachians are less likely to believe in climate change. It has been theorized that this is a result of the region being financially dependent upon the coal industry (Bell 2016). Therefore, the motivating question behind this project is why are the majority of Appalachians still holding climate change beliefs that support the coal industry if the decline of the industry means that it is no longer supporting them?

A key limitation of previous research on climate change beliefs in Appalachia is that virtually all research was conducted well after the peak of coal production in the region. The regional coal industry has been in decline since the early 20th century, with especially rapid

decline occurring over the last 30 years. For example, over the last 10 years the number of Appalachian Kentuckians employed in the coal industry decreased 66% from 19,030 in 2008 to 6,364 in 2017 (Kentucky Department of Energy, 2017). Furthermore, there are 3 times as many unemployed miners (18,076) than employed miners living in Appalachian Kentucky (EKY Works, 2018). This decline has led to the coal industry providing only 4% of the jobs in the region; falling behind retail (15%) and manufacturing (5%) (EKY Works, 2018). Unfortunately, this decline can also be used to explain the increasing poverty levels in the region, because miners are moving into unemployment or low wage jobs in other sectors.

Because of this, the region's actual degree of financial dependence on the coal industry may not be high enough to justify theorizing financial risk perception as the primary motivational factor in the formation of climate change beliefs in Appalachia. Furthermore, questioning this prevailing theory will only become more relevant. The degree of financial dependence on the coal industry among Appalachian Kentuckians will continue to decrease with a record low 3,500 mining jobs projected to be left in the region by 2021 (EKY Works, 2018).

Appalachia receives political attention as an area where the energy industry is important, but, as mentioned previously, the climate change beliefs of residents have gone relatively unexplored beyond the finding that Appalachians are less likely to believe in climate change than other Americans. The theoretical debate about belief formation as it relates to culture and risk perception has yet to be applied to the climate change beliefs of Appalachians specifically. As a region with a unique relationship to climate change because of its experiences with environmental destruction and its reliance on the coal industry, it is reasonable to view the lack of academic attention on the formation of climate change beliefs in the region as a significant oversight. Furthermore, as a problem with global consequences, climate change is a topic that

needs to be thoroughly studied both scientifically and socially. To take the necessary steps to combat climate change, public and political support for such efforts must increase. If we hope to change minds on climate change, we must first understand how climate change beliefs are formed, and then design persuasive efforts that speak to those belief formation processes.

My project applies this knowledge to the study of the climate change beliefs of Appalachians. Specifically, this project determines if there is a relationship between personal/familial financial connection to the coal industry and climate change beliefs. If financial connection to the coal industry has a significant effect on climate change beliefs, then the theory of risk perception will be supported. If financial connection to the coal industry does not have a significant effect on climate change beliefs, then the argument that social identity and culture play a larger role will be strengthened. The goal of this project is to determine if economic risk is shaping the climate change beliefs of Appalachians, or if cultural identity is playing the larger role. My hypothesis is that Appalachians who are financially connected to the coal industry are no more or less likely to have positive climate change beliefs than Appalachians who are not financially connected to the coal industry.

In an effort to further investigate the relationship between social identity/culture and the climate change beliefs of Appalachians, the secondary goal of this project is to determine if social factors are significant indicators of climate change beliefs. Previous research has shown that political affiliation and gender can affect the likelihood of having specific climate change beliefs. Because of this, my second hypothesis is that Appalachians who are members of the Democratic Party are more likely to hold positive climate change beliefs than their Republican counterparts. Similarly, I expect female Appalachians to be more likely to hold positive climate change beliefs than their male counterparts. If either of these social factors show a significant

influence on climate change beliefs, then the social identity group theory on belief formation will be further supported.

In order to determine if it is risk perception or social identity formation that shapes climate change beliefs, I surveyed a group of Appalachian students on their employment ties to the coal industry and their climate change beliefs. To answer the second hypothesis, the students were also asked about their biological sex and political affiliations. I analyzed the results using frequency tables, crosstabs, and chi squares. The main finding is that there is no significant relationship between personal/familial financial connection to the coal industry and the climate change beliefs of young adult Appalachians. Second, political affiliation and biological sex do have a significant relationship with some climate change beliefs. Additional findings are that most of the respondents believe in climate change, believe that humans are causing it, believe it will have an impact upon them, and support the development of alternative energy sources. Lastly, there is no significant difference between the beliefs of Appalachian respondents and non-Appalachian respondents.

Chapter 2: Literature and Theory

As climate change has become part of global discourse over the last few decades, beliefs about climate change have become an increasingly significant topic for social science research. Early research was exploratory in nature with researchers looking to catalog opinions on climate change related matters. Later, researchers moved on to look for patterns that point to common indicators of beliefs. More recently, researchers have turned to deeper analysis, asking how climate change beliefs are formed, or why certain groups of people can be commonly matched with certain kinds of beliefs about climate change.

The results of this social research have coincided with the progression of scientific research. As more scientists published results supporting the existence of climate change, and those results were communicated to the public, social scientists started finding that more people believed in climate change and were concerned about its consequences (Davidson & Haan, 2011). Over the last 10 years, research has revealed that a majority of Americans (and citizens of most other developed countries) believe that climate change is real. But, even among those who believe in climate change, a significant minority do not view it as a consequence of human activity, but rather as a part of a natural climate cycle. Because of this, researchers started considering why, in the face of increasing amounts of opposing evidence, many Americans do not believe in climate change, and/or do not believe that it is a problem that must be addressed.

Exploratory Research on Climate Change Beliefs

Researchers from many social science disciplines first began to study the social aspects of climate change beliefs by simply figuring out what those beliefs were, and how many people held them. In 2008, Leiserowitz, Maibach, and Roser-Renouf conducted the most comprehensive study of climate change beliefs in the United States to date through their positions at Yale

University, with derivative work being continued up to the present. The results of this original study allowed the researchers to classify American adults in 6 different categories based upon their climate change beliefs. The results are considered to be particularly reliable because of the large national sample used.

The first category, the Alarmed, made up 18% of the sample. The individuals in this category believed that climate change was real and were taking personal action as a result of that belief. The second category, the Concerned, made up 33% of the sample. These individuals also believed that climate change was real but were not acting upon that belief. This was the largest group. The first middle category, the Cautious, made up 19% of the sample. This group, while not completely convinced that climate change was real, thought that it was probably real. But, like the Concerned, they also did not act upon that belief.

The next category, the Disengaged, made up 12% of the sample. These individuals did not know if climate change was real, and therefore took no action to address it. The second to last category, the Doubtful, made up 11% of the sample. This group believed that climate change was probably not real but were not completely sure. They also took no action to address climate change. The last group, the Dismissive, made up 7% of the sample, and consisted of those who believed that climate change was definitely not real.

As stated earlier, this study was a significant piece of social research on climate change beliefs because of the original and organized nature of the work. However, the study is also known for the results revealing a distinction between climate change beliefs and mitigation efforts. The majority of the sample (51%) believed that climate change was definitely happening, and when including those who believed that it was probably happening that number jumps to 70%. However, only 18% of the sample were taking some action to slow or prevent climate

change. This indicates that building support for climate change mitigation efforts relies on more than just changing individual beliefs about climate change.

While this study remains one of the most far-reaching surveys of climate change beliefs in America, and yielded important findings, it only catalogued climate change beliefs. The purpose of this research was to determine what climate change beliefs were common among the general American population, and how those beliefs relate to participation in mitigation activities. My research is an effort to build upon this knowledge about common climate change beliefs to discover more about how those beliefs are formed.

Shortly after this time, in 2010, Dunlap and McCright used Gallup poll results and historical data to study the change in the beliefs that Americans held about the physical environment over time. They explained that historically, environmental protection was a nonpartisan issue. They pointed to the work of both Roosevelt Administrations that focused on conservation of the natural environment through the national parks system, and the environmental programs included in the New Deal. However, using Gallup poll data, they found that this near universal support did not apply to climate change beliefs. The percentage of American's believing in climate change did not becoming a majority until sometime between the 1997 and 2007 Gallup polls. They theorized that the change in beliefs about the environment started during the 1980s when the Reagan Administration presented environmental regulations as a burden on the economy. This theory was supported by the finding that in 2007, 76% of Democrats believed in climate change, while only 42% of Republicans believed in climate change (Dunlap & McCright, 2010).

The results of this study were significant for its view of climate change beliefs through a historical lens. Additionally, the study went further to point to potential indicators of climate

change beliefs (political affiliation), the next step in social research on the subject. While this does start to hint at reasons why certain beliefs are common among specific groups of people, it still does not go as far as to investigate how climate change beliefs are actually formed.

Indicators of Climate Change Beliefs

Building off of the work discussed above, several studies have now concluded that political affiliation is the most significant indicator of climate change beliefs, but this is a relatively recent finding. Many researchers first pointed to other demographic indicators, and then addressed the influence of political affiliation on those indicators. For example, a study conducted by Davidson and Haan in 2011 found gender to be a significant indicator of climate change beliefs, with women in a mining community in Alberta being more likely to support climate change mitigation efforts than men. Similarly, they found age to be a significant indicator of climate change beliefs, with younger generations being more likely to support climate change mitigation efforts. However, the statistical analysis revealed that women and young people were more likely to support climate change mitigation efforts simply because they were less likely to affiliate with conservative political parties. This was supported by political affiliation being the indicator that best held up to tests of statistical significance (Davidson & Haan, 2011).

Similarly, a study conducted in 2012 by Safi, Smith, and Liu found that gender plays an important role in determining climate change beliefs, but that political affiliation was the most significant factor. Their study showed age to be completely insignificant, and gender to be insignificant when controlling for political affiliation. These results highlight political affiliation as the ultimate indicator of climate change beliefs, with other indicators being affected by it.

These two projects take the study of climate change beliefs one step further by finding that certain social identities (gender and political affiliation) correlate with certain beliefs about climate change. But, they do not examine these connections as they relate to the belief formation process. Nevertheless, they do build upon previous work to lay the foundation for deeper investigation into the effects of social identity on climate change beliefs.

Appalachian Identity

Before moving on to discuss more recent research on the formation of climate change beliefs, it is necessary to review the research regarding the second topic explored by this study, Appalachian identity and culture. Early work on this subject tended to rely on negative stereotypes about Appalachians and overestimated the degree of isolation experienced by Appalachians from the rest of the country (Bell, 2016). Because of this, more recent research has focused on using aspects of Appalachia's physical and social environment to point to specific norms and values that characterize the region.

Land and Appalachian Culture

The theme of the cultural value of land emerged from this research. A study of Appalachian residents of North Carolina conducted by Cooper et al, in 2007 revealed that those who strongly identify with the region were more likely to value a connection to land, and wished to maintain a rural, land-based, identity. Additionally, the more a respondent identified with Appalachia the less likely they were to support economic development because they viewed it to be a threat to land conservation (Cooper et al, 2007).

A unique study conducted by Weaver & Holtkamp in 2016 highlighted the significance of land in Appalachian culture by studying the way Appalachians named places and businesses. They found that a greater percentage of places and businesses in Appalachia were named based

upon their physical environment than those in the United States in general. The results showed a popularity of names that alluded to land, like those that included the words branch, holler (hollow), or creek. Weaver and Holtkamp positioned this as evidence of the physical environment playing an important role in Appalachian culture.

These findings are particularly relevant to my project, because they show that Appalachian identity does influence the way Appalachians think about the natural environment. These studies bring up the question of why the cultural significance of nature and environmental preservation does not extend to matters relating to climate change. The results of these studies are not directly connected to climate change beliefs, but they do have some potential implications on the subject. Specifically, how does this land-based identity effect the way Appalachians think of climate change? Does it make some see climate change as a threat to this identity, since it has the potential to fundamentally change the natural environment? Does it make others see efforts to mitigate climate change (i.e. pursuing alternative energy sources) as a threat to their land-based identity because of the resulting change in the way they interact with the land (ending the mining of coal)?

Appalachian Values: Resilience, Pride, and Trust

As a region that has experienced high levels of out migration, Appalachia provides another subset of individuals whose relationship to Appalachian identity has been studied by social researchers. In the study previously discussed by Cooper et al (2010), the researchers found that the majority of survey respondents who migrated out of Appalachia maintained an Appalachian identity that was equivalent to, and sometimes stronger than, that of individuals who still lived in the region. A common response given by these individuals was that they live

outside of the region for practical reasons (such as employment opportunities), but still identify culturally as an Appalachian and hold the same values that were taught to them growing up.

The study of Appalachian identity has revealed some examples of Appalachian values. As mentioned earlier, academic inquiry and mainstream knowledge previously focused on negative portrayals of Appalachians that supported common stereotypes (Bell, 2016). However, more recently, academics looked into positive cultural values that can be found in Appalachia. In an article written by Denham, a medical professional serving in the region, those who claim an Appalachian identity tended to value resilience, self-sufficiency, and pride (2016).

Denham theorized that the development of this aspect of the Appalachian identity was a result of the higher rates of generational poverty experienced in the area. In other words, value is placed on resilience and self-sufficiency because they are necessary to survive the effects of widespread poverty (2016). Similarly, Denham argued that pride became a part of the Appalachian identity as a result of the negative stereotyping that those from the region have faced both historically and presently.

Social researchers have also studied the relationship between trust and Appalachian culture as an aspect of Appalachian identity. For example, Weaver and Holtkamp found that a significant portion of businesses in the region had some form of the term “Appalachia” in their names (2016). They theorized that this results from a regional culture that emphasizes a trust of insiders and distrust of outsiders. In other words, both small businesses and corporations are trying to take advantage of a perceived insider status to succeed.

Denham also pointed to a distrust of outsiders as a challenge that many medical professionals working in the area have to overcome (2016). In an effort to help those who are not from the area work better with their colleagues and patients, she suggested learning to navigate

the above discussed aspects of the Appalachian identity (pride, self-sufficiency, and resilience) to diminish their status as an outsider.

As researchers began to understand that a distrust of outsiders was a part of traditional Appalachian culture, some turned to studying why this is so. In 1998, Staley conducted an in-depth study of a multi-generational family living in Appalachian North Carolina. The interviews led to the insight that outsiders were often seen as a threat because their presence in the community could lead to a disintegration of traditional regional culture. Furthermore, the elder family members believed that Appalachian youth, including their children, were abandoning their mountain culture because of their increased connectivity with mainstream American culture. As a result, the older family members intensified their efforts to preserve the regional culture (1998).

Similarly, the respondents were not hostile towards outsiders simply because of their potential role in cultural change, but because of the significance that trust plays in the regional culture. When questioned about their hostility, many of the respondents replied that it is important that they know everyone in their communities because it means that they will know whether to trust them or not (Staley, 1998). In other words, the lack of familiarity with people who moved into the region was viewed not just as a cultural threat, but as a potentially personal threat as well.

The value placed on resilience, pride, and trust, as part of Appalachian culture, gains its relevance to the topic of climate change beliefs in Appalachia through the process of climate change belief formation. They are important in answering the question of whether the climate change beliefs of Appalachians are being shaped by perceived economic risk, or by identity group dynamics. The presence of these values as a significant part of Appalachian culture could

provide some explanations for why Appalachians are less likely to believe in climate change and support mitigation efforts. For example, a distrust of outsiders could sow a seed of doubt in the scientific evidence of climate change put forth by scientists, who are largely not from the region. Furthermore, if there is a link between the Appalachian identity and coal mining, then the view of coal mining being destructive to the climate could be interpreted as a judgment on Appalachians themselves.

Formation of Climate Change Beliefs

After determining which beliefs on climate change are common, and discerning common demographic indicators of those beliefs, researchers became more interested in how climate change beliefs are formed. Studies went beyond simply looking at political orientation to find out why certain beliefs are common among certain groups of individuals. The results have been mixed, with two major theoretical camps emerging.

Risk Perception

The original theory about how beliefs on climate change are formed argues that individuals form their beliefs based on whether they perceive climate change to be a threat. This theory presents individuals as rationally forming their beliefs so that if they think climate change will have consequences on themselves or their communities, they are more likely to believe in it and support efforts to stop it. The study discussed above by Safi, Smith, and Liu (2012), found that vulnerability to climate change influenced the climate change beliefs of farmers and ranchers in Nevada. The survey respondents with farms located in areas that were more vulnerable to drought were more likely to view themselves as being put at risk by climate change and were therefore more likely to approve of efforts to stop it. They were also more likely to view climate change as a consequence of human activity.

The researchers explained that, as farmers, their participants were among the first Americans to see the consequences of climate change, and therefore viewed it as a risk that is significant enough to offset any perceived economic consequences that implementing environmentally friendly farming practices could have on their businesses (Safi, Smith, & Liu, 2012). The opposite holds true for the results of the study conducted by Davidson and Haan in 2011 on a mining community in Alberta. The study found that while nearly all survey respondents believed that the climate was changing, they did not see climate change as being caused by human activity. The researchers theorized that this was an effort by the mining community to distance themselves from the environmental consequences of mining. Furthermore, as residents of a region that was economically dependent on the energy industry, they may have viewed attempts to mitigate climate change as a greater threat to their personal wellbeing than climate change itself (Davidson & Haan, 2011).

The relationship between risk perception and climate change beliefs has been further supported by other similar studies (see Zahran, Brody, Grover, & Vedlitz 2006, and Arbuckle, Morton, & Hobbs, 2013, and Mase, Gramig, & Prokopy, 2016), but one additional study stands out for its research on a community that both benefits from and is put at risk by efforts to mitigate climate change. In 2015, Dai, Kesternich, Loschel, & Ziegler surveyed 1,000 people across cities in China, and found that over 90% believed in climate change, and supported climate change mitigation efforts. This was a surprising finding since China is a world leader in the production and consumption of fossil fuels. The researchers theorized that despite being part of an economy that is heavily dependent on the energy industry, the Chinese were more likely to believe in climate change, and wanted to address it, because they were already seeing the effects of climate change in an increase in frequency and severity of extreme weather events (Dai et al,

2015). In other words, the connection between dangerous weather and climate change led the survey participants to view the climate risk as more threatening than the economic risk associated with climate change mitigation.

Political research conducted by the Pew Research Center in 2018 lends recent support to the theory of risk perception forming climate change beliefs. The results of their national poll revealed that Americans who lived within 25 miles of a coastline were more likely to believe that climate change was affecting their community. Two thirds (67%) of these respondents expressed this belief, while only 50% of other Americans saw climate change as affecting their communities. This discrepancy grew larger when controlling for political affiliation. Of the Republican respondents living near a coast line, 42% believed that climate change was affecting their communities, while only 28% of Republicans living elsewhere in America shared that belief.

These studies dive deeper than just establishing certain climate change beliefs as common among certain groups of people but begin trying to provide possible explanations for why this is so. They present an objective cognitive risk evaluation process as the major influence on the formation of climate change beliefs. The implication is that a group's shared risks lead to shared beliefs. While the studies provide sufficient evidence for this theory, they do not equally consider the social factors that could be influencing the group's perception of risk.

Social Identity Group Theory

Social identity group theory is a promising new framework. Some researchers argued that the formation of climate change beliefs goes beyond a straight forward consideration of risk. This research has highlighted the roles played by norms, social groups, and identities. The social identity group approach argues that beliefs assimilate to group norms when a person views

themselves to be a member of a group (Fielding, & Hornsey, 2016). In 2016, Fielding & Hornsey applied this theory to the formation of climate change beliefs. They argued that the reason that political affiliation was the best indicator of climate change beliefs was that members of political parties assimilate their beliefs to those of their party.

This is an entirely different approach to the formation of climate change beliefs than the popular risk perception theory, because it does not present individuals as rationally choosing the beliefs that best address the risks they perceive. Rather, individuals adopt the beliefs of those with whom they identify. Fielding and Hornsey, saw evidence for this theory in the existence of significant numbers of people who do not believe in climate change, despite the multitude of scientific evidence that supports climate change as reality (2016).

While their work remained theoretical, some newer research supports their ideas. In 2014, Price, Walker, & Boschetti surveyed Australians to assess the effects of cultural biases and myths on climate change beliefs and responses to climate change. This work highlighted the myth of environmental elasticity as the reason some Australians did not believe in climate change or are able to rationalize their environmentally damaging behavior. Among these groups, there was a prevailing idea that the environment has a natural tendency to seek equilibrium regardless of human activity. Because of this prominent cultural belief, individuals were led to view climate change as naturally occurring and believe that the climate will self-correct without human intervention (Price, Walker, & Boschetti, 2014). In this case, survey participants based their climate change beliefs not directly off the perception of risks, but from prevailing cultural supported concepts.

While not specifically addressing the topic of climate change beliefs, a study conducted as part of the Cultural Cognition Project linked the risk perception and social identity group

theories by studying the relationship between culture and risk perception relating to beliefs about scientific knowledge. Kahan analyzed the cultural theory of risk, and the concept of cultural cognition more specifically (2008). Cultural cognition, a concept first developed by Douglas & Wildavsky, is a component of the cultural theory of risk that points to individuals assimilating their beliefs to fall in line with their cultural identities and values (Kahan, 2008).

Kahan explained that risk perception is formed by culture through a selective perception of risk. This results in individuals focusing on some risks and ignoring others. Specifically, individuals form their perception of risks in a way that supports their cultural worldview (Kahan, 2008). This could serve as explanation for why disbelief in climate change is more common among Appalachians than Americans in general. Appalachian individuals may be focusing on the economic risk that mitigation efforts would have on the coal industry and ignoring the environmental and health risks that result from climate change, because doing so protects their way of life. Kahan's work provides an alternative way of linking the risk perception and social identity group theories. Cultural cognition as a theory supports the idea that economic risk perception is shaping the climate change beliefs of Appalachians, while also supporting the idea that culture is shaping the perception of that risk.

Additional support for this interplay between the two theories can be found in the work done on the relationship between risk assessment and culture by environmental sociologist Michael Bell. Bell explained the weaknesses of rational risk assessment theory as resulting from cultural contexts. The rational risk assessment theory holds that individuals compare their best knowledge about potential risks and choose the least dangerous option (Bell, 2016). Bell argued that this process is complicated by culturally influenced contexts like knowledge availability, and the relationship between power and trust. Bell argues an individual cannot make a rational

assessment of risk if all of the relevant facts regarding the risk are not known. Not everyone in a society has access to the same information. Additionally, those with power shape what information is communicated, how it is communicated, and what information should be trusted (Bell, 2016).

Bell's analysis of risk assessment and the influence of culture can be applied to the formation of climate change beliefs in Appalachia. The coal industry holds a great deal of power in the region and is therefore in a situation where they can shape what the public considers "the facts" about climate change. Through influence on the political system, education initiatives, marketing campaigns, and more, the coal industry is pushing a narrative that explains climate change as something less than a scientific reality created by untrustworthy outsiders, and overestimates the role played by the coal industry in the Appalachian economy. Thereby, signaling Appalachians to perceive climate science and outsiders as threats instead of climate change and the coal industry.

While these studies point to the influence of social factors on the formation of climate change beliefs, and even position them as intermingling with the theory of risk perception, they do not apply these findings to a specific cultural population. Because of this, these findings can only be theoretically applied to the climate change beliefs of Appalachians.

Environmental Social Research in Appalachia

While most research on the formation of climate change beliefs has been conducted on populations outside of Appalachia, some social researchers have studied environmental issues in the region. The results of which, inform the debate on how climate change beliefs are formed. One example is Shannon Bell's study published in 2016. Bell was curious as to why so few

Appalachians participated in environmental justice movements despite the fact that the region was facing the environmental and health consequences of the actions of the coal mining industry.

Bell used a combination of interviews, participant observation, content analysis, geospatial viewshed analysis, and photovoice conducted in Appalachian West Virginia, and found several barriers to participation in Appalachian environmental justice movements. The first barrier, depleted social capital, had to do with the high degrees of isolation experienced by Appalachian residents. The research revealed limited social networks, and few formal organizations. This was a barrier because preexisting connections to individuals or groups already active in the environmental justice movement were imperative to the likelihood that an individual would become involved in those movements (Bell, 2016). The second barrier was the gendering of activist involvement. Men were extremely underrepresented in local environmental justice movements. Bell theorized that this resulted from the coal industry's influence on the hegemonic masculinity of the region (2016). In other words, ties to, and support of the coal industry has long been linked to masculinity in Appalachia. Because of this, Appalachian men were much less likely to participate in environmental justice movements.

The third barrier was the coal industry's efforts to maintain the perception that coal mining is the defining characteristic of Appalachian identity, and the entirety of the Appalachian economy. Bell pointed to the "Friends of Coal" campaign created in collaboration by members of the coal industry. In an effort to combat potential regulations placed on the industry, this group engaged in various marketing campaigns to position the coal industry as the defining characteristic of Appalachia, thereby integrating themselves into Appalachian culture (Bell, 2016).

The last barrier was the coal industry's deliberate hiding of environmental destruction from the majority of Appalachians. In an effort to minimize the relationship between coal mining and environmental destruction and pollution, coal companies specifically conducted mining activities on land that was out of sight of Appalachians going about their day to day activities (Bell, 2016). An example of this was the tendency of strip mining to be conducted on private land owned by coal corporations that are far from major roads and public centers.

While not the primary focus of Bell's work, these barriers to participation in the Appalachian environmental justice movement can be applied to the climate change belief formation process of Appalachians, particularly in regard to the social identity group theory discussed above. These barriers highlight the role played by culture in determining an individual's mindset toward environmental issues. The first barrier, a lack of social capital was deemed significant because ties to someone or some group that were active in the environmental justice movement increased the likelihood that an individual would participate in that movement. This gives some support to the theory that relationships influence an individual's climate change beliefs. In other words, it is possible that if members of an individual's primary social groups believe something about climate change, they are more likely to hold that belief themselves.

The second barrier can also be used to support the social identity group theory on climate change beliefs. Cultural gender roles and ideology are influencing Appalachians' thoughts on the environmental justice movement by equating support of the coal industry with masculinity. The logic follows that this would, at least, mean that the same gender ideology is influencing the climate change beliefs of Appalachians by equating masculinity with beliefs that support the coal industry (i.e. coal mining is not a partial cause of climate change, and that alternative energy sources do not need to be developed).

The third and fourth barrier link the risk perception and social identity group theories to climate change belief formation. They are both examples of the coal industry attempting to control how Appalachians think about environmental issues. First, they imbed the coal industry into Appalachian identity, and then they hide the consequences of mining in order to manipulate perceptions of risk. As a result, a threat to the coal industry becomes a threat to Appalachian culture. This insight does not lend support to the idea that climate change beliefs are formed by a rational consideration of economic versus environmental risk. Rather, it leads to the theory that culture is forming the perception of those risks.

Additionally, other social research focusing on environmental issues in Appalachia can be viewed as support for the social identity group theory. An analysis of an Appalachian newspaper supports identity assimilation to social group norms as the way that climate change beliefs form (Burke, Welch-Devine, & Gustafson, 2015). The researchers reviewed newspaper articles from the Appalachian region of North Carolina and found that the prevailing cultural belief was to view nature as something to be passively enjoyed and left to care for itself. Despite numerous articles on increased severe weather in recent years, the weather was not linked to climate change because regional residents viewed the environment as naturally seeking equilibrium (Burke, Welch-Devine, & Gustafson, 2015).

This study also theorized that Appalachians were less likely to believe in climate change because of the way they related to outsiders. The historical treatment of Appalachia as an internal colony, or peripheral region, has led many residents to be suspicious of outsiders (Burke, Welch-Devine, & Gustafson, 2015). Because of this, they view climate science as another scheme that outsiders are forcing upon them. In this situation, Appalachians were less likely to believe in

climate change because of a social norm, not necessarily because they thought mitigating climate change could harm the local economy.

Another study of a small Appalachian community in North Carolina in 2015 revealed similar results. Rice, Burke, and Heynon conducted a few small discussion groups in an attempt to learn more about how Appalachians think about climate change. They found that those who did believe in climate change did so because of their experience with long-term changes in weather (i.e. decreased snowfall since childhood). Similarly, they used observations of economic development and altered mountain landscapes as evidence of climate change (Rice, Burke, & Heynon, 2015).

In application to the study of climate change belief formation in Appalachia, these results provide further support that economic risk may not be as important of a factor in the process as was originally theorized. Participants in the study based their climate change beliefs on environmental experiences and risks, not economic experiences, and risks.

Gaps in Previous Research

My project seeks to build upon the research detailed above to discover why certain climate change beliefs are more common among Appalachians than other regional American groups. Specifically, there is a gap in the literature in terms of an analysis of the effects of aspects of Appalachian culture on the climate change belief formation process. The gap exists for a few reasons. First, some previous research simply catalogued which climate change beliefs were common without going further into discovering how those beliefs were formed. Other research did point to connections between social factors (i.e. gender and political affiliation) and climate change beliefs but did not look into why those connections exist. Some research ignored social factors entirely and presented the climate change belief formation process to be an

objective consideration of risk. Second, other work did consider the effects of social factors on the belief formation process but did not apply them to a cultural group, and not Appalachians specifically.

It is this gap in the research that my project is designed to fill. My work is an effort to discover why certain climate change beliefs are more common among Appalachians, and to apply aspects of Appalachian culture to the climate change belief formation process. Politically, the region receives attention as an area where the energy industry is important, but the beliefs of residents have gone relatively unexplored beyond the finding that Appalachians are less likely to believe in climate change than other Americans. The above reviewed research on belief formation as it relates to culture and risk perception has yet to be applied to the climate change beliefs of Appalachians. As a region with a unique relationship to climate change, because of its experiences with environmental destruction and its reliance on the coal industry, it is reasonable to view the lack of academic attention on the formation of climate change beliefs in the region as a significant oversight.

Lastly, as a problem with global consequences, climate change is a topic that needs to be thoroughly studied. To take the necessary steps to combat climate change, public and political support for such efforts must increase. In order to change minds on climate change issues, the climate change belief formation process must first be understood. Only then can effective persuasive efforts that address the belief formation process be designed.

Research Question, Variables, & Hypothesis

As discussed above, while more intensive social research is being done on climate change beliefs, research on the beliefs of Appalachians barely scrapes the surface. There is a need for research that goes beyond simply cataloging the common climate change beliefs in the region.

Furthermore, I believe that the Appalachia is an ideal setting of study to test current theoretical perspectives on climate change beliefs because the decline of the coal industry in the region puts many Appalachians in the position of no longer being directly financially dependent on the production of fossil fuels. Yet, widespread disbelief in climate change and opposition to pursuing alternative energy sources remains (Leiserowitz et al., 2008).

For this reason, the primary research question for the proposed project is, are Appalachians who are financially connected to the coal industry as likely to have positive climate change beliefs as Appalachians who are not financially connected to the coal industry? The general objective of this study is to determine if personal/familial financial dependence on the coal industry influences climate change beliefs in an effort to find out if the perception of economic risk really is shaping the climate change beliefs of Appalachians, or if it is culture and social identity that play the larger role.

The independent variables for this project are financial connection to the coal industry, as well as political affiliation, and biological sex. For the purposes of this project, individuals are categorized as being financially connected to the coal industry if they or someone in their household or immediate family work in the coal industry. The dependent variables are beliefs about climate change. The specific beliefs being studied in this project include beliefs about the existence of climate change, beliefs about the cause of climate change, beliefs about the effects of climate change, and beliefs about the development of alternative energy sources. The beliefs were organized in this manner after reviewing previous research on the subject that revealed these groupings to adequately account for differences in beliefs among and within social groups (Dunlap & McCright, 2008). For this project, the following are considered positive climate change beliefs: believing in the existence of climate change, believing that human activity causes

climate change, believing that climate change will have negative consequences for themselves or their communities, and supporting the development of alternative energy sources.

The primary hypothesis for this project is that Appalachians who are financially connected to the coal industry are no more or less likely to have positive climate change beliefs than Appalachians who are not financially connected to the coal industry. In other words, I expect financial connection to the coal industry and the climate change beliefs of Appalachians to have no significant relationship. I chose this hypothesis because the social identity group approach led me to believe that it is cultural ties to the coal industry, not financial ties that shape the climate change beliefs of Appalachians (Fielding & Hornsey, 2016). Because of this, the secondary hypothesis regards the effects of social factors (political affiliation and biological sex) on climate change beliefs. I hypothesize that female Appalachians will be more likely to have positive climate change beliefs than male Appalachians. Similarly, I expect Democratic Appalachians to be more likely to have positive climate change beliefs than Republican Appalachians.

The alternatives to my hypotheses are that any of the independent variables have a negative relationship with the dependent variable (positive climate change beliefs). And, that financial connection to the coal industry has a positive relationship to positive climate change beliefs. Lastly, the null hypothesis is that personal connection to the coal industry and climate change beliefs do have a relationship.

Chapter 3: Methodology

Research Design & Procedures

To test the above-mentioned hypotheses, I surveyed students at Morehead State University (a university located in central Appalachia). The survey was administered to 145 students in sections of in-person introductory sociology courses during the first month of the Spring 2018 semester. These courses met general education requirements, so they provided a sample of both traditional and nontraditional students who were pursuing many different degree programs. Only closed-ended questions were asked so that the survey could be quickly filled out. Lastly, it was made clear to students through instructions attached to the survey, and verbal explanation from the researcher, that the survey was not a required component of the course, and there would be no consequences for declining to participate.

To measure financial dependence on the coal industry, the survey asked if the individual, someone in their household, or an immediate family member was employed in the coal industry at that time. To measure climate change beliefs, the survey asked the individual if they believed that climate change is real, if they believed that human activity causes climate change, if they believed that climate change will have a negative effect on themselves, their family, or their community, and if they believed that the use of alternative energy sources should be further pursued. Answers to these questions were simply, yes or no. Respondents were also asked about general demographic information (age, sex, political affiliation) and region of residence. This demographic information was asked for two reasons. First, it was used to separate the responses of non-Appalachian students from those of Appalachian students. Second, these demographics have been found to be potential indicators of climate change beliefs (Davidson & Haan, 2011) (Safi et al., 2012). Specifically, political affiliation and biological sex were looked at as

indicators that the cultural/social significance of the coal industry is shaping the climate change beliefs of Appalachians, not financial dependence.

The percentage of respondents deemed connected to the coal industry who exhibited positive beliefs about climate change (believe that climate change is real, believe that humans cause it, believe that it will have consequences, and support the development of alternative energy sources) was compared to the percentage of respondents deemed not connected to the coal industry who exhibit those same positive beliefs about climate change. Similarly, the percentage of female respondents who exhibited positive climate change beliefs was compared to the number of male respondents who exhibited positive climate change beliefs, and the percentage of Democratic respondents with those beliefs to the percentage of Republican respondents with those beliefs. A large difference between the percentages would indicate a relationship between the independent and the dependent variables

I entered the data into SPSS, and conducted a series of crosstabs, frequency tables, and chi square tests. I ran these to find if there was a statistically significant difference between the number of respondents with positive climate change beliefs who were connected to the coal industry, and the number of respondents with positive climate change beliefs who were not connected to the coal industry. If the p-value was higher than .05, then the hypothesis that there is no relationship between financial dependence on the coal industry and climate change beliefs was deemed correct. If the p-value was .05 or lower, then the null hypothesis was not rejected.

While the study of the relationship between connection to the coal industry and the climate change beliefs of young Appalachians was the primary goal of this project, updating and continuing the study of potential indicators of climate change beliefs revealed itself as a secondary analysis. The percentages of respondents with positive climate change beliefs were

compared by each demographic measure (age, sex, political affiliation) and region of residence. Each relationship between these variables and the measured climate change beliefs was then put through a chi square test to determine statistical significance.

Relationship between Sample and General Appalachian Population

As stated earlier, the sample used in this study was primarily composed of young adults who live in the Appalachian region of Kentucky. This sample was chosen for the convenience that familiarity with the campus community afforded the researcher, and because of the willingness of those associated with a university to participate in academic research. Additionally, the study of climate change beliefs gets its importance because of the role it plays in addressing a significant problem in the future. Therefore, the study of the beliefs of young people could prove to be particularly vital.

The population of Appalachian Kentucky skews older, and this project's sample skews younger. According to data collected from the 2010 US census, the population of Appalachian Kentucky decreased by 2% since the previous census in 2000 and was then sitting around 1 million people. This decrease was largely due to the fact that the population of this region is slightly older (median age: 40) than that of the United States as a whole (median age: 36) (US Census, 2010).

Additionally, the sample was made up of individuals who were enrolled in an institution of higher education. The majority of individuals living in this region of Kentucky never attend college. The educational experience of Appalachians in Kentucky also varies from that of Americans in general. Among Appalachian Kentuckians over the age of 24, 82% do not have an Associate's or Bachelor's degree (EKY Works, 2016). That percentage for the American population as a whole is 65%.

Lastly, as mentioned above, this study's sample was comprised of students who were taking in-person, introductory sociology courses. This means that only students who chose to take an in-person course, rather than an online course were included. This might have resulted in the sample skewing younger towards those who either live on campus, or conveniently near campus.

Also, the sampled courses fulfilled a general education requirement where students chose one course out of a group of social science courses, including economics, political science, sociology, geography, and cultural studies options. As a result, this study's sample included only the students who chose to take one of the sociology courses. While all the courses that meet this requirement have similar elements, the students included in this sample are those who were more interested in the sociology courses and therefore may have had experience with or inclinations towards open sociological inquiry.

Chapter 4: Results

Respondent Demographics

Of the 145 respondents surveyed, 100 resided in Appalachia, while 45 reported living outside of the region. The majority of respondents (126) were not financially connected to the coal industry, but 19 reported being personally connected to the coal industry. Most respondents were female (97 females, 47 males, 1 other), and all but 2 respondents were under the age of 30. Lastly, the respondents indicated varied political affiliations (45 Democrats, 39 Republicans, 36 Independents, 25 Others).

Demographic Variables- Indicators of Climate Change Beliefs

I analyzed the above demographic variables (region of residence, sex, and political affiliation) as potential indicators of climate change beliefs. The variables with significant relationships with the measured climate change beliefs were sex and political affiliation. The relationships between region of residence and climate change beliefs were not statistically significant. Biological sex had a marginally significant relationship with a belief in the existence of climate change. Female respondents were more likely to believe in climate change (98%) than male respondents (89%) ($p < .077$).

Table 4.1: Percentage of respondents with positive climate change beliefs by sex

	Males	Females
Believe in CC	89%*	98%*
Believe Humans cause CC	77%	87%
Believe CC Impacts Them	68%	78%
Develop Alt Energy	89%	90%

*significant p value

Political affiliation had a significant relationship with the belief that humans are causing climate change ($p < .011$). Of the respondents who reported a political affiliation of “Other”, 96% believed that humans are causing climate change. 89% of Democrats and 83% of Independents reported believing that humans are causing climate change, while only 69% of Republicans reported the same.

Table 4.2: Percentage of respondents with positive climate change beliefs by political affiliation

	Republicans	Democrats	Independents	Others
Believe in CC	95%	96%	92%	100%
Believe Humans cause CC	69%*	89%*	83%*	96%*
Believe CC Impacts Them	62%	84%	78%	76%
Develop Alt Energy	85%	93%	92%	88%

*significant p value

Region of residence proved to be the potential indicator that did not show a significant relationship with the climate change beliefs being studied. This larger p value is supported by the frequency table above that shows very little difference between the beliefs of Appalachian respondents and non-Appalachian respondents. The only type of belief where there was a difference in the percentages greater than a few points was the belief that the government should prioritize the development of alternative energy sources. But, even with a gap, both sample populations showed overwhelming support.

Table 4.3: Percentage of respondents with positive climate change beliefs by region of residence

	Appalachians	Non-Appalachians
Believe in CC	96%	93%
Believe Humans cause CC	83%	84%
Believe CC Impacts Them	74%	78%
Develop Alt Energy	87%	96%

No significant p values

Connection to the Coal Industry

The percentage of respondents connected to the coal industry who exhibited positive climate change beliefs varied only slightly ($\leq 6\%$) with the percentage of respondents with no connection to the coal industry who exhibited positive climate change beliefs. Consistent with this study's hypothesis, no significant relationship was found between personal connection to the coal industry and any of the measured climate change beliefs. See the below tables for frequencies.

Table 4.4: Percentage of respondents with positive climate change beliefs by relationship to coal industry

	Connected to Coal	Not Connected to Coal	Significance
Believe in CC	100%	94%	P < 1.1
Believe Humans cause CC	84%	84%	P < .31
Believe CC Impacts Them	79%	75%	P < .17
Develop Alt Energy	84%	90%	P < .69

The results in Table 4.5 shows no relationship between connection to the coal industry and the likelihood of believing in climate change. Furthermore, all the respondents with personal/financial ties to the coal industry indicated a belief in the existence of climate change. This lack of a relationship is supported by a very high p value of 1.

Table 4.5: Frequencies of respondents who believe in climate change by relationship to coal industry

Crosstab					
			Connected to Coal Industry		Total
			Yes	No	
Believe in Climate Change	Yes	Count	19	119	138
		Expected Count	18.1	119.9	138.0
		Residual	.9	-.9	
	No	Count	0	7	7
		Expected Count	.9	6.1	7.0
		Residual	-.9	.9	
Total		Count	19	126	145
		Expected Count	19.0	126.0	145.0

While table 4.6 shows that 16% of the respondents with a connection to the coal industry indicated a disbelief that humans are causing climate change, there was still no significant relationship found between the variables. This is because 15% of the respondents without a connection to the coal industry also indicated a disbelief that humans are causing climate change. This lack of a relationship find support in the high p value of .31.

Table 4.6: Frequencies of respondents who believe humans are causing climate change by connection to coal industry

Crosstab					
			Connected to Coal Industry		Total
			Yes	No	
Believe Humans Cause Climate Change	Yes	Count	16	105	121
		Expected Count	15.9	105.1	121.0
		Residual	.1	-.1	
	No	Count	3	19	22
		Expected Count	2.9	19.1	22.0
		Residual	.1	-.1	
	3	Count	0	2	2
		Expected Count	.3	1.7	2.0
		Residual	-.3	.3	
Total		Count	19	126	145
		Expected Count	19.0	126.0	145.0

Similarly, the lack of a relationship between belief that climate change will impact themselves or their communities and connection to the coal industry can be seen in Table 4.7. 21% of the respondents with a personal connection to the coal industry did not believe that climate change would affect themselves or their communities, but 25% of the respondents with no ties to the coal industry shared that belief. This is supported by the high p value of .17.

Table 4.7: Frequencies of respondents who believe that climate change will impact themselves or their communities by connection to coal industry

Crosstab					
			Connected to Coal Industry		Total
			Yes	No	
Believe Climate Change will impact them/community	Yes	Count	15	94	109
		Expected Count	14.3	94.7	109.0
		Residual	.7	-.7	
	No	Count	4	32	36
		Expected Count	4.7	31.3	36.0
		Residual	-.7	.7	
Total		Count	19	126	145
		Expected Count	19.0	126.0	145.0

Lastly, the data analysis also did not reveal a relationship between financial connection to the coal industry and a belief that the government should or should not prioritize the development of alternative energy sources. Table 4.8 shows that only 16% of the respondents with ties to the coal industry expressed a belief that the federal government should prioritize the production of fossil fuels over the development of alternative energy sources, while 10% of respondents with no ties to the coal industry shared that belief. This is supported by an insignificant p value of .69.

Table 4.8: Frequencies of respondents who believe that the government should prioritize the development of alternative energy sources by connection to the coal industry

Crosstab						
			Connected to Coal Industry		Total	
			Yes	No		
Should Government prioritize increasing production of fossil fuels or development of alternative energy sources	Fossil Fuels	Count	3	12	15	
		Expected Count	2.0	13.0	15.0	
		Residual	1.0	-1.0		
	Alt Energy	Count	16	114	130	
		Expected Count	17.0	113.0	130.0	
		Residual	-1.0	1.0		
	Total		Count	19	126	145
			Expected Count	19.0	126.0	145.0

Frequency of Positive Climate Change Beliefs

While the following results do not directly apply to this project’s hypotheses, their surprising nature makes them relevant to the discussion. The majority of respondents reported having positive climate change beliefs. 95% of the respondents believed in climate change, and 90% wanted the federal government to prioritize the development of alternative energy sources over increasing the production of fossil fuels. 83% believed that humans cause climate change, and 75% believed that climate change will impact themselves, their families, or their communities.

Table 4.9: Frequency/ Percentage of respondents who believe in climate change

Do you believe that climate change is happening?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	138	95.2	95.2	95.2
	No	7	4.8	4.8	100.0
	Total	145	100.0	100.0	

Table 4.10: Frequency/ Percentage of respondents who believe the government should prioritize the development of alternative energy sources

Should Government prioritize increasing production of fossil fuels or development of alternative energy sources?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fossil Fuels	15	10.3	10.3	10.3
	Alt Energy	130	89.7	89.7	100.0
	Total	145	100.0	100.0	

Table 4.11: Frequency/Percentage of respondents who believe human activity is causing climate change

Do you believe that human activity is causing climate change?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	121	83.4	83.4	83.4
	No	22	15.2	15.2	98.6
	N/A	2	1.4	1.4	100.0
	Total	145	100.0	100.0	

Table 4.12: Frequency/Percentage of respondents who believe that climate change will impact themselves/their communities

Do you believe that climate change will negatively impact you, your family, and/or your community?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	109	75.2	75.2	75.2
	No	36	24.8	24.8	100.0
	Total	145	100.0	100.0	

Chapter 5: Discussion and Conclusion

The results of this study largely support the hypothesis that Appalachians with a financial connection to the coal industry are no more or less likely to have positive climate change beliefs than Appalachians who are not financially connected to the coal industry. However, as discussed earlier, this outcome is subject to a few limitations, primarily age. Nearly all of the individuals included in the sample were under the age of 30. Because of this, a more accurate conclusion is that the results point to there being no relationship between financial connection to the coal industry and the climate change beliefs of young adult Appalachians attending a university in Eastern Kentucky.

This conclusion supports the work done by Fielding & Hornsey on the social identity group approach to the formation of climate change beliefs (2016). They theorized that individuals adopt the climate change beliefs of those with whom they identify. When this concept is applied to these results on the climate change beliefs of young adult Appalachians, a possible explanation emerges. Since financial reliance on the coal industry does not affect the likelihood of having positive climate change beliefs, the relationship between the coal industry and the climate change beliefs of Appalachians may not be one centered solely on economic security. It is possible that a byproduct of the financial decline of the coal industry in the region is a decreasing significance of the coal industry as a core part of the Appalachian identity. This is supported by the finding that most young adult Appalachians have positive climate change beliefs, regardless of any financial connection to the coal industry.

The work done by Burke and Welch-Devine (2015), when applied to the results of this study, also presents another possible explanation as to why young adult Appalachians are more likely to believe in climate change than the general Appalachian population. As previously

mentioned, they theorized that Appalachians may be less likely to believe in climate change than Americans from other regions because of a historically grounded suspicion of outsiders. In other words, climate change is seen as an idea created by outsiders, so it is greeted with suspicion. If this theory is correct, then young Appalachians may be rejecting this part of Appalachian culture at higher rates than previous generations.

The claim that young Appalachians could be rejecting parts of Appalachian culture is supported by the work done by Staley. She discovered that increased communication and connectivity between Appalachian youth and mainstream American culture led older Appalachians to believe that their descendants were abandoning the traditional regional culture, despite their best efforts to preserve that culture (Staley, 1998). The results of this study indicate that hostility towards outsiders, and a positive view of the coal industry may be parts of the traditional regional culture that young Appalachians are not co-opting from their elders.

When viewed through the lens of Bell's research on the barriers to participation in the Appalachian environmental justice movement, this potential culture shift among young Appalachians both becomes clearer and raises more questions. If young Appalachians really are more connected to mainstream American culture, then the effect of depleted social capital on climate change beliefs is possibly weakening among this group. Increased connectivity with those outside of Appalachia make it easier for young Appalachians to form relationships with those who have positive climate change beliefs, which in turn influences their own beliefs.

Additionally, the fact that young Appalachians are more likely to have positive climate change beliefs may be an indication that the coal industry's efforts to position itself as a determining characteristic of the Appalachian identity are having a limited effect on this group. The prevalence of positive climate change beliefs among the sample group indicates that young

Appalachians are not falling prey to the coal industry's efforts to shape the Appalachian identity. If this theory proves correct, it offers a significant opportunity for environmental justice and climate change mitigation activists to build future support in Appalachia.

Furthermore, Denham's (2015), and Weaver & Holkamp's (2016) work on the Appalachian identity presented this in-group significance to be partially stemming from the historical isolation of those in the region from outsiders, with the exception of those who came to the region to take advantage of its natural resources. When connected to the work done by Burke & Welch-Devine (2015), this offers a potential explanation that young Appalachians are socialized in a regional culture that is less isolated than it used to be and are therefore less likely to reject beliefs held and promoted by those from other regions.

Analyses that were not part of the primary goal of this study also revealed some important findings. First, there are no significant differences in climate change beliefs between Appalachian respondents and non-Appalachian respondents. This finding does not fall in line with previous research. Specifically, the national poll conducted by Leiserowitz, Maibach, and Roser-Renouf found Appalachians to be less likely to believe in climate change than other Americans (2009). In this study, most Appalachian respondents believe in climate change, believe that humans are causing it, believe that it will impact themselves or their communities, and want the government to prioritize the development of alternative energy sources. The discrepancy between the results of this study and previous research likely stems from the sample population skewing young. Even though this finding clashes with some previous research, it is supported by a national trend established by other research (Davidson & Haan, 2011, Safi, Smith & Liu, 2012). These studies found that members of younger generations were more likely to have positive climate change beliefs.

An additional finding fell in line with those of previous social research. This study found that political affiliation is still the best demographic indicator of climate change beliefs, an idea presented by Davidson & Han in 2011, and Safi, Smith, and Liu in 2012. This research serves as an extension of the study of this relationship to the Appalachian region. Young adult Appalachians who are members of the Republican party are less likely to have positive climate change beliefs than those who belong to the Democratic party. This is a similar result to those found in the study of other populations.

In addition to clarifying the relationship between personal connection to the coal industry and the climate change beliefs of Appalachians, this study also makes some contributions to the theoretical debate about climate change belief formation. The finding that there is no correlation between financial dependence on the coal industry and the likelihood of holding positive climate change beliefs weakens the theory of risk perception. Since this theory presents individuals as rationally weighing the risks and benefits of potential outcomes and forming their beliefs in relation to that calculation, the findings of this study do not support the theory. In order for the results to support this theory the members of the sample who were financially connected to the coal industry would have to be less likely to hold positive climate change beliefs, because those beliefs would support mitigation efforts that are perceived to be a financial risk.

The results are also contrary to what Safi, Smith & Liu found in their study of the climate change beliefs of farmers. Their study revealed that the farmers who were most vulnerable to climate change were more likely to believe in it (2012). Similarly, Davidson & Haan found that the miners they surveyed were less likely to believe that climate change was the result of human activity because efforts to stop climate change were a perceived economic threat (2011). However, in this study, those who may experience financial risk from climate change mitigation

efforts are no less likely to support those efforts. Therefore, their beliefs are not being shaped by risk perception alone. Additionally, a greater percentage of this study's respondents believe in climate change than believe that climate change will impact themselves, their families, and/or their communities. This indicates that individuals are not simply basing their climate change beliefs on whether they perceive climate change to be a threat.

Finally, even though the results of this study contradict the theory of risk perception, they do not provide the necessary evidence to fully support the social identity group approach on their own. However, they do point toward cultural elements playing a role in the formation of climate change beliefs. For example, the finding that political affiliation is still the strongest indicator of climate change beliefs, even in comparison to financial dependence on the coal industry, falls in line with the theory that individuals assimilate their climate change beliefs to the norms and values of a social group to which they belong.

Conclusion

As previously discussed, the study of climate change beliefs is a relatively new area of study for social researchers. Researchers first focused on cataloging and describing climate change beliefs and found that Appalachians were less likely to believe in climate change than Americans in general. Then, they started looking for patterns of beliefs, and found that political affiliation was a strong indicator of beliefs with Democrats being more likely to believe in climate change than Republicans. And now, researchers are attempting to understand how climate change beliefs are formed. Some point to risk perception as the primary motivator in belief formation, and others highlight the roles played by culture and identity.

This study contributes to this theoretical debate by applying it to the study of climate change beliefs in Appalachia. Specifically, I sought to discover if there is a relationship between

financial connection to the coal industry and the likelihood of holding positive climate change beliefs (i.e. believing in the existence of climate change, believing that human activity is causing climate change, believing that climate change will have negative consequences for oneself and their community, and supporting the development of alternative energy sources).

I hypothesized that there would be no relationship between financial connection to the coal industry and climate change beliefs. This hypothesis was informed by the social identity group approach to the formation of climate change beliefs that holds that individuals assimilate their climate change beliefs to those most commonly held by members of their social groups. To answer this question, a group of young adults who were enrolled in introductory sociology courses at Morehead State University were surveyed on their relationship to the coal industry and their beliefs about climate change.

The results were analyzed using cross-tabulations, frequency tables, and chi square tests. It was found that biological sex and political affiliation have statistically significant relationships with some climate change beliefs. Specifically, female respondents are more likely to believe in climate change, and Democrats are more likely to believe that humans are causing climate change. Furthermore, the percentage of respondents connected to the coal industry who exhibit positive climate change beliefs varied only slightly from the percentage of respondents with no connection to the coal industry with positive climate change beliefs. Therefore, no significant relationship between climate change beliefs and personal connection to the coal industry was found.

These results supported the hypothesis with age as a limitation, because the sample population skewed young (all respondents are under the age of 30). The results weakened the theory of risk perception, because those who would be put at financial risk by climate change

mitigation efforts are not less likely to support them. This led to the theory that the decline of the coal industry in Appalachia may have decreased the significance of the coal industry not just in the Appalachian economy, but also as a part of the Appalachian identity. Additionally, previous research attributed the prevalence of negative climate change beliefs in Appalachia to a culturally shaped suspicion of outsiders. If correct, the above results indicate that young Appalachians may not be adopting this part of Appalachian culture as commonly as previous generations.

The findings are not enough to fully support the social identity group approach to climate change belief formation, but they do serve to advance past research that indicates that climate change beliefs are not simply formed by the perception of climate change as a personal threat. In addition to this implication on the theoretical debate about the climate change belief formation process, the results of this study are important because they help to close the gap in research that left the climate change beliefs of Appalachians only vaguely explored. Lastly, these findings further clarify how climate change beliefs are formed in a way that will help activists and scientists build more public support for climate change mitigation efforts.

Limitations and Further Research

Given the importance of this subject, additional research is recommended. This study has some limitations that influence the ability of the results to be generalized to the Appalachian population as a whole. Primarily, this project is a study of a relatively small group of Appalachians under the age of 30. In order to adequately study the climate change beliefs of Appalachia as a whole, a larger sample size that includes older Appalachian residents is necessary. A study of the climate change beliefs of Appalachians of different generations could have significant implications on future efforts to mitigate climate change, especially since the

above findings point to a generational shift in the common climate change beliefs of Appalachians.

Another potential subject of future research centers around the search for other possible demographic indicators of climate change beliefs. While other demographics, such as race, religion, sexuality, and socioeconomic status, have been lightly analyzed for a connection with climate change beliefs elsewhere, they have not been adequately studied in application to the Appalachian population. Lastly, the opportunity for further research that may be the most likely to contribute to the understanding of climate change belief formation is a deeper look into the roles played by social identity and culture. Specifically, there is an opportunity to build off of the results of this study as an attempt to understand why young Appalachians are more likely to have positive climate change beliefs than previous research indicated. Does it have something to do with the region becoming less isolated over time? Are the coal industry's ideology construction efforts to position themselves at the center of Appalachian culture and economics beginning to fail? Is it simply a result of young people being more likely to believe in climate change in general? These questions would best be studied by a more detailed qualitative analysis that looks into specific social identities that are held by young Appalachians and how they correlate with climate change beliefs.

References

- Arbuckle, J. G., Morton, L. W., & Hobbs, J. (2013). Farmer beliefs and concerns about climate change and attitudes toward adaptation and mitigation: Evidence from Iowa. *Climatic Change*, 118(3-4), 551-563. doi:10.1007/s10584-013-0700-0.
- Bell, M. (2016). Chapter 10. In *An Invitation to Environmental Sociology*. USA: Sage Publications.
- Bell, S. E. (2016). *Fighting king coal: The challenges to micromobilization in central Appalachia*. Cambridge, MA: The MIT Press.
- Bell, S. E., & York, R. (2010). Community Economic Identity: The Coal Industry and Ideology Construction in West Virginia. *Rural Sociology*, 75(1), 111-143. doi:10.1111/j.1549-0831.2009.00004.x.
- Burke, B. J., Welch-Devine, M., & Gustafson, S. (2015). Nature Talk in an Appalachian Newspaper: What Environmental Discourse Analysis Reveals about Efforts to Address Exurbanization and Climate Change. *Human Organization*, 74(2), 185-196. doi:10.17730/0018-7259-74.2.185
- Cook, M., Thompson, Carol B., Barry, Joyce, Kim, Yeon-Su, & Parson, Sean. (2016). The Political Economy of Mountaintop Removal Mining in West Virginia: Hegemony and Resistance, ProQuest Dissertations and Theses.
- Cooper, Christopher & Knotts, Gibbs & Livingston, Don. (2010). Appalachian Identity And Policy Opinions. *Journal of Appalachian Studies*. 16. 26-41. 10.2307/41446840.
- Dai, J., Kesternich, M., Löschel, A., & Ziegler, A. (2015). Extreme weather experiences and climate change beliefs in China: An econometric analysis. *Ecological Economics*, 116, 310-321. doi:10.1016/j.ecolecon.2015.05.001
- Davidson, D. J., & Haan, M. (2011). Gender, political ideology, and climate change beliefs in an extractive industry community. *Population and Environment*, 34(2), 217-234. doi:10.1007/s11111-011-0156-y
- Denham, S. A. (2015). Does a Culture of Appalachia Truly Exist? *Journal of Transcultural Nursing*, 27(2), 94-102. doi:10.1177/1043659615579712
- Dunlap, R. E., & Mccright, A. M. (2008). A Widening Gap: Republican and Democratic Views on Climate Change. *Environment: Science and Policy for Sustainable Development*, 50(5), 26-35. doi:10.3200/envt.50.5.26-35
- EKY Works: Workforce Analysis. (2016, August). Retrieved June 14, 2018, from [http://www.ekcep.org/sites/default/files/EKY Deliverable 9.7.16.pdf](http://www.ekcep.org/sites/default/files/EKY_Deliverable_9.7.16.pdf)

- Fielding, K. S., & Hornsey, M. J. (2016). A Social Identity Analysis of Climate Change and Environmental Attitudes and Behaviors: Insights and Opportunities. *Frontiers in Psychology, 7*. doi:10.3389/fpsyg.2016.00121
- Kahan, Dan M., Cultural Cognition as a Conception of the Cultural Theory of Risk (April 21, 2008). Handbook of Risk Theory, S. Roeser, ed., Forthcoming; Harvard Law School Program on Risk Regulation Research Paper No. 08-20; Yale Law School, Public Law Working Paper No. 222. Available at SSRN: <https://ssrn.com/abstract=1123807>
- Kennedy, B. (2018, May 16). Most Americans say climate change affects their local community, including two-thirds living near coast. Retrieved October 12, 2018, from <http://www.pewresearch.org/fact-tank/2018/05/16/most-americans-say-climate-change-affects-their-local-community-including-two-thirds-living-near-coast/>.
- Kentucky, Energy and Environment Cabinet. (2017, August 2). *Kentucky Quarterly Coal Report*. Retrieved June 14, 2018, from [http://energy.ky.gov/Coal Facts Library/Kentucky Quarterly Coal Report \(Q2-2017\).pdf](http://energy.ky.gov/Coal Facts Library/Kentucky Quarterly Coal Report (Q2-2017).pdf)
- Kruke, L., Larson, K., Klinsky, S., & White, D. (2015). Young people and climate change: beliefs and behavioral choices among high school students from Phoenix, AZ and Plainfield, IL. *ProQuest Dissertations Publishing*.
- Leiserowitz, A., Maibach, E., & Roser-Renouf, C. (2009, May 20). Global Warming's Six Americas. Retrieved June 27, 2018, from <http://climatecommunication.yale.edu/publications/global-warmings-six-americas-2009/>
- Lievens, M. (2010). Towards an eco-Marxism. *Radical Philosophy Review, 13*(1), 1-18.
- Mase, A., Cho, H., & Prokopy, L. (2015). Enhancing the social amplification of risk framework (SARF) by exploring trust, the availability heuristic, and agricultural advisors' belief in climate change. *Journal of Environmental Psychology, 41*, 166-176. DOI: 10.1016/j.jenvp.2014.12.004.
- Mase, A. S., Gramig, B. M., & Prokopy, L. S. (2016). Climate change beliefs, risk perceptions, and adaptation behavior among Midwestern U.S. crop farmers. *Climate Risk Management*. doi:10.1016/j.crm.2016.11.004
- Price, J. C., Walker, I. A., & Boschetti, F. (2014). Measuring cultural values and beliefs about environment to identify their role in climate change responses. *Journal of Environmental Psychology, 37*, 8-20. doi:10.1016/j.jenvp.2013.10.001
- Rice, J., Burke, B., & Heynen, N. (2015). Knowing climate change, embodying climate praxis: Experiential knowledge in southern Appalachia. *Annals of the Association of American Geographers, 105*(2), 253-262.

Safi, A. S., Smith, W. J., & Liu, Z. (2012). Rural Nevada and Climate Change: Vulnerability, Beliefs, and Risk Perception. *Risk Analysis*, 32(6), 1041-1059. doi:10.1111/j.1539-6924.2012.01836.x

Shepherd-Powell, J. A., & Anglin, M. K. *Beyond the coal divide: The cultural politics of natural resource extraction in central Appalachia* (Unpublished doctoral dissertation). University of Kentucky.

Staley, K. L. (1998). Identity in a Mountain Family. *Journal of Appalachian Studies*, 4(2), 239-253. Retrieved July 15, 2018.

Stanley, S., Wilson, M., Sibley, C., & Milfont, T. (2017). Dimensions of social dominance and their associations with environmentalism. *Personality and Individual Differences*, 107, 228-236. DOI: 10.1016/j.paid.2016.11.051.

Taylor, A., Bruin, W., & Dessai, S. (2014). Climate change beliefs and perceptions of weather-related changes in the United Kingdom. *Risk Analysis*; 34(11), 1995-2004. DOI: 10.1111/risa.12234.

Weaver, R., & Holtkamp, C. (2016). Determinants of Appalachian Identity: Using Vernacular Traces to Study Cultural Geographies of an American Region. *Annals of the Association of American Geographers*, 106(1), 203.

Zahran, S., Brody, S. D., Grover, H., & Vedlitz, A. (2006). Climate Change Vulnerability and Policy Support. *Society and Natural Resources*, 19, 771-789. doi:10.1080/08941920600835528.

Appendix

Survey

Dear participant:

My name is Rebecca Johnson, and I am a graduate student here at Morehead State University. For my thesis project, I am studying the climate change opinions of Appalachians. Because you are a student at Morehead, I am inviting you to participate in this research by filling out the attached survey.

The survey only asks you to circle answers and should take no more than a few minutes to complete. The survey is **not** a required component of this course. You will not receive credit for filling it out, and you can choose not to participate with no consequence to your grade.

To ensure confidentiality, do not include your name. Copies of this project will be provided to my advisor and a board of instructors, but I am the only person who will see individual surveys. Also, participation in this project is limited to students age 18 or older, so if you are under the age of 18, please return a blank survey.

You may choose not to participate at any time by returning an incomplete or blank survey.

Thank you for taking the time to assist me in this project.

Sincerely,

Rebecca Johnson

Please circle your answers.

1. Do you live in one of the following areas: Eastern Kentucky, West Virginia, Southeastern Ohio, Southwestern Virginia, Western North Carolina, Eastern Tennessee?

Yes No

2. Are you currently employed in the coal industry?

Yes No

3. Is a member of your household other than yourself currently employed in the coal industry?

Yes No

4. Is a member of your immediate family other than those in your household currently employed in the coal industry?

Yes No

5. Select your current age range:

18- 29 30- 39 40- 49 50- 59 60 and Older

6. Select your sex: Male Female Other

7. What is your political affiliation?

Republican Democrat Independent Other None

8. Do you believe that climate change is happening?

Yes No

9. Do you believe that human activity is causing climate change?

Yes No Climate change does not exist.

10. Do you believe that climate change will negatively impact you, your family, and/or your community?

Yes No Climate change does not exist.

11. Which do you think should be a higher national priority, increasing the production of fossil fuels (ex. oil, coal, natural gas) or developing alternative energy sources (ex. solar, wind)?

Increasing production of fossil fuels Developing alternative energy sources

