

CLIMATE CHANGE MITIGATION ACTION: IS STORY-BASED COMMUNICATION
EFFECTIVE FOR THE GOVERNMENT OF THE CITY OF FLAGSTAFF, ARIZONA TO
INCREASE RESIDENTS' PARTICIPATION?

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ABSTRACT

CLIMATE CHANGE MITIGATION ACTION: IS STORY-BASED COMMUNICATION EFFECTIVE FOR THE GOVERNMENT OF THE CITY OF FLAGSTAFF, ARIZONA TO INCREASE RESIDENTS' PARTICIPATION?

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The City of Flagstaff has developed the Flagstaff Carbon Neutrality Plan which aims to make the city carbon neutral by 2030. In the plan it is mentioned that “action by residents across the community is needed” for this goal to be achieved. However, there is no mention of how this will be achieved. Using the story-based strategy framework to design my research and analyze the results, I developed an experiment to find out if story-based communication is effective to communicate climate change mitigation action and promote public action to the residents of Flagstaff, Arizona. There were two study groups: one where participants were exposed to communication based on facts, and another where participants were exposed to story-based communication. Participants were surveyed on the same questions before, immediately after, and one week after exposure; so that I could compare any differences in their responses. The results of my experiment align with existing literature which indicate that story-based communication seems to be more effective than other forms of communication. However, my experiment found a polarizing pattern on respondents, as fewer to no participants seemed to be neutral one week after exposure to story-based communication. I hope that my research will function

as a guide to the city of Flagstaff on where to focus to achieve their goals pertaining to the Flagstaff Carbon Neutrality Plan, and that it will inspire other researchers to research whether the polarization effect that was observed in my experiment would be observed in future studies as well.

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Introduction

The United States of America is currently and has been for many consecutive years the largest economy on the planet and a worldwide trendsetter in many fields. Many would expect such a country to be a leader in several areas, one of them being environmental sustainability actions. However, the U.S.A. has generally made progress on climate change mitigation at a slower pace than other highly developed nations, such as these in the European Union. One of the reasons this is happening can be residents' perspectives on climate change. According to Marlon et al. (2021) most Americans believe that climate change truly exists, and they are generally concerned about it. However, climate change is still considered to be a low priority in the context of other societal issues in the U.S. society.

In my thesis, I want to explore effective ways on how climate change can be prioritized more as a social issue among residents in the U.S. -specifically, by asking how communication about climate change can be designed to promote action. I have focused my thesis on residents of Flagstaff, Arizona. In detail, I tested whether story-based communication messaging (Reinsborough & Canning, 2017) is effective in building resident support relating to climate change mitigation in general and the Flagstaff Carbon Neutrality Plan specifically. The research revealed insights useful to municipal and state governments as well as to whomever has interest in raising the concern of climate change to the public. It tested story-based communication theory and found effects that have not been mentioned in existing literature before.

Personal Motivation

I believe that when people act collectively, they have the power to change everything. But to act collectively, the public needs to become aware and concerned about an issue. According to Moser (2006), individuals acting collectively play two critical roles in climate mitigation. The first one is that they can exert influence via consumption patterns as consumers of environmental resources, material goods, and energy, and the second one is that they can exert political influence by supporting climate-friendly policies. I hope that public decision makers and administrators will find my findings useful on how they can use already existing tools such as marketing and communication to shift public opinion to become more environmentally friendly. The immediate beneficiaries from my research I intend to be public decision makers and specifically the City of Flagstaff.

Research Significance

The Flagstaff's Carbon Neutrality Plan (Niemann, 2021) aims to achieve carbon neutrality for the city by the year 2030. For this to happen, residents' participation is crucial, but it is unlikely to happen without effective communication from the city. Though this research focuses on Flagstaff, the findings could be applied in other U.S. cities similar to Flagstaff in terms of population demographics and size. Therefore, the study aims to explore how social change can be achieved by utilizing the power municipal and state governments have to influence public opinion with the goal of accelerating progress towards environmental sustainability. Additionally, because

many environmental sustainability actions can bring long-term financial benefits to individuals and societies along with the environmental benefits, the application of my research's findings has the potential to enhance Flagstaff's local economy in the long run by reducing waste in resources.

Personal background

Having lived virtually all my life in the European Union (which aspires to be the first climate neutral continent by 2050 and invests significantly in it) and now having moved to the U.S.A., many cultural differences are apparent to me in everyday life as well as in the relations between people, governments, and the environment. I have observed that climate change concerns more European citizens and governments than it does their U.S. counterparts. E.U. governmental institutions spend a significant amount of money not only on building environmentally sustainable infrastructure, but also on marketing and communication campaigns that raise awareness on climate change and environmental sustainability among E.U. residents. Story-based communication is often utilized to communicate these messages over social media, showcasing stories from certain regions of the Union or stories of individuals who achieved something beneficial for the environment or the local society thanks to environmental sustainability practices.

Testing whether a similar approach to environmental sustainability communication would be effective in Flagstaff is remarkably interesting to me

because if it is found to be effective, then the city of Flagstaff could be inspired by the effective communication already implemented in other countries. Specifically, the city of Flagstaff could reconsider the approach it takes in communicating climate change mitigation action. In this way city officials could start communication campaigns quickly and save financial resources by not having to conduct extensive marketing research to start such campaigns. Having majored in Marketing Communications for my bachelor's degree, I am interested in using the knowledge I have obtained during my studies and my experience to conduct effective research which could test whether story-based messages would be effective to help the city of Flagstaff achieve goals pertaining to the city's Carbon Neutrality Plan. Effective messages could potentially be used by other U.S. municipal and state governments as well to help them achieve positive change in societies and social cohesion on the importance of climate change.

Research Question

In light of my experience and of my analysis of the problem of achieving effecting climate change communication, I developed this specific research question: Is story-based communication messaging effective for the City of Flagstaff to use as a tool to contribute to the achievement of the goals described in the Flagstaff Carbon Neutrality Plan?

The city of Flagstaff has created a comprehensive plan to make the city more environmentally friendly by achieving carbon neutrality by the year 2030 (The Flagstaff Carbon Neutrality Plan, 2021). This goal entails numerous actions, many of which require active resident participation and action, such as better utilization of public transport and home energy efficiency improvement. The plan mentions that “City actions alone will not be sufficient. Action by residents across the community will also be needed” (p. 39). Action refers mostly to climate change mitigation efforts and not climate adaptation. However, apart from mentioning some communication channels that will be used, no other mention exists in the plan of specific marketing and communication strategies that can help achieve these goals. The channels of communication mentioned in the plan are social media platforms, events, community conversation, volunteer opportunities, and training which, again, are overly broad and not specific. My research question is intended to fill this gap in the city’s Carbon Neutrality Plan by testing whether story-based communication can be more effective in promoting community action and ultimately realizing the plan’s goals.

Theoretical Framework

Climate change is one of the most pressing global issues of our time. It is a complex problem that requires coordinated and collaborative efforts from individuals, communities, organizations, and governments worldwide. Effective communication is essential to address climate change because it is necessary to build

awareness, understanding, and support for the actions needed to mitigate and adapt to its impacts.

Citizens have a crucial role to play in addressing climate change. As individuals, we can take action to reduce our carbon footprint, promote sustainable practices in our daily lives, and advocate for policy changes that support a transition to a low-carbon economy. However, achieving meaningful progress on climate change requires collective action, which is why effective communication is essential to mobilize citizens to act together.

According to Corbett (2021) communication is essential to address climate change. In this context, the author mentions that stories can effectively convey beliefs and stimulate engagement and action, while they are also characterized as "powerful." Information and news regarding the climate crisis circulate daily which contributes to awareness raising and cognition. However, too often such information has not led to engagement. Engaging stories instead can be narrated so that communication can expand beyond dull factual messages about climate change.

Story-based Strategy

The theoretical frame I am using for my thesis is story-based strategy, which is "an approach to social change that has emerged from the experiments and innovations of a diverse community of practitioners affiliated with the Center for Story-based Strategy over the past 15 years" (Reinsborough & Canning, 2017, p. 40).

This approach arose from inquiry into how to innovate strategies that bring social change as a response to the messaging demands and movement building of the globalized information era. How can voices of justice compete in an algorithm-driven, multiplatform, and clickbait media environment of 24-hour infotainment? The Center for Story-based Strategy began in 2002 as a strategy study examining the importance of narrative in movement creation, experimenting with culture-shifting interventions, and developing grassroots activists' capacity to "change the story." These experiments grew into what became known as story-based strategy over the next decade, as the Center trained thousands of organizers and collaborated with hundreds of grassroots groups and coalitions around the United States.

The Center for Story-based Strategy is located in Oakland, California and "is a national movement building organization dedicated to harnessing the power of narrative for social change." It was originally founded as the smartMeme Strategy and Training Project in 2002. (Reinsborough & Canning, 2017, p. 256).

Story-based strategy combines social movement building with an examination of narrative power, placing storytelling at the core of social change. This approach involves looking at social change strategy through a narrative lens, recognizing that every topic has an established network of existing stories and cultural assumptions that frame public understanding. At the heart of story-based strategy is the recognition that stories have the power to shape public opinion and influence social change. By analyzing the current narrative around a problem, communicators can identify opportunities to change it through strategic intervention. Through the use of

storytelling, communication professionals can challenge existing narratives and create new ones that resonate with a broader audience. By framing social issues in a way that speaks to people's values and emotions, story-based strategy can help to mobilize public support for change.

According to Reinsborough and Canning (2017) storytelling is a timeless art form that has always been at the heart of social reform efforts, but in today's world, the power of narrative has become even more important in maintaining social control. While many people use the terms "narrative" and "story" interchangeably, they are distinct concepts with different characteristics. Stories are individual, bounded accounts of events with a clear beginning, middle, and end. The scale and content of stories vary widely, reflecting the diversity of human experiences. In contrast, narratives are larger, more open-ended, and less bound in a linear sequence. They consist of multiple smaller, interrelated stories that are symbolic of the larger narrative. Narratives are powerful tools for shaping public opinion and influencing social change. They provide a framework for interpreting events and understanding the world around us. Narratives can also be used by social movements to challenge existing power structures and promote social justice. By creating and disseminating alternative narratives, social movements can challenge dominant narratives and change the way people think about social issues. Storytelling is a powerful tool for creating and disseminating these alternative narratives, and it has played a crucial role in many successful social reform efforts throughout history.

Humans live in a world defined by stories. The power of stories can unite or divide people(s), fade issues or spotlight new ones. They can deceive, inform, enlighten, entertain, or even do all the previously mentioned. Narrative power works in this way: people grasp stories from several and diverse sources including personal experience, family, media, educational, cultural, and religious institutions. Some stories are part of cultural background while others are absorbed consciously. These stories teach individuals the functions of a society and create shared culture and identities. The most powerful of these stories operate as contemporary mythologies.

The strategy argues that myths are meanings and should not be limited by the common use of the term, which often is used instead of the term *lie*. Meaning, unlike facts, does not exist in the world to be discovered but is generated by interpretation humans make. The powers of stories derive from their ability to provide meaning and not necessarily factual truth. Thus, narrative is one of the primary ways in which humans create meaning in the world. Stories are not meaningful to audiences just because they are factually true. Often the opposite happens: people believe that a story is true when it is meaningful to them, connects with their values, or relates to their experiences in a compelling way. Also, the meaning of a story is not fixed, but can change depending on the context in which it is told and the interpretations that are made. This is because meaning is subjective and is generated by the person who is interpreting the story. Different people can interpret the same story in different ways, depending on their own experiences and beliefs.

There is a narrative side to all power relationships since humans understand the world and their role in it through stories; therefore, stories incorporate power. This could be the power to normalize unjust situations or justify acts of violence. Similarly, making changes imaginable, urgent, and convincing people to see a better future are all within the power of stories. This is of utmost importance as, according to Friederici (2022), the narratives that prevail in addressing climate change tend to have predetermined endings, giving a sense of inevitability. Therefore, the power of stories can empower social change.

Since there are narratives that have been already established in the United States regarding climate change, for a new narrative, more compelling to the general public to be established, the story-based strategy provides a framework for the generation -or deconstruction- of a social change narrative. This can be very useful both for my research experiment as well as in future application of my research's findings. Reinsborough & Canning, 2017 suggest that a current narrative should be first deconstructed in order for a new one to be introduced effectively. In order for prospective change makers to achieve change through their narrative, they should design it in a way that it will connect with the values of their targeted audiences. Additionally, the narrative should challenge underlying assumptions and outcompete opposing narratives. To achieve this there is a technique that has been developed by the Center for Story-based Strategy named the "battle of the story" framework. According to this framework the central elements of stories are conflict, characters, imagery, foreshadowing and assumptions. *Conflict* is what makes a story interesting

enough so that the audience will care about the outcome of the story. The way conflict is framed is what defines the story's point of view, which is crucial to how power operates in the story. *Characters* provide ground for the audience to relate. The dynamics of who gets to "speak" in a story, how sympathetic they are and who is represented as heroes, villains or victims are especially important to how power operates in the story. *Imagery* is what drives today's mass media since effective stories use language that offers powerful images. *Foreshadowing* suggests a specific future or makes promises about the resolution of a conflict. Finally, *assumptions* combine all the elements of a story because they are unmentioned foundations that need to be accepted by someone to believe the story is true. The most essential element of a story is probably to identify and challenge underlying assumptions (Reinsborough & Canning, 2017).

Literature Review

Climate change is a global phenomenon that has been widely discussed in the scientific and political spheres. Understanding perceptions of climate change among the general public is crucial in order to develop effective communication and policy strategies. To do so, it is important to understand how perceptions have evolved over time.

Over years, a number of studies have found that the majority of Americans believed in the existence of climate change and its human causes; however, they did not prioritize it as a political issue (Leiserowitz et al., 2013). Myers et al. (2012), for example, found that while 66 percent of Americans believed that climate change was happening, only 42 percent believed that it was caused by human activities. Additionally, only 30 percent of Americans considered climate change to be a "very serious" problem, and only 42 percent were willing to pay more for energy if it would reduce the effects of climate change.

In the following years, more recent studies have shown that perceptions of climate change among Americans have shifted. In 2018 Chryst et al. found that the percentage of Americans who believed that climate change was happening rose to 72 percent, and the percentage who believed it was caused by human activities increased to 63 percent. Additionally, the percentage of Americans who considered climate change to be a "very serious" problem went up to 39 percent. It is also indicated in the same study that there was a greater willingness to pay more for energy if it would reduce the effects of climate change.

In 2020, Leiserowitz et al. found that perceptions of climate change among Americans had become more polarized along political lines. Specifically, while 85 percent of Democrats believed that climate change was happening and was caused by human activities, only 50 percent of Republicans held these beliefs. Additionally,

only 34 percent of Republicans considered climate change to be a "very serious" problem, compared to 63 percent of Democrats.

As we move into 2023, more recent studies have shown that perceptions of climate change continue to become more polarized along political lines, with the majority of Democrats and Independents believing in the existence of climate change and its human causes, while the majority of Republicans say they do not do so. Furthermore, the general public has become more aware of the impacts of climate change and the need for immediate action. A growing number of Americans support policies to reduce carbon emissions and to increase the use of renewable energy sources (Ballew et al., 2022).

Perceptions of climate change among US residents have shifted over the past decade, with an increasing number of Americans believing in the existence of climate change and its human causes, and a growing number willing to take action to reduce the effects of climate change (mitigation action). However, perceptions of climate change have become more polarized along political lines, with Democrats more likely to believe in the existence of climate change and its human causes, and Republicans less likely to do so. Therefore, it is crucial for communication and policy strategies to take into account these political divisions in order to effectively engage the public.

Although there has been a shift of perceptions regarding climate change during the past decade, United States residents continue to see climate change as a low priority among other societal issues, especially if compared with their European

counterparts (Corner, et al. 2015). Researching why this is the case is also important for effective communication to be developed.

One reason why climate change is seen as a low priority among residents of the United States of America is a lack of understanding and knowledge about the issue. According to Lee et al. (2015) many have a limited understanding of the causes and consequences of climate change, depending on their education level. This lack of understanding can make it difficult for individuals to see the relevance of the issue to their daily lives, and to prioritize it accordingly. It can also become a barrier to meaningful action on climate change because when people do not understand the issue, they may be more susceptible to misinformation and disinformation about climate change leading, to perceptions becoming formed from false facts.

Another reason why climate change is seen as a low priority in U.S. residents is a lack of perceived personal relevance. According to Leiserowitz et al. (2021) many Americans do not see themselves as personally affected by climate change, and thus do not feel a sense of urgency to take action. This lack of perceived personal relevance can make it difficult for individuals to prioritize climate change, as they do not see it as a pressing issue that requires immediate attention.

A third reason why climate change is seen as a low priority for those residing in the United States of America is a lack of trust in information and institutions related to climate change. Lee et al. (2015) found that many Americans do not trust the information and institutions that are involved in communicating climate change.

This lack of trust can make it difficult for individuals to engage with the issue, as they may not believe that the institutions are providing accurate and reliable information.

A fourth reason is the presence of competing priorities. Many Americans prioritize issues such as the economy, jobs, and healthcare over climate change. This can make it difficult for individuals to prioritize climate change, as they may see it as less pressing than other issues that they perceive as having a more immediate impact on their lives.

Additionally, the perceived cost of addressing climate change can also play a role on why some American residents see it as a low priority. Studies have found that individuals are less likely to support policies to address climate change if they perceive the cost as too high, either in terms of economic or personal sacrifice (Hamilton & Stampone, 2013). For example, individuals may be unwilling to pay more for energy or to make lifestyle changes if they believe it would significantly impact their standard of living and cause them inconvenience.

Lastly, political polarization, as mentioned before too, has been identified as a barrier to addressing climate change. Opinions on climate change have become increasingly polarized along political lines, with Republicans less likely to believe in the existence of climate change and its human causes than Democrats and Independents (Leiserowitz et al., 2020). This can make it difficult for people to prioritize climate change, as they may not believe in the issue based on their political ideologies.

Given the polarizing nature of the subject, those who communicate climate change mitigation messages must be very cautious when framing these messages in order to be effective. However, this can be challenging due to the diverse perspectives and values held by different audiences. Therefore, it is important to research some approaches that can be effective in communicating controversial subjects, such as climate change in the USA.

One approach that has been found to be effective in doing so is the use of storytelling and personal narratives. Studies have found that personal stories and narratives can help to make complex and abstract issues more relatable and understandable for audiences. Additionally, personal narratives can help to build empathy and emotional connection with the audience, which can increase the likelihood of them taking action on the issue (Braddock & Dillard, 2016).

Another approach suggests that the utilization of visuals and imagery can be a powerful tool for communicating controversial subjects. Brossard & Scheufele (2013) found that visual aids such as infographics, videos, and photographs can effectively assist in making complex information more accessible and understandable for audiences. Additionally, visual aids can effectively convey the emotional impact of an issue, which can increase the likelihood of the audience taking action.

It is also important to consider the audience when communicating controversial subjects. Scheufele (2014) has found that tailoring messages and strategies to the specific values, beliefs, and concerns of the audience can increase

the effectiveness of communication. For example, if the audience is particularly concerned about the economic impacts of an issue, it may be more effective to communicate the economic benefits of action taking, rather than the environmental benefits.

Transparency and honesty are essential when communicating controversial subjects. Fairbanks et al. (2007) supports that transparency and honesty are crucial for building trust with the audience, which in turn increases their likelihood of taking action on the issue. It also creates feedback channels between citizens and decision-makers enabling the latter to evaluate and adjust policies accordingly.

The above-mentioned create a new question. Is the communication that the public receives not effective or is it not adequate? What about the information deficit model?

The information deficit model is widely discussed in the field of science communication; it suggests that the public's lack of understanding or acceptance of scientific issues is due to a deficit of information (Suldovsky, B. 2017). According to this model, if the public is provided with more and better information, they will come to understand and accept science. However, research over the past several years has challenged the effectiveness of this model.

One criticism for the information deficit model is that it underestimates the complexity of the public's understanding and acceptance of science. According to Kahan (2012) people's understanding and acceptance of science is shaped by a wide

range of factors, including their values, beliefs, and social identities. Additionally, people's understanding of science is often influenced by their prior knowledge, experiences, and the context in which information is presented (Scheufele, 2014). Therefore, simply providing more information may not be sufficient to change people's understanding and acceptance of science.

Another limitation of the information deficit model is that it does not consider the impact of emotions and values in shaping people's understanding and acceptance of science (Scheufele, 2014). According to Peters et al. (2004) people's emotional reactions to science, such as fear and/or awe, can have a major influence on their understanding and acceptance of science. Additionally, people's values, such as their political or religious beliefs, can also shape their understanding and acceptance of science (Kahan, 2012).

Recent studies have challenged the assumption that providing more information alone is sufficient for changing public understanding and acceptance of science. Nisbet & Scheufele (2009) suggest that the public actively engages with science, interpreting information in light of their own experiences and beliefs. The public's values and emotions also play a role in shaping their understanding and acceptance of science (Kahan et al, 2012). Therefore, simply providing more information may not be sufficient to change people's understanding and acceptance of science, as they may interpret the information in ways that are consistent with their existing beliefs.

Nyhan & Reifler (2010) support that the information deficit model may not be an effective method for addressing public skepticism or mistrust, especially in situations where the information provided is conflicting or complex. Also, the information deficit model can be particularly ineffective when communicating controversial or politically charged issues such as climate change (Lewandowsky et al, 2013).

While the information deficit model has been widely adopted in the past, recent research has highlighted its limitations. Instead, it is important to adopt a more context-specific approach that takes into account the complexity of the public's understanding and acceptance of science and the role of emotions and values. One result of people's emotions and values is the self-categorization that occurs and creates groups of people within society.

Self-categorization is the process by which individuals identify with a particular group or social category and adopt the attitudes and behaviors associated with that group. Self-categorization can play a significant role in shaping individuals' perceptions and actions related to climate change.

One way in which individuals self-categorize themselves in regard to climate change is through their political identity. According to Feinberg & Willer (2011), political identity is a strong predictor of individuals' beliefs and attitudes about climate change. For example, individuals who identify as conservatives or Republicans are less likely to believe in the existence of climate change or to support

policies to address it than those who identify as liberals or Democrats. This may be due to a perceived conflict between addressing climate change and promoting economic growth or individual freedom.

Another way in which individuals self-categorize themselves in regard to climate change is through their environmental identity. This identity is a strong predictor of individuals' behaviors and actions related to climate change (Kollmuss & Agyeman, 2002). For example, individuals who have a strong environmental identity are more likely to engage in behaviors such as recycling, reducing energy consumption, and supporting policies to address climate change.

Moreover, individuals may also self-categorize themselves in regard to climate change based on their demographic characteristics. Age, education, and occupation are all factors that can shape individuals' perceptions and actions related to climate change (Wibeck, 2014). For example, individuals who are older or have less education are less likely to believe in the existence of climate change or to support policies to address it.

Self-categorization can also be influenced by the way in which information about climate change is framed and presented. Studies have found that the framing of climate change information can influence individuals' perceptions and actions related to the issue (Feinberg & Willer, 2011). For example, framing climate change as a problem that primarily affects future generations or remote regions of the world

may lead individuals to perceive the issue as less relevant or less urgent than if it were framed as a problem that affects their community or their own well-being.

Understanding the factors that influence individuals' self-categorization related to climate change is important for communicators looking to effectively engage and mobilize the public on this issue. These factors include political identity, environmental identity, demographic characteristics, and the way in which information about climate change is framed and presented. One approach that can help effectively communicate on climate change is story-based communication.

Story-based communication is a method of communicating information or ideas using stories or narratives as the primary means of conveying the message. This approach is based on the idea that stories are a powerful tool for capturing people's attention, building emotional connections, and inspiring action. It is argued to be an effective strategy for promoting public action on various issues, including climate change. As outlined in the book " Re:imagining Change: How to Use Story-Based Strategy to Win Campaigns, Build Movements, and Change the World" by Patrick Reinsborough and Doyle Canning, stories have the power to inspire people to take action by connecting them emotionally to the issues and providing a sense of hope and possibility.

Story-based communication is an effective strategy for promoting public action on various issues, including climate change. One key element of story-based communication is the use of narrative frames. Narrative frames are the underlying

stories that shape how we see and understand the world. The book argues that by using narrative frames that align with the values and aspirations of the audience, it is possible to shift their perceptions and inspire them to take action. For example, instead of framing climate change as an environmental problem, it can be framed as a human rights issue that affects marginalized communities the most. This approach can connect the audience emotionally to the issue and inspire them to take action to protect the rights of these communities.

Another key element of story-based communication is the use of personal narratives. Personal narratives are stories that people can relate to on a personal level. The authors of the book argue that by using personal narratives, it is possible to connect the audience emotionally to the issue and inspire them to take action. For example, a personal story about a farmer who was affected by the drought caused by climate change can connect the audience emotionally to the issue and inspire them to act to protect the farmers and their livelihood. The book provides numerous examples of campaigns and movements that have used story-based strategy effectively to win campaigns, build movements, and promote change.

According to Simmons (2019) stories have the ability to activate the brain's emotional centers, making them more memorable and impactful than dry facts or statistics. Stories have been found to be more effective at influencing behavior change than traditional persuasive messages. Also, it has been found that stories can be used to build empathy and increase understanding of different perspectives,

making them an effective tool for promoting social change (Wheeler et al 2020). Personal narratives, in particular, have been found to be effective at challenging stereotypes and promoting understanding of different perspectives (Pennebaker, 2011). Therefore, story-based communication is a powerful tool for promoting public action on various issues, including climate change.

Another reason why story-based communication is effective is that it can help create a sense of identification with the characters, which can lead to increased engagement with the message. People are more likely to identify with characters in stories and therefore become more invested in the message being conveyed. Using stories as a way to convey information has been found to be more engaging for audiences than traditional methods such as lectures or written reports. This is because stories have the ability to transport people to different worlds and perspectives, evoke emotions, and create a sense of connection with the characters and the message (Reinsborough & Canning 2017).

Additionally, story-based communication is effective in promoting public action because it provides a sense of hope and possibility, thereby inspiring people to take action on an issue (Feinberg & Willer, 2011). For example, a study by Chryst et al (2018) found that people who were exposed to a climate change narrative that included a sense of hope and possibility were more likely to take actions to reduce their carbon footprint. Moreover, according to Myers et al. (2012) people who were exposed to a narrative that emphasized the potential benefits of taking action on

climate change, such as economic growth and job creation, were more likely to support climate policies.

Summing up, the perceptions of climate change among U.S. residents have undergone a shift in the past decade, with an increasing number of U.S. residents recognizing the existence of climate change and its human causes. Despite this shift, though, climate change remains a low priority among other societal issues for the majority of United States residents (Marlon et al. 2021).

Effective communication of controversial subjects, such as climate change, remains a challenge. The information deficit model, which assumes that lack of knowledge or misinformation is the primary barrier to public action on climate change, has been criticized as an incomplete explanation of why climate change remains a low priority among U.S. residents. Other factors, such as values, beliefs, and cultural identity, also play a crucial role in shaping public perception and action on climate change. As a result, many people tend to self-categorize themselves according to their cultural identities. In the context of climate change, individuals who identify with pro-climate action groups are more likely to engage in mitigation action. However, to engage those who do not self-categorize themselves in these groups, effective communication of climate change seems essential for doing so on this important issue. Story-based communication seems to be what many studies are suggesting. Therefore, in my thesis I will test if story-based communication is

effective to promote climate change mitigation action in the city of Flagstaff, Arizona by conducting primary research using the methods described below.

Methodology

For the research I conducted, the methodology that fitted the best was case study. According to Blair (2016) a case study methodological approach is recommended when research needs to reply a “how” when the researcher can have limited control over events, and when the focus is on current, real-life contexts. The approach is based on the systematic examination of a single unit of analysis, such as an individual, group, organization, event, or community. The unit of analysis can be either a single case or multiple cases, and the study can be conducted at a single point in time or over a period of time. The case study methodology offers a number of advantages, including the ability to explore complex phenomena in-depth, to identify important variables and relationships, and to understand the context and processes that cause events and outcomes. It is also useful for understanding the perspectives and experiences of individuals and groups, and for exploring the ways in which cultural, social, and historical factors influence events and outcomes. Finally, case study research can provide rich and detailed data that can be used to inform theories, policies, and practice.

The research I conducted matches all the criteria described for a case study methodology. Firstly, it was about what messages are more effective in the local population and, subsequently, how the City of Flagstaff can increase perceived importance for climate change action on Flagstaff residents by using effective marketing and communication strategies. Secondly, I can have very limited to no control on what communication Flagstaff residents receive; and thirdly, the focus of my research is on a current and real-life context, namely climate change mitigation action.

The focus of the research is on the effectiveness of communication strategies, and specifically story-based communication, in increasing the perceived importance of climate change action among residents in Flagstaff. The research explored whether story-based messages are more likely to resonate with residents compared to factual communication.

In conclusion, the case study approach is a great methodology for this research because it allows for an in-depth examination of the challenges and opportunities associated with promoting climate change action in a specific location. The focus on a real-life context, limited control over communication, and examination of a current socio-political context makes the case study approach particularly well-suited for this research. The research provides valuable insights into whether story-based communication is more effective in communicating the controversial issue of climate change and promotes engagement and public participation in Flagstaff.

Methods

Quasi-experimentation

Drawing insights for Flagstaff requires research on the local population. The first method I used for my research is quasi-experimentation. Quasi-experiments are a type of research design that are used to assess the effects of treatments or interventions in real-world settings where random assignment to treatment conditions is not possible or feasible. Unlike true experiments, in which assignment to treatment conditions is determined randomly, in quasi-experiments, the assignment is determined nonrandomly (Bickman & Rog 1998). This makes quasi-experiments well-suited for studying treatments or interventions in real-world settings where randomization is not possible or desirable.

This is particularly useful when studying interventions that cannot be controlled or manipulated in the laboratory, such as educational interventions or exposure to television shows. Quasi-experiments also allow for the examination of the effects of treatments over time and can provide insights into the ways in which treatments affect individuals, groups, or communities. Using the before and after quasi-experimental design, I was able to measure the efficacy of communication messages in specific audiences in Flagstaff.

Secondary Analysis

The second research method I used is secondary analysis. Publicly available data from previously conducted studies provide resources to researchers to examine and analyze new hypotheses, derive additional interpretations, and inform research questions (Sherif, 2018). Secondary analysis is a research method that involves using publicly available data from previously conducted studies to answer new research questions or to gain additional insights into existing data. This approach can provide a cost-effective and time-efficient way for researchers to examine and analyze new hypotheses, as the data collection and processing have already been completed.

One of the main advantages of secondary analysis is that it allows researchers to gain access to large and complex data sets that might not be feasible to collect in a new primary study. This is particularly useful when studying large-scale phenomena, such as population-level health outcomes, or when examining data from long-term studies, such as longitudinal studies that follow individuals over many years. Secondary analysis also provides a way for researchers to re-examine existing data to gain additional insights and to test new hypotheses, which can lead to new and important discoveries. The insights I drew from my primary research methods are combined with valuable data from other scientific studies in an effort to find answers to my research question. Because many messages that are prevailing climate change communication are framed negatively and alarmingly, Wibeck (2014) suggests that research on a more positive framing would be useful to be conducted.

Therefore, the story-based message that I created is framed in a positive way which aims to inspire and empower the audiences instead of trying to create fear.

Survey Details

The way that I implemented these methods in this thesis are the following. For the quasi-experiment I created communication materials (videos) about climate change (mitigation action) and displayed them to two different audiences (study groups). I surveyed the study groups before displaying the message using the Qualtrics software. Then I exposed them to the message and surveyed them again immediately after exposure. Another survey took place after a short period of time (one week) testing the efficacy of the messages in each audience. All surveys contained the same questions. The surveys contained thirty-five questions that were requesting information about the participants' views on environmental policy support, and their opinions about the goals of the Flagstaff Carbon Neutrality Plan as well as some open-ended optional questions where participants could write whatever they wished. The first survey contained questions regarding the respondents' demographics too.

The messages that I exposed the participants to are both short videos, but of two different types. Both videos were about climate change in Flagstaff but one of them depicted a local resident, narrating a story about a recent wildfire in Flagstaff that led to flooding afterwards; it included some personal views and opinions. The

other video was a news report which presented facts about the recent wildfire and how climate change increases the likelihood of new fires due to extensive dry periods.

Research Sample

The participants surveyed were ten people for each of the two study groups, that I recruited in different and diverse locations around Flagstaff. I recruited participants by asking them in person if they would like to participate. These locations were chosen based on the profile of their typical visitor. For example, a grocery store which competes on pricing (Walmart) is more likely to attract many customers who are more cautious of their spending habits. Therefore, it is more likely that such a store attracts people with lower income. On the other hand, another grocery store that focuses on quality (Whole Foods) is more likely to attract customers of higher income. Recruiting people from both stores was an effort to provide diversity in my audience in terms of income. Another example is that I recruited people in a Church, where people are likely to be conservative and in contrast, I did so in a self-administered, anti-capitalist space where visitors are likely to be liberals. In this way I was able to get an inclusive audience for my research which is representative of the Flagstaff population. The city of Flagstaff is known to be home of a diverse population housing residents with different beliefs and of diverse financial and cultural backgrounds. This happens due to its different climate

in Arizona that attracts people from all over the world, its proximity to the Grand Canyon, the Navajo and Hopi nations, and Northern Arizona University which brings students from all over the USA and the world. Many of these students end up residing in Flagstaff permanently, opening businesses and influencing the local population.

Because the quasi-experiment required time investment by the people who participated in it, I used funding, which is intended to help students with their research, from the Sustainable Communities program at Northern Arizona University. I did so to provide incentives to the participants to participate in the entirety of the study. Participants received an Amazon.com gift card of \$25.

IRB challenge with research design

In order to start my research, I had to get approval from Northern Arizona University's Institutional Review Board which I got. My research design was originally a little different but due to IRB restrictions, I had to change it. Specifically, initially I wanted to not let experiment participants know what the subject of the study was, and I wanted to include questions with similar meaning, but worded differently. This would help participants' answers to questions to be less influenced by bias and memory. However, I could not do this because IRB did not allow it. Instead, I let all participants know what I was researching before agreeing to participate in the experiment, and all my questions were more direct. This created two main limitations

to my experiment. The first one is that participants' responses were heavily influenced on the second survey by memory. The second limitation is that responses could be influenced by bias. In detail, when participants respond consciously to a question, they tend to reply to what they consider socially acceptable and not what they actually believe (Bergen & Labonté (2020). However, if people do not really understand the goal of the question, they tend to reflect their true belief in their response. I was not able to attain the latter due to the restrictions IRB imposed on my research. To protect the participants' identity and personal information, I assigned a random number to each participant to match their replies for each part of my research. In this way I did not access each participant's identifiable information during the analysis of the data they provided.

Data Analysis

To analyze the data that I collected from the quasi-experiment I compared how effective each message was to the study group. To measure the effectiveness of the message I compared their answers from the first survey (before they were exposed to the message), the second survey (immediately after they were exposed to the message), and the third survey (after a week from when they were exposed to the message). If there were differences in their replies to the same questions across the three surveys, this indicates that the messages were effective. A lack of change would indicate that the messages did not shift opinions for the specific segment.

Results Summary

The results of the experiment suggest that story-based communication may be slightly more effective than facts-based communication to communicate climate change mitigation action to Flagstaff residents. Specifically, responses in the facts-based study group show that communication based on facts had some effectiveness, but the responses in the study-group which was exposed to story-based communication appear to show somewhat higher effectiveness. However, in certain instances, story-based communication seemed to polarize the participants; some respondents who initially were neutral or did not have strong feelings about an issue were found to either strongly support or strongly oppose a statement or an idea after they were exposed to the message. Some examples of the findings are following:

In the question on whether participants believe that climate change affects the weather in Flagstaff, findings from all three surveys revealed interesting insights regarding the effectiveness of story-based communication. In the facts-based study group, consistent responses were observed across all surveys. However, in the story-based study group, there were noticeable differences. In the first survey, participants were divided between those who agreed and those who remained neutral. In the second survey, only a small percentage of participants expressed neutrality, with the majority agreeing with the statement. In the third survey, a significant portion of

participants, approximately 70 percent, expressed agreement that climate change affects the weather in Flagstaff.

For the question "how much do you think global warming will harm you personally," while slight changes were observed from survey 1 to survey 3, indicating some level of effectiveness of the messages, the story-based communication study group showed more pronounced differences in responses between the three surveys. In fact, story-based communication was particularly effective in shifting opinions of participants who initially believed that global warming would not affect them at all. This was evident both immediately after exposure and after one week of exposure. Approximately half of the participants in the story-based communication study group showed a change in their opinions, indicating that the story-based approach had a more significant impact in shifting their perceptions compared to the facts-based approach.

In terms of policy support, the results in both study groups varied depending on the policy proposed. For the statement "require utilities to produce 50 percent electricity from renewable sources", in the facts-based study group, initially, there was a mix of strong support and somewhat support for the statement. Immediately after exposure to the message, the overall support slightly decreased. However, after one week, the overall support increased again with the majority of participants strongly supporting the statement, and a significant portion somewhat supporting it. In the story-based study group, the initial support for the statement was relatively

high, with a majority of participants expressing support. However, immediately after exposure to the message, a portion of participants who initially expressed somewhat opposition shifted to strongly opposing the statement. After one week of exposure, the overall opposition increased to 30 percent, with a significant portion of participants strongly opposing the statement.

For the statement "bike riding should be promoted more in Flagstaff," in the facts-based study group, the results remained consistent across all three surveys, indicating ineffectiveness of the message. In the other study group, there was a noticeable shift in opinions. In the first survey, a significant portion of participants strongly agreed with the statement, while a smaller percentage somewhat agreed, and others remained neutral. In the second survey, the responses remained the same while in the third survey, there was a notable increase in the percentage of participants who strongly agreed with the statement.

For the statement "public transport use should be promoted in Flagstaff" the trends that emerge from the percentages reveal a dramatic shift in opinions among the group exposed to story-based communication. In surveys 1 and 2, most respondents showed agreement with the statement, with 50 percent strongly agreeing, 20 percent somewhat agreeing, and 30 percent remaining neutral. However, in survey 3, there was an opinion shift with 20 percent of the respondents neither agreeing nor disagreeing, and a majority of 70 percent strongly agreeing, and 10 percent somewhat agreeing. On the other hand, the facts-based communication

group showed a slight decline in support immediately after exposure, with 20 percent of participants indicating less agreement than before and after one week, support increased again.

For the statement "clean electricity should be promoted in Flagstaff" in the story-based study group, in survey 1, a majority of 60 percent of respondents strongly agreed with the statement, while 20 percent neither agreed nor disagreed, and 20 percent somewhat agreed. In survey 2, the percentage of strong agreement decreased to 50 percent, with 20 percent somewhat agreeing, 20 percent remaining neutral, and 10 percent somewhat disagreeing. However, in survey 3, there were no respondents who strongly disagreed or somewhat agreed, with a significant majority of 70 percent strongly agreeing and 30 percent remaining neutral. In comparison, in the facts-based study group, in survey 1, 60 percent of participants strongly agreed, 10 percent somewhat agreed, and another 10 percent remained neutral. In survey 2, the percentage of strong agreement increased to 70 percent, with 30 percent remaining neutral. Finally, in survey 3, a higher percentage of 80 percent strongly agreed, with 20 percent somewhat agreeing.

For the statement "electrification of homes should be promoted more in Flagstaff" the respondents in the story-based study group seemed to shift their opinions, as before exposure total agreement was 40 percent, immediately after exposure it remained 40 percent but one week after it increased to 50 percent. It is worth mentioning that disagreement also decreased from 30 percent to 20 percent

after one week too. In the facts-based communication study group agreement increased by 10 percent too but unlike the other group disagreement remained the same.

The results above indicate that although story-based communication was effective in these cases, it also created a slight polarization since participants who were neutral in many of the questions, after exposure shifted to either strongly agreeing or strongly disagreeing.

Regarding residents actively supporting policies by being willing to pay more city taxes to do so, participants' support in the story-based study group shifted towards being more willing overall to pay more taxes to support different programs such as better public biking infrastructure, better public transportation, and a subsidizations program for solar roofs. In the facts-based study group participants' support towards the same programs shifted towards support too but to a lesser extent than the other group.

For the statements "the city of Flagstaff should do more to address global warming" the Arizona state government should do more to address global warming" and "the federal government should do more to address global warming" results from both study-groups were similar as both types of communication shifted some of those who believed the governments should do "more" to "much more". They also shifted some of those who thought the governments should do "less" to "much less."

For the detailed results of every question, please refer to the appendices.

Discussion

Existing literature proposes that story-based communication seems to be an effective tool for communicating climate change and encouraging public action. However, researchers suggest that more research needs to be conducted on story-based communication and its effectiveness on promoting climate change mitigation action (Hendersson & Wamsler, 2021). After reading the Flagstaff Carbon Neutrality Plan, I noticed it mentions that public participation is crucial to attain the goal of Flagstaff to become carbon neutral by 2030. However, in the plan there was no mention of how the city would achieve widespread public participation. Therefore, based on the existing literature and the Flagstaff Carbon Neutrality Plan, I wanted to test if story-based communication would be effective to help the city achieve their goals as pertaining to the Plan.

Research Limitations

Since the study had to be conducted as part of my Master of Arts Program in Sustainable Communities at Northern Arizona University, the research has certain limitations that arise from many factors such as limited timeframe, limited funding,

and university research policies. In this chapter I will first explore these limitations before taking a broader look at my findings and their implications.

Small sample size

The sample size of the experiment I conducted was 20 Flagstaff residents split in two study groups of 10 participants each. The city of Flagstaff's population size is approximately 76,000 people. This sample size is small as a proportion of the total population. This presents certain limitations on the research, as there is a greater likelihood of random variation and bias. This can result in findings that are not accurate or are generalizations. Although I took measures to make the sample size as representative of the Flagstaff population as I could, the sample size is still too small to achieve an accurate representation.

Another limitation that the small sample size presents is that limits the statistical power of the study. Statistical power refers to the ability of a study to detect a significant effect or relationship between variables (Kraemer & Blasey, 2015). When the sample size is small, it is likely that the study will not have sufficient statistical power to detect meaningful differences between groups or relationships between variables. As a result, the findings may be inconclusive or may not be able to fully support conclusions.

Different demographics

Though they were intended to be parallel to one another, the two study groups had different demographics both in terms of sex and age distribution. In the study group that was exposed to communication based in facts female participants outnumbered the male ones, representing 80 percent of the sample size, while the mean age was 28 years. On the other hand, in the study group that participants were exposed to story-based communication, female participants represented 60 percent of the group and males 40 percent while the age mean was 42 years. These differences can present certain limitations in this research.

One limitation is the limited external validity of the study. External validity refers to the extent to which the findings can be applied to real-world situations (Slack & Draugalis, 2001). Comparing two study groups with different demographics, the external validity of the study may be limited. For example, since there are different demographics in the two study groups, this could potentially mean that the findings regarding the specific messaging may transfer to the real world and be effective only for the demographic to which the experiment took place. In other words, the lessons learnt about the fact-based communication would be most applicable to female-dominated demographics. Hence, the findings may not be transferrable to a real-world context for other demographic segments.

Different starting points in beliefs

There were differences as well in terms of different starting points in beliefs for the two study groups. Specifically, in the study group that was exposed to communication based on facts, in the first survey (before exposure) the vast majority (90 percent) of the participants believed that climate change is happening compared to 70 percent in the other study-group. This may have affected how responses were received, as personal beliefs about climate change and politics are often deeply ingrained and influence how individuals perceive and respond to environmental issues. Therefore, there is a risk of bias.

Selection bias occurs when certain groups are overrepresented or underrepresented in the sample, leading to inaccurate or biased results (Heckman, 1990). For example, in one study group people who believe that climate change is happening may be overrepresented while the other study group may have a more a more representative sample of Flagstaff's general population.

Exposure only one time

In this experiment, participants were exposed to the message only one time, which does not necessarily happen in a real-life context. In real life, people are exposed to messages about a particular topic multiple times, from various sources, which can shape their opinions and behaviors over time. Most Americans have been exposed to climate change communication multiple times and from many sources over a long period of time.

One of the limitations of basing an experiment on a single delivery of a message is the potential for primacy or recency effects. Primacy effects occur when people remember the information they heard first, while recency effects occur when people remember the information they heard last (Panagopoulos, 2011). In an experiment where participants are only exposed to the message one time, the information presented at the beginning or end of the message may have a more significant impact on their opinion or behavior than the rest of the message. This may not accurately reflect how people receive and process messages delivered numerous times in a variety of forms.

Another limitation is the potential for confounding variables. These are factors that may influence the outcome of the study but are not directly related to the research question (Ewert & Sibthorp, 2009). For example, the fact that participants in the two groups have a different degree of change in attitudes before and after exposure to the message may not necessarily mean that it happened because of exposure. It may have happened because the two different study-groups may have received different information from their information sources throughout the week that was in between the second and the third survey.

Responses are influenced by memory

In the study there were many instances where participants had identical responses to the first and second surveys, but their responses changed on the third survey. This could lead to biased responses. For instance, if a participant initially responded very positively or very negatively to a question, they were perhaps more likely to remember that response and give a similar response in the second survey, regardless of whether their actual opinion had changed. The third survey took place after a week; it is most likely that participants did not remember their responses to the first and second surveys, perhaps explaining why more answers were different than in the earlier surveys.

IRB Restrictions

The Institutional Review Board (IRB) of Northern Arizona University required me to inform participants in advance of the experiment about the research topic and the questions I would ask them. While this was done to reflect ethical considerations and obtain informed consent, it changed the design of my research. The new research design potentially introduced bias into the participants' responses. Knowing the purpose of the research may have influenced participants' perceptions during the experiment. They may have consciously or unconsciously altered their responses based on their knowledge of the research topic, or their perceptions of what the researcher might have been expecting from them. This may have led to a potential

bias in the data collected, as participants may not have been providing genuine or spontaneous responses, but rather responses that they believed to be desirable or in line with the research objectives.

Is story-based communication more effective?

Given these limitations, there are still some indications that story-based communication is more effective than communication based on facts.

In the question “how much do you think global warming will harm you personally” half of the participants in the story-based study group who initially replied that global warming would not affect them, shifted their opinions after exposure to the communication. One reason why this may have happened is because in story-based communication personal narratives exist and they can help to build empathy and emotional connection which seem to be more effective (Braddock & Dillard, 2016). This may happen when stories are designed to connect with audiences through both empathy and connection to place. In this case, the story-based video message displayed a local of Flagstaff narrating their experiences of the recent wildfires and flooding in the area.

Another reason could be that the story was made to be relatable with Flagstaff residents; since it was about a local who experienced some effects of climate change locally. Tailoring messages to the specific values, beliefs, and concerns of the audience can increase the effectiveness of communication (Scheufele 2014).

According to Patrick Reinsborough and Doyle Canning (2017), stories also have the power to inspire people to take action when they provide a sense of hope and possibility. Many Americans feel hopeless when it comes to tackling the challenges of climate change (Rabe, G. (2004). In the story-based message the issue was presented as something that it is feasible to mitigate or overcome since the example of how successfully other countries are handling the issue was mentioned. This provided a tangible example that mitigating or overcoming the issue is possible and others are working towards it already, successfully.

Moreover, stories are more memorable than dry facts and statistics (Simmons, 2019). Therefore, they are found to be more effective at influencing behavior over time. This was observed in the experiment, as the degree of change in opinions was greater between surveys 2 and 3 than between surveys 1 and 2. This may have happened because the answers were less influenced by the participants' memory than they were in the second survey. It could also have happened because participants had some time to process and rethink the information they received during exposure to the message, so they were able to make conclusions that eventually changed their views on the topic.

But story-based communication could have a polarizing effect in societies

An interesting finding was that story-based communication seemed to have a polarizing effect on participants. I draw this conclusion because after exposure to the message, participants who initially had neutral responses in certain questions changed their responses in the following surveys to either strongly supporting or opposing an idea or policy. This might have happened because of emotional reactions (since a story can trigger stronger emotions than facts), because of the tendency of people to self-categorize or because the American public is deeply divided by politics.

One reason why story-based communication seems to have a polarizing effect on people could be people's emotions. According to Peters et al. (2004), people's emotional reactions, such as fear and/or awe, can have a major influence on their understanding and acceptance of science. Emotions can evoke a sense of empathy and identification, allowing individuals to emotionally connect with the impacts of climate change and the urgency of taking action.

Storytelling engages imagination. Many times, when people are immersed into a story, they imagine a different reality that it may not reflect their current. This engagement of the imagination creates an emotional investment which has the potential to stimulate senses (Nguyen, P. 2021). For example, a person getting immersed to a story about a character overcoming a challenging obstacle can feel a sense of hope.

Additionally, emotions may also lead to biased processing of information, causing individuals to rely on intuitive heuristics or emotional reasoning rather than critical thinking. For example, awe can inspire a sense of wonder and admiration, leading individuals to be more receptive to new ideas and more open to accepting scientific concepts.

A second reason could be the tendency of people to self-categorize. This is the process by which individuals identify with a particular group or social category and adopt the attitudes and behaviors associated with that group. According to Feinberg & Willer (2011), political identity is a strong predictor of individuals' beliefs and attitudes toward climate change. For example, individuals who identify as conservatives or Republicans are less likely to believe in the existence of climate change or to support policies to address it than those who identify as liberals or Democrats. Therefore, somebody who already has a negative perception about issues pertaining to climate change may be more likely to reject communication about it since the message itself could be perceived as a way to influence the society in a way that is non-desirable by those who do not believe in climate change.

Also, stories have the power to challenge and destruct social norms and stereotypes (Reinsborough & Canning, 2017) by presenting characters who do not fit traditional social categories. Social change is many times not welcomed by people; therefore, such communication could have adverse effects of what it was intended to do. For example, a story-based message about the importance of affordable

healthcare could portray a male nurse. This could challenge the stereotype that nursing is a profession for women. This example could expand people's understanding of what is possible and acceptable; but, it could also make people who do not agree with male nurses as a profession reject the message as a whole. Therefore, the goal of communicating the benefits of affordable healthcare was not achieved.

A third reason why story-based communication could contribute to polarization is because the American public is already deeply divided by politics (Dagnes, A. 2019). Story-based communication has the potential to create a sense of us vs. them. This could occur when a story is framed in a way that creates a binary of either or. In this case, people would be encouraged to identify with one group and oppose the other. For example, a message that portrays people who commute with cars as problematic while those who use public transport as exemplary, could create social tension between the two groups.

Support of the Flagstaff Carbon Neutrality Plan

From the experiment, other insights apart from the effectiveness of story-based communication can be drawn. Some survey questions asked respondents which specific elements of the Flagstaff Carbon Neutrality Plan they would support. The policies mentioned below are sorted from those which citizens in both surveys showed most support to those with less.

1. Promotion of bike riding in Flagstaff
2. Promotion of clean electricity in Flagstaff
3. Promotion of public transportation in Flagstaff
4. Promotion of electrification of houses in Flagstaff

These results do not specifically point to reasons for these varying degrees of support, but there was an interesting trend related to policy about the promotion of electrification. The experiment included two optional open questions where participants could write whatever they wanted. Four of the participants chose to write comments on the electrification of homes. Three of them could not identify the benefits of electrification and/or they believed that electrification could be harmful for the environment (no further explanation was given). One respondent was concerned about energy security stating that it is safe for alternative energy sources to exist in case of an infrastructure failure. This may suggest that a primary communication challenge for the City of Flagstaff is doing a thorough job of explaining why particular carbon neutrality policies would be beneficial.

Some recommendations I make to the city of Flagstaff are to invest more on marketing and communication efforts, and specifically:

1. Create a communication strategy that will use story-based messages to engage and educate residents
2. Communicate the progress the City is making on its sustainability goals; this will help to those thinking that the issue cannot be mitigated, and perhaps create positive emotions
3. Communicate and create empathy across the community since this will perhaps increase public participation
4. Make local connections to the issue of climate change
5. Educate residents on specific benefits of the electrification of homes and other policies that are proposed in the Flagstaff Carbon Neutrality Plan
6. In partnership with APS (Arizona Public Service), increase trust on power infrastructure

If implemented, these recommendations could help to increase support from people towards the Flagstaff Carbon Neutrality Plan and motivate more residents to take action on environmental sustainability issues. They could, ultimately, help enable the city to achieve the Plan's goals.

The results of my experiment, despite its limitations, align with existing literature suggesting that story-based communication seems to be more effective than communication based on facts to communicate climate change mitigation and

support public action. However, I did observe one effect, polarization is a result of story-based communication, which I have not seen mentioned in other literature. Therefore, more research needs to be done to examine whether this phenomenon can be observed in other experiments too.

Regarding the City of Flagstaff, although this experiment provides certain indications, more extensive research would need to be completed so that the City could develop a marketing plan to achieve its goals pertaining to the Carbon Neutrality Plan.

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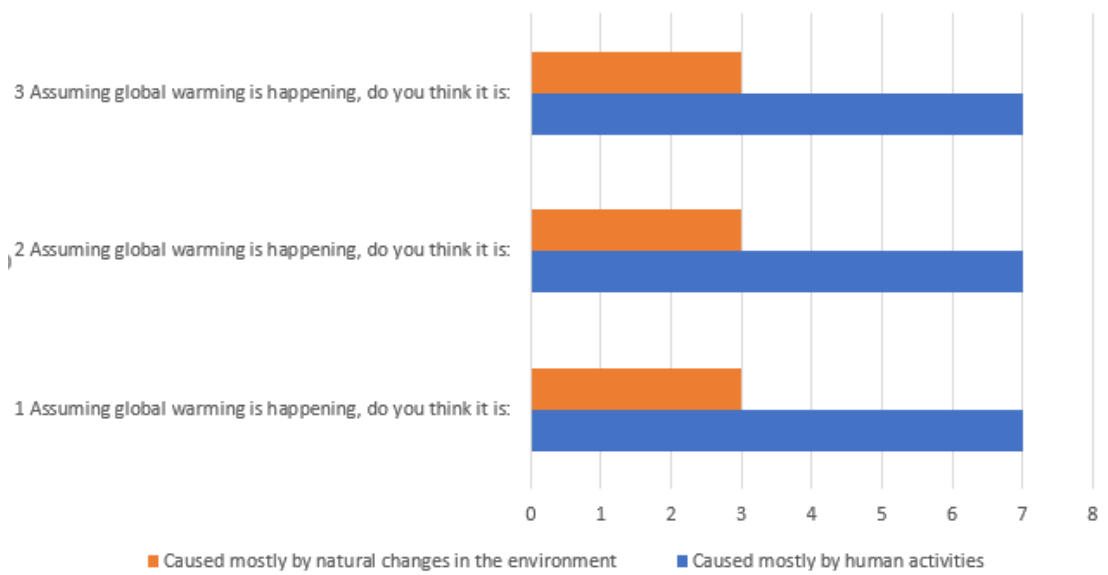
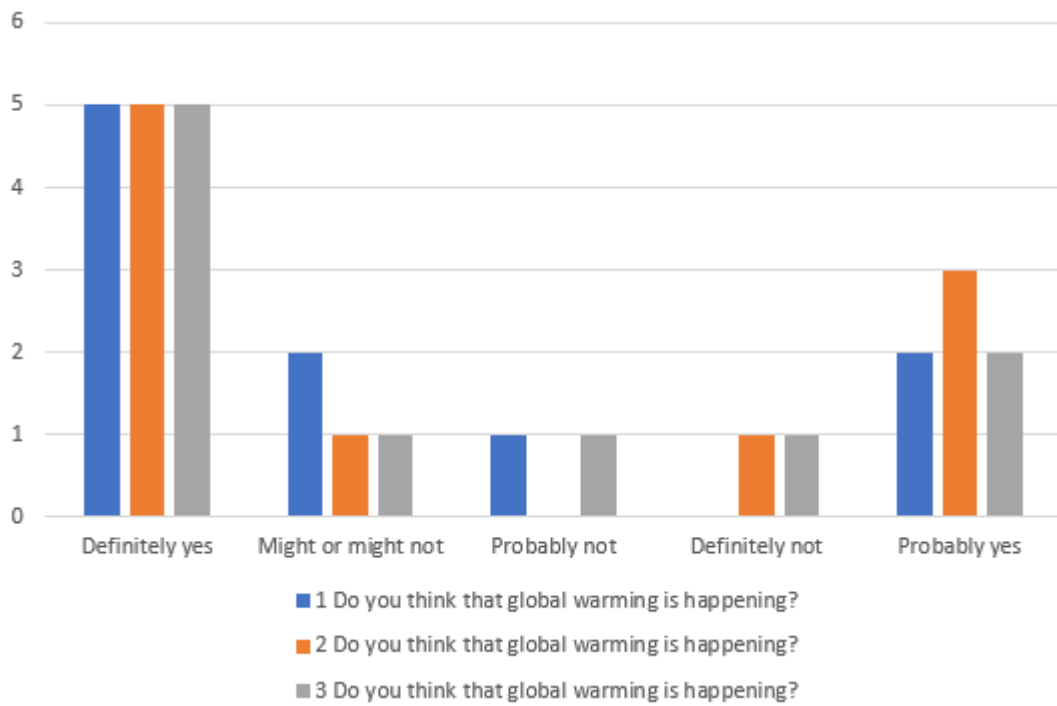
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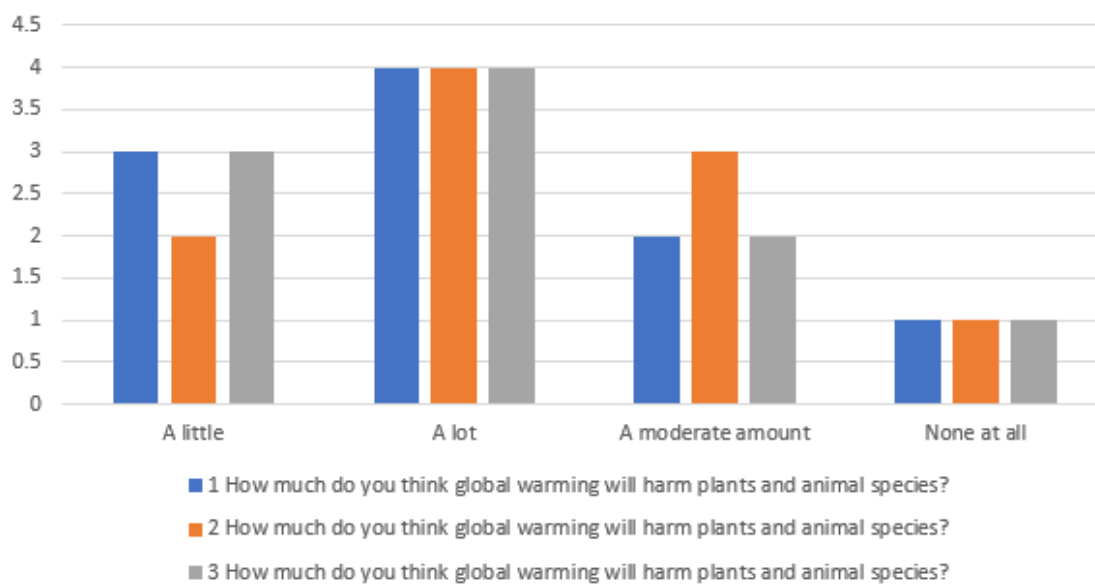
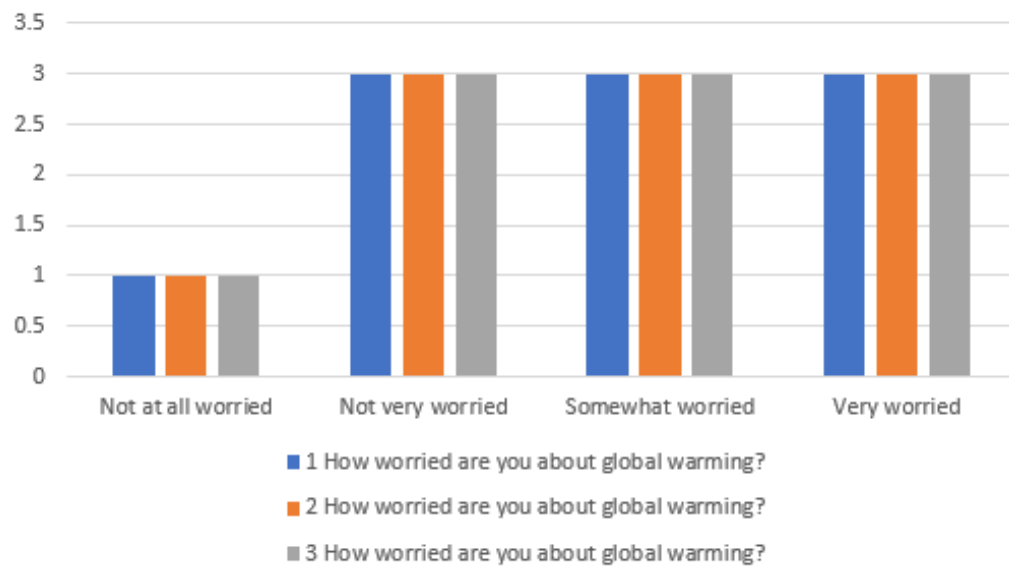
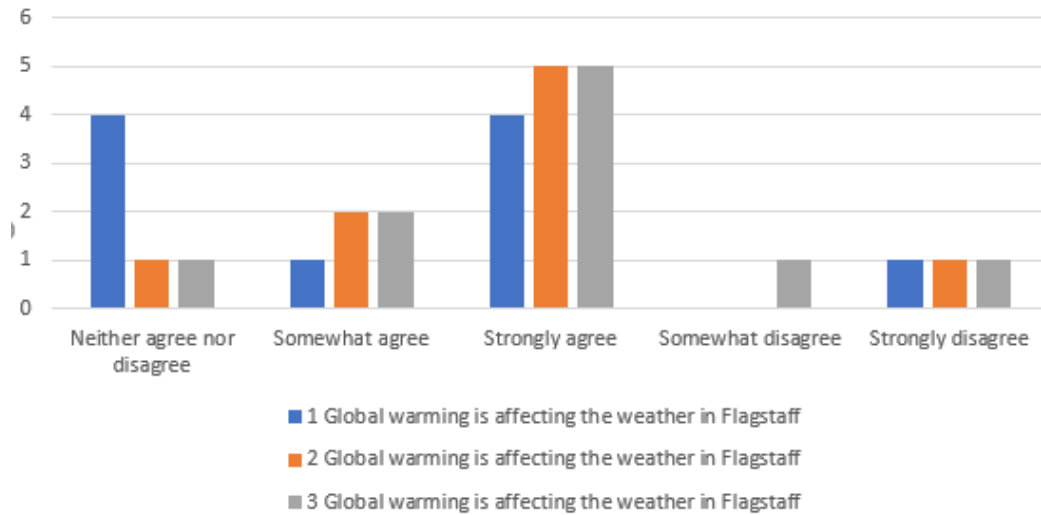
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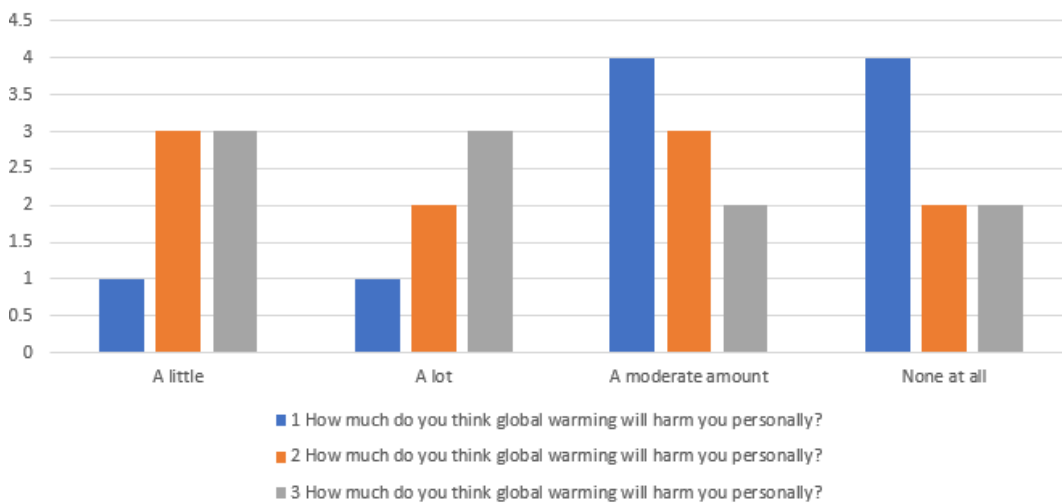
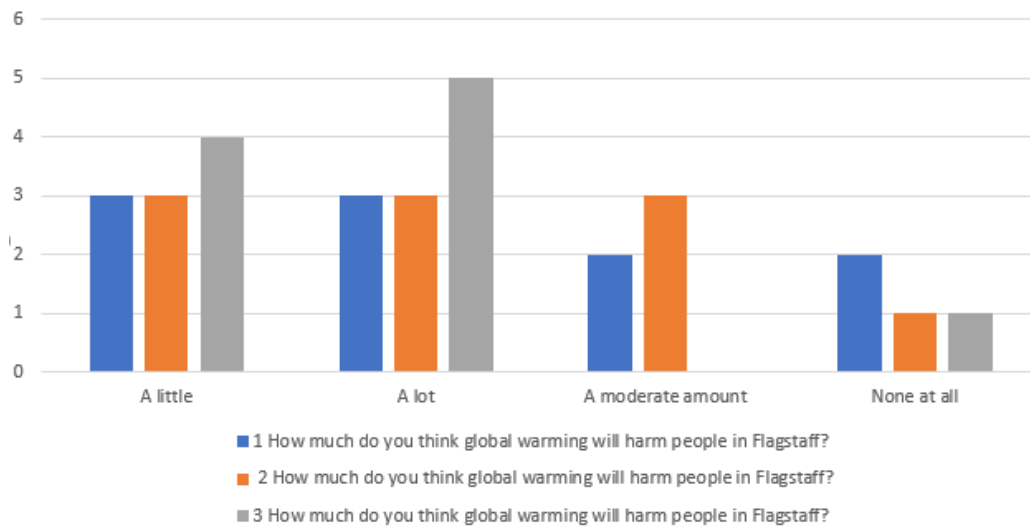
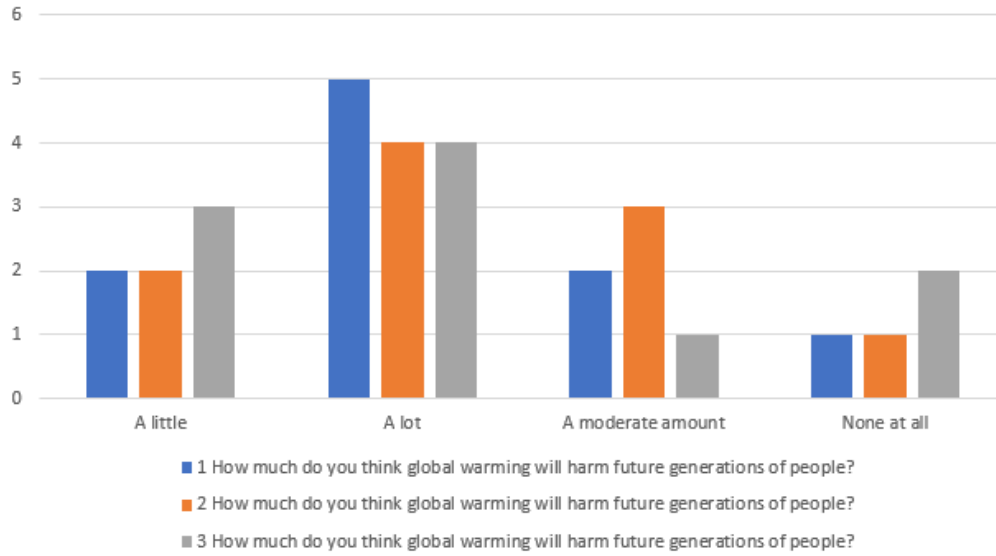
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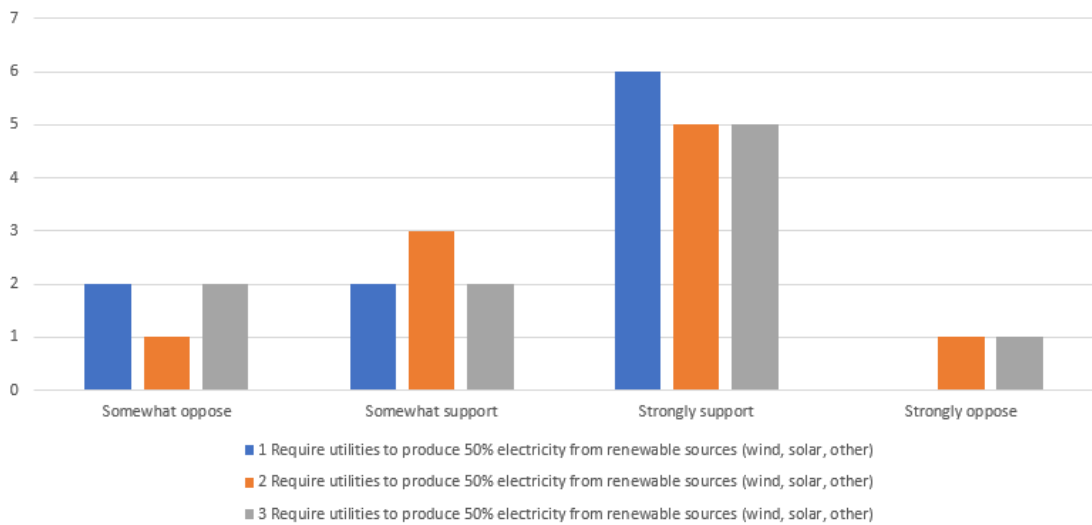
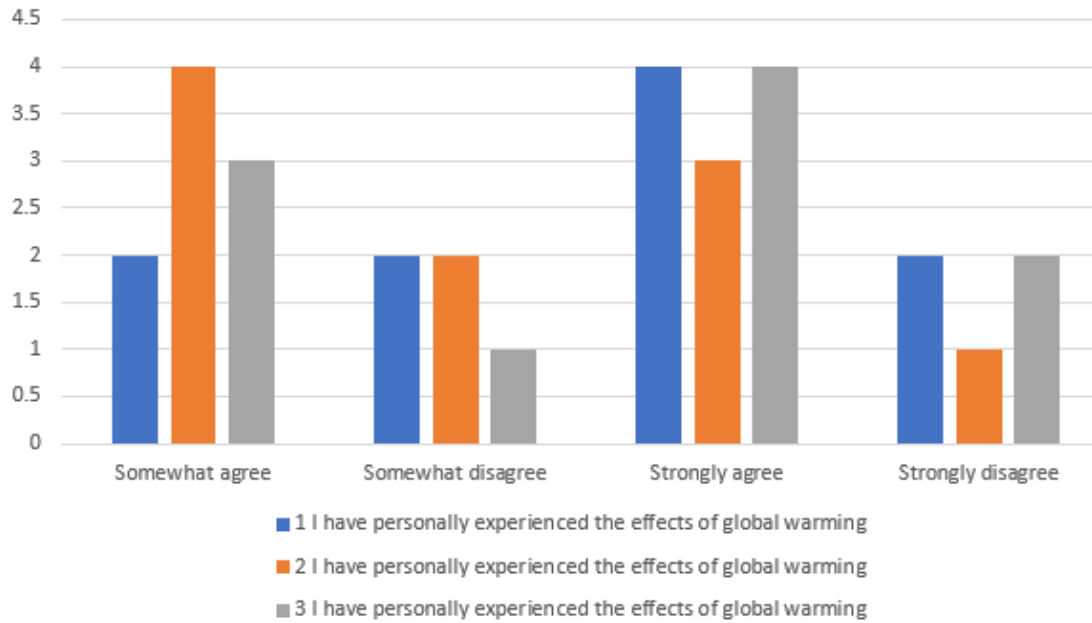
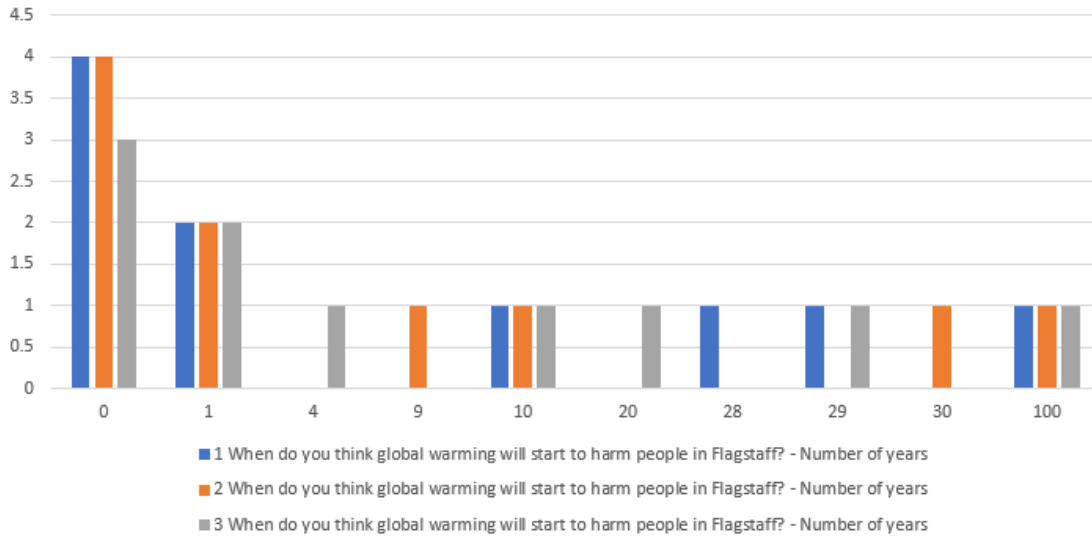
Appendices

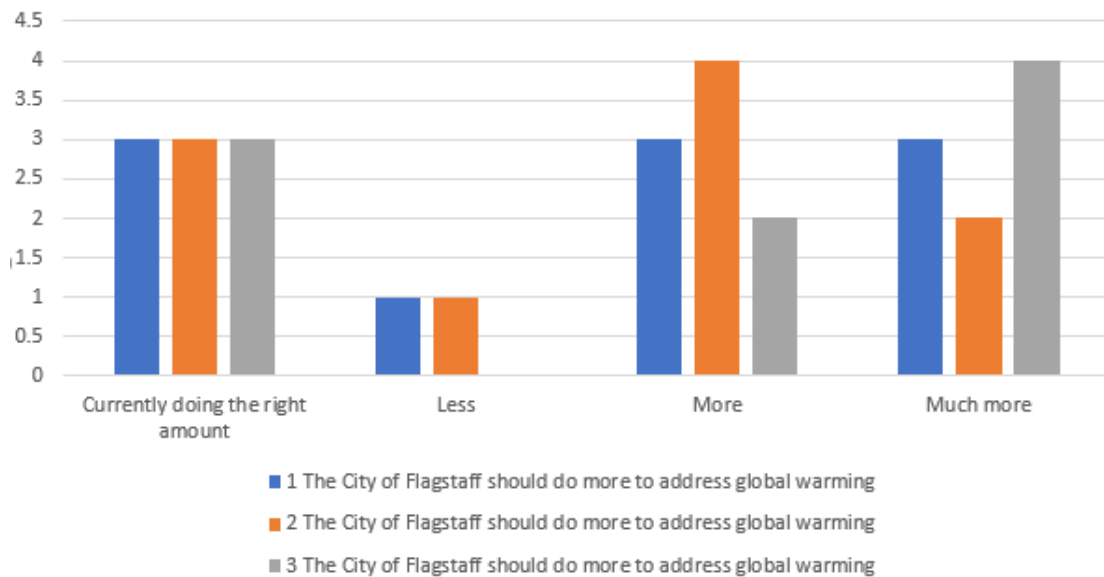
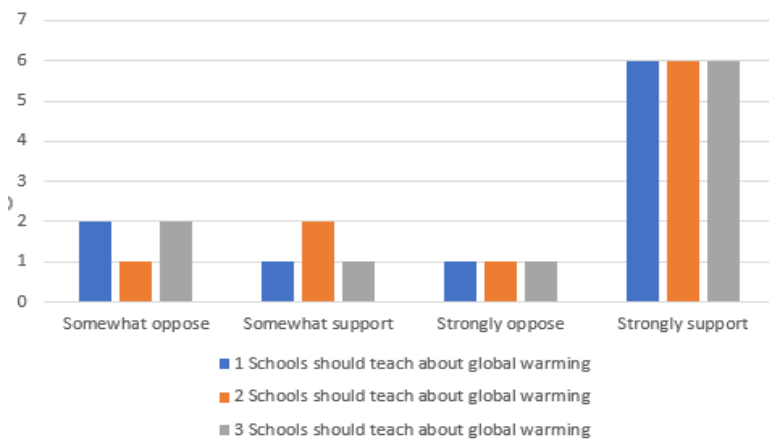
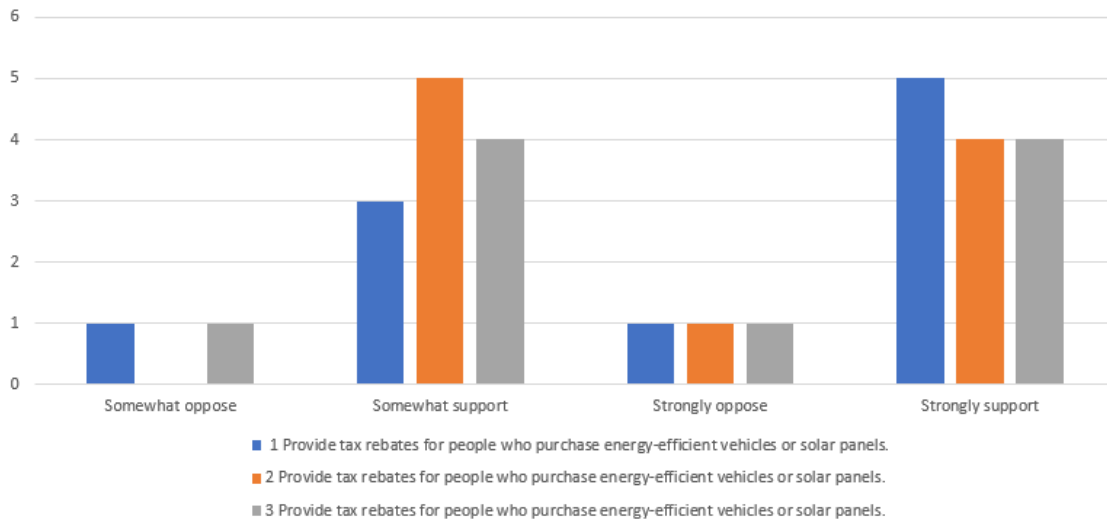
Appendix 1 - Story-based communication detailed results

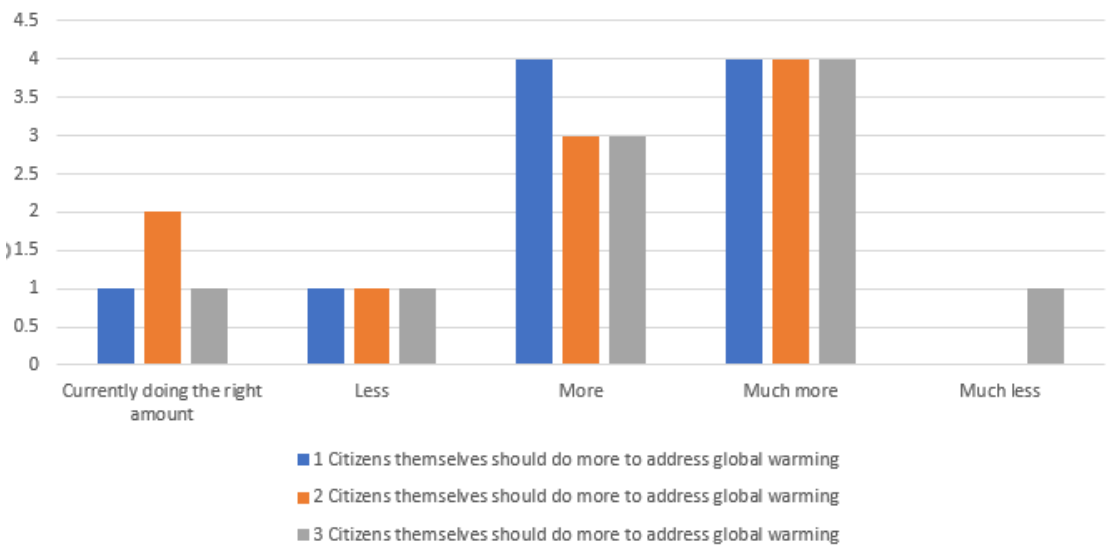
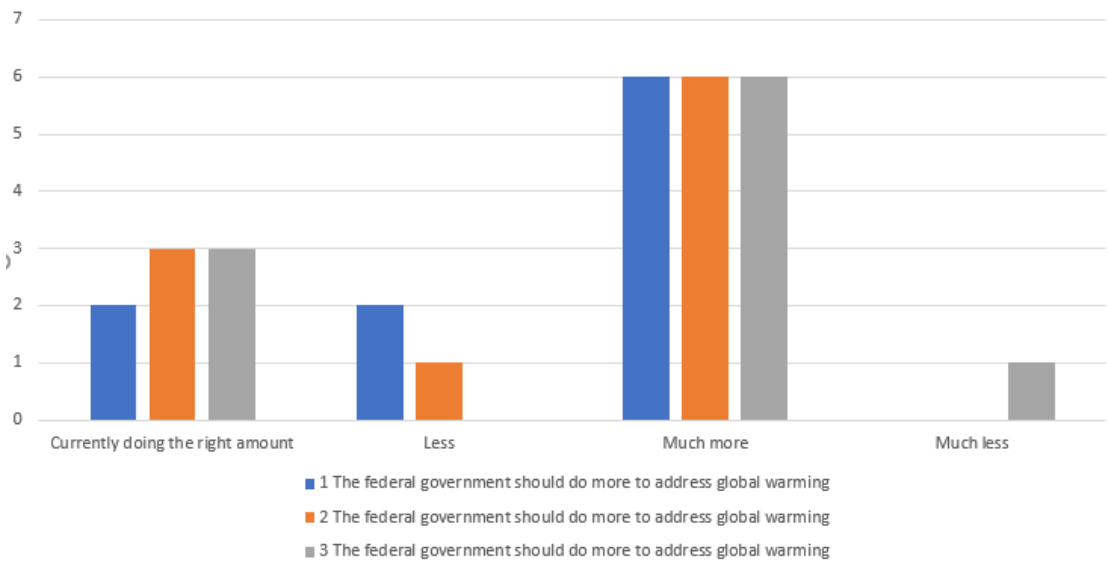
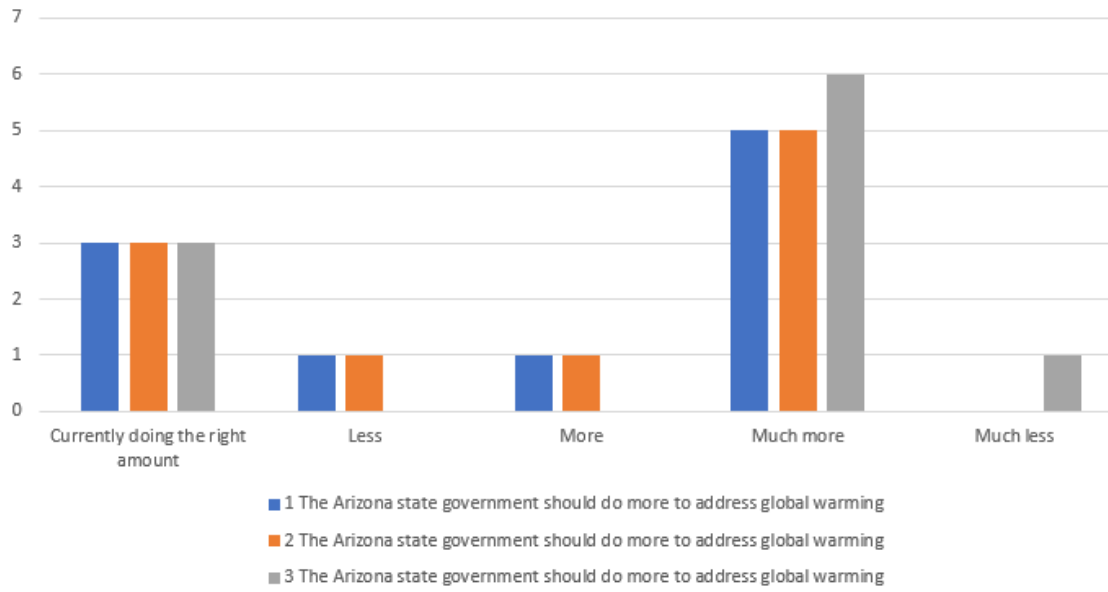


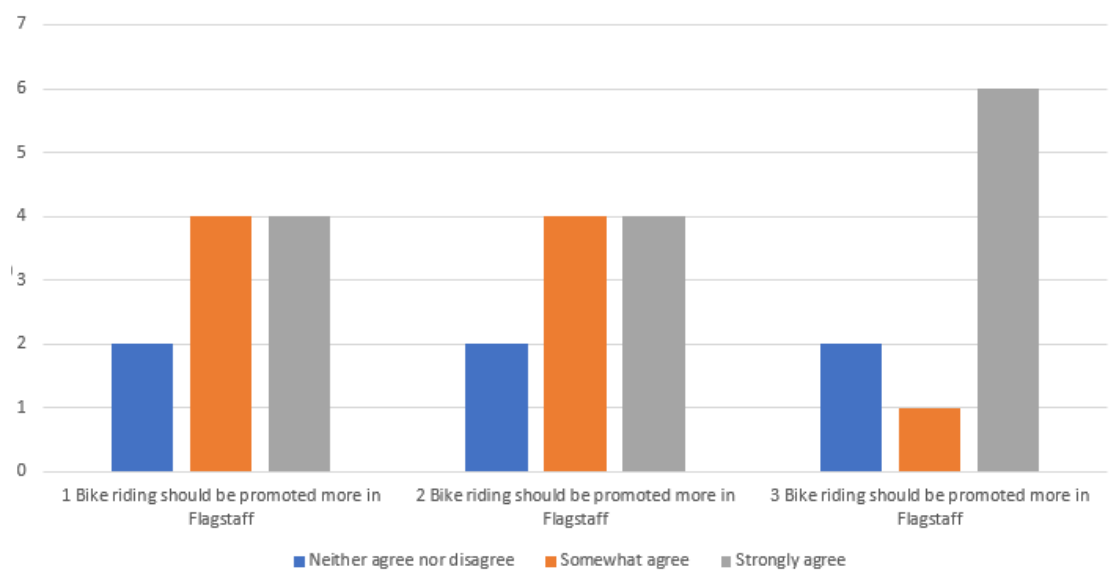
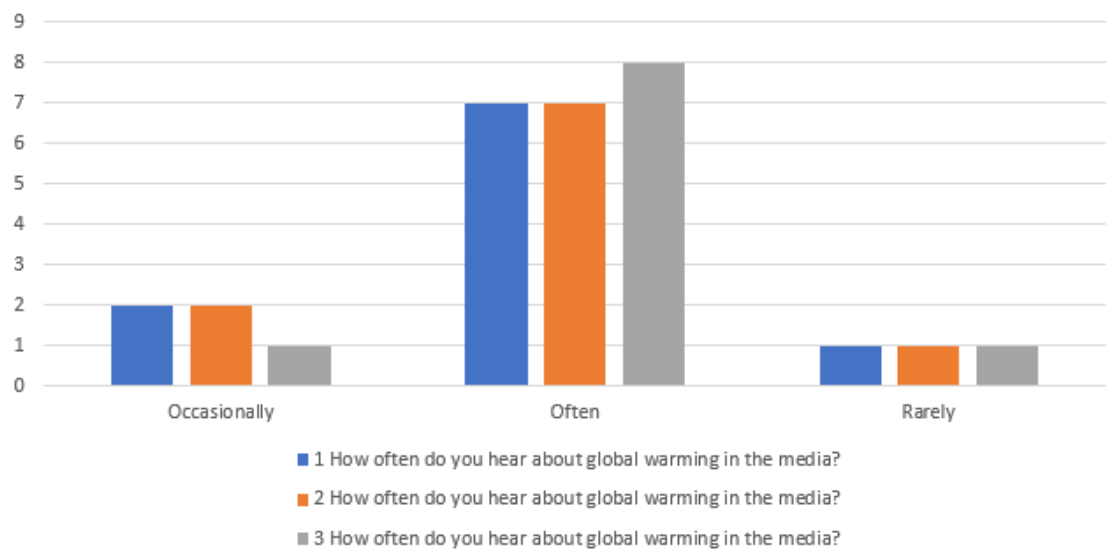
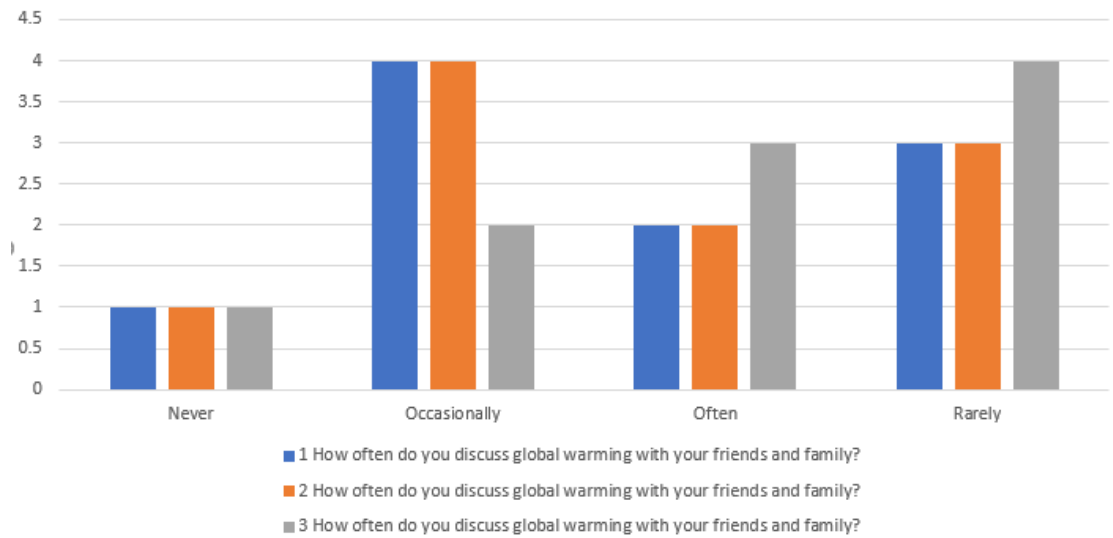


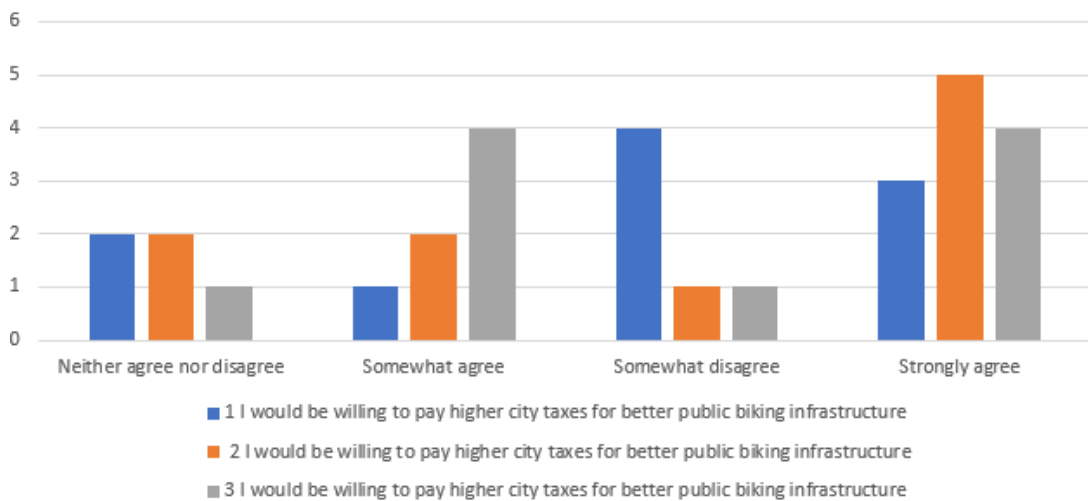
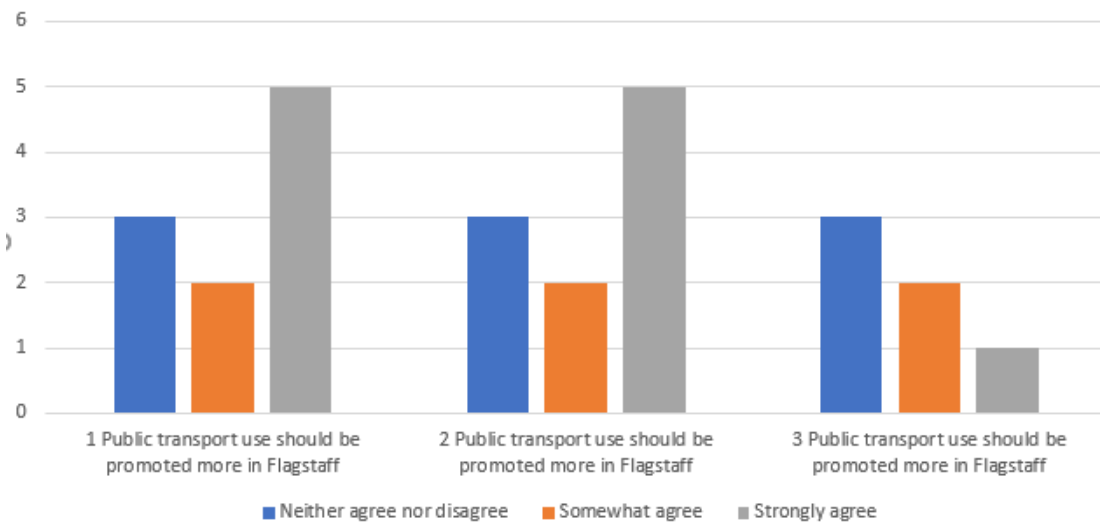
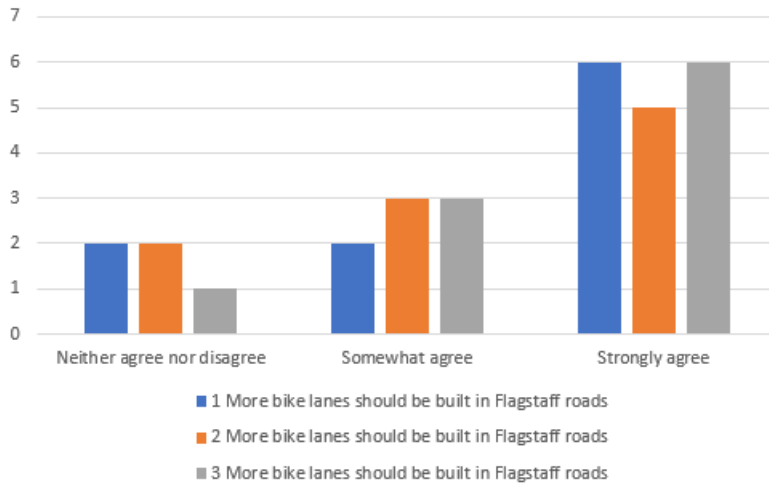


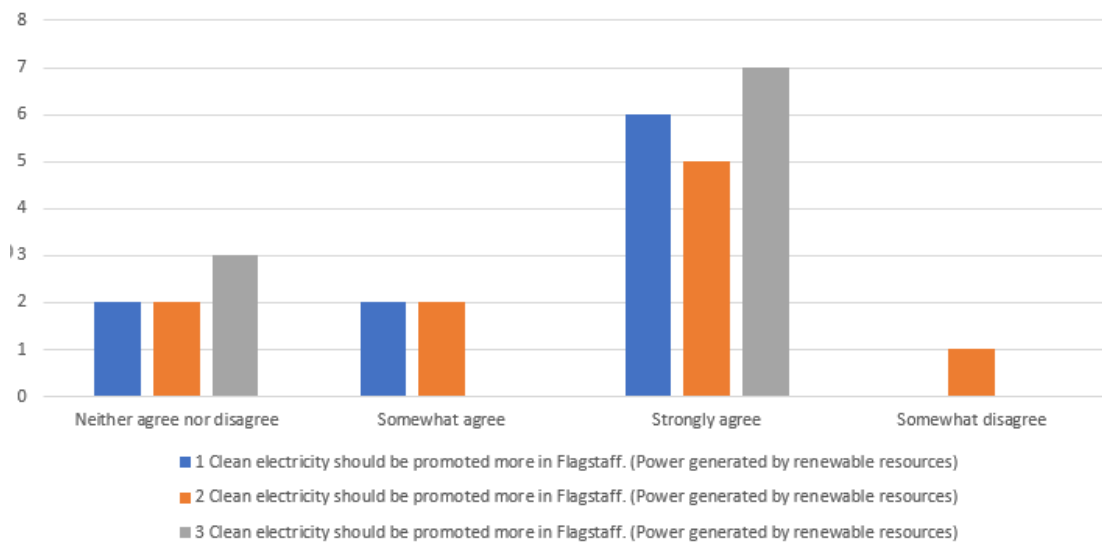
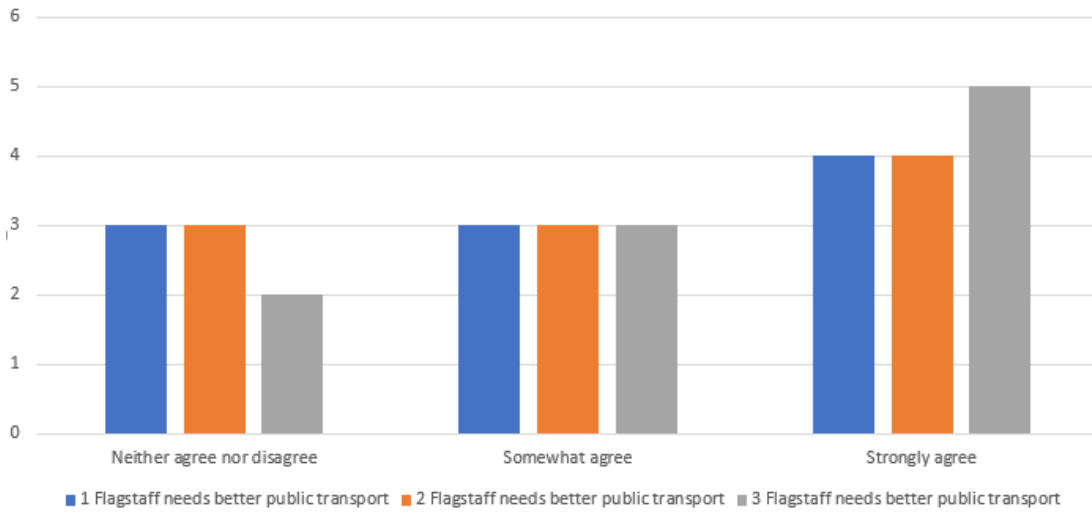


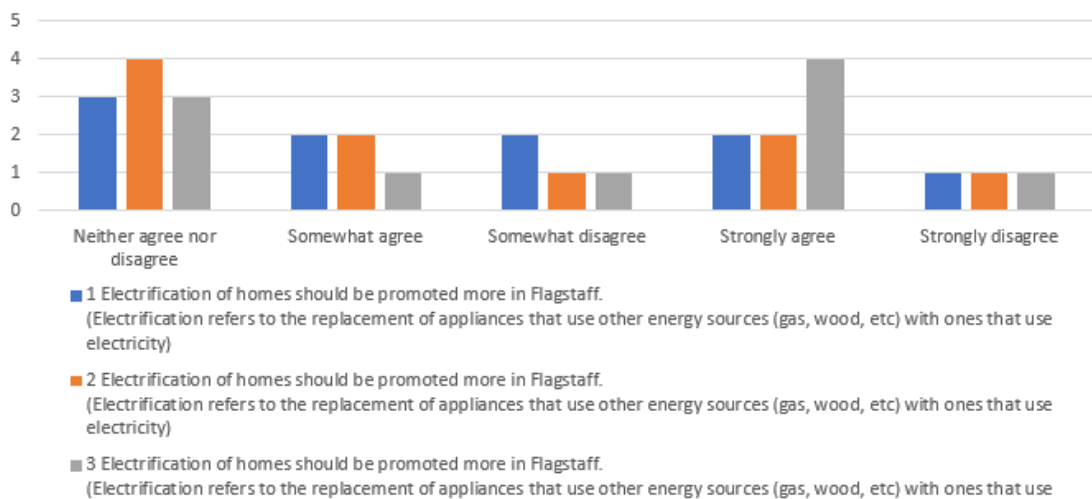
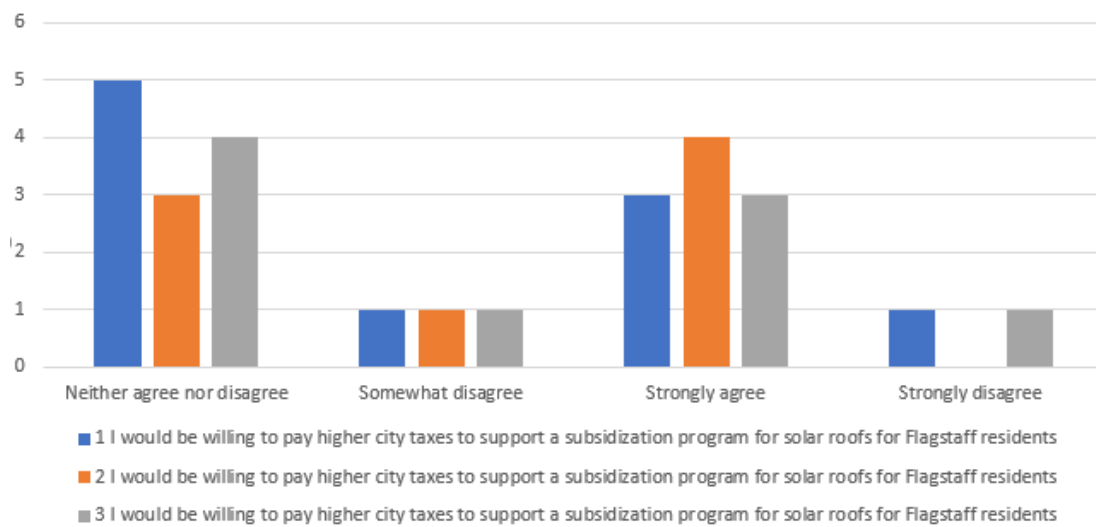
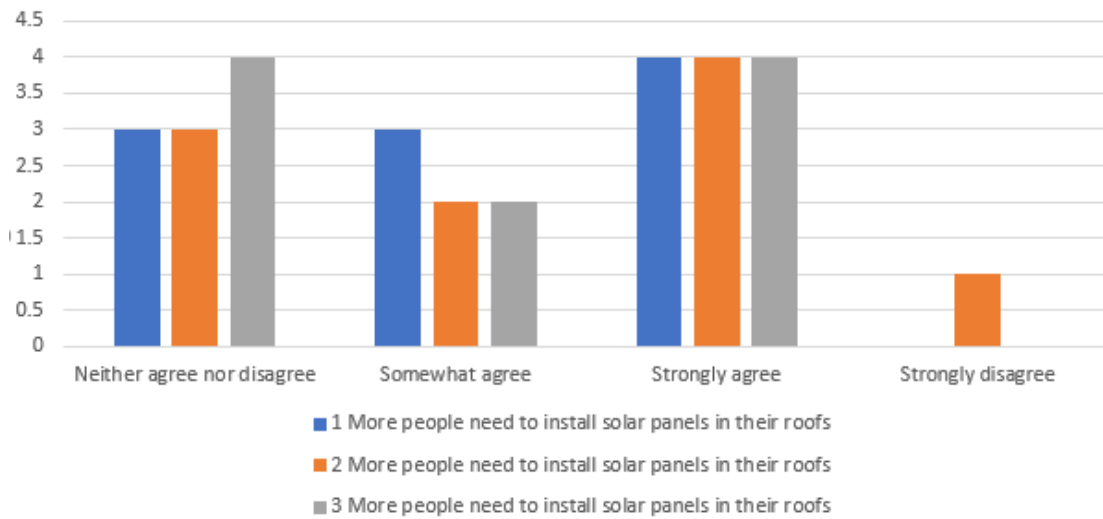


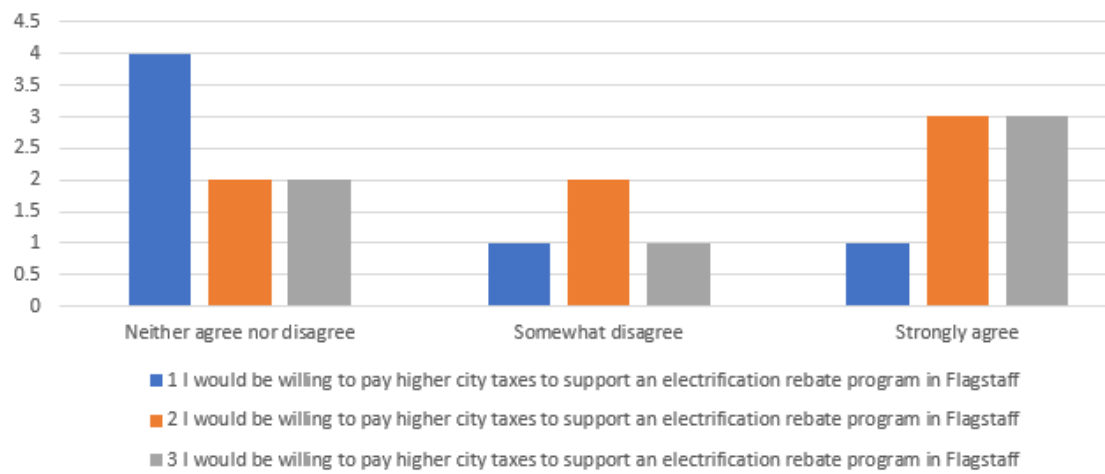
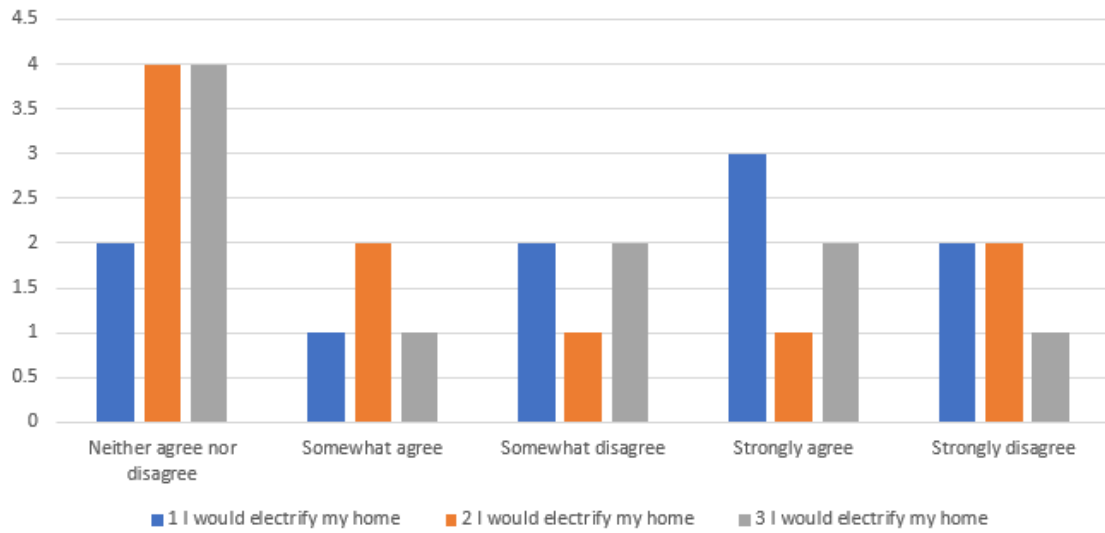












Appendix 2 - Facts-based communication detailed results

