THE NARRATIVE

OF CLIMATE CHANGE

Inspiring Positive Behavioural Change Through Elements
of the Environmental Narrative

BY ANNIE CONSTANTINESCU

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The Narrative of Climate Change

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The science of climate change dates back to the 19th century with publications made as early as 1859 by John Tyndall. Between the mid-1800s and today, there have been other scientific discoveries about human involvement in the changing climate but despite the scientific proof, it has not generated widespread public action. Accepting this as the basis of a wicked problem, the goal of this paper is to understand the necessary components of effective climate change communication that will allow individuals to detach from their predispositions and effectively frame climate change at an individual level. The hope is that once this occurs, individuals will adopt a more environmentally friendly mentality and lifestyle (referred to in this paper as environmental citizenship). The analysis of past and current narratives of climate change in tandem with applying Narrative Policy Framework and rhetorical narrative structures presented three main narrative types: Scientific-Based, Fear-Based, and Story-Based. A prototype was designed using these three narrative structures in conjunction with visual grammar tools to observe the saliency of the different narratives and their components. This MRP identifies narrative elements which help bridge the gap between the current paradigm and having a more informed and environmentally-conscious society.

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"Can I be honest with you? I've always kind of hated films about climate change. What is it about those vanishing glaciers and desperate polar bears that makes me want to click away? Is it really possible to be bored by the end of the world? It's not that I don't care what happens to polar bears. It's just that we're told that the cause isn't out there, that it's in us, it's human nature. We're innately greedy and short-sighted. And if that's true, there is no hope. But when I finally stopped looking away, traveled into the heart of the crisis, met people on the front lines, I discovered so much of what I thought I knew was wrong. And I began to wonder: what if human nature isn't the problem? What if even greenhouse gases aren't the problem? What if the real problem is a story".

Naomi Klein in *This Changes Everything (2015)*

I remember sitting in my seat at the Toronto International Film Festival and hearing this surprising introduction to the anticipated documentary; This Changes Everything by Avi Lewis and Naomi Klein back in 2015. I was looking forward to seeing how the power couple was going to bring Naomi Klein's popular book with the same title to life, but I would never have expected that it would immediately start with such a strong statement bashing the very essence of what people came to see - a film about climate change. Back then, I was not familiar with the concept of 'narrative as a strategy'. So although I was a bit hesitant at first,

I remember thinking "okay, let's see where she goes with this".

This Changes Everything serves an essential job for its audience. Not only does it capture the climate realities surrounding our world, but it is communicated through content-rich stories of people who are affected by the issues first-hand. Instead of only reciting facts and depicting the scientific evidence, this approach leveraged strong narratives to compliment the truths of climate change - essentially enhancing what the audience would take away from their experience. It was this one experience that snowballed my interest in understanding the different ways climate change is portrayed. It encouraged me to expand my boundaries in how I digest content and take a look at what motivates individuals to empathize with what is happening to our planet. I began researching climate change to try and grasp its immediacy, urgency, and how significant of a change we need to correct the current environmental landscape.

This entire process was equally inspiring and overwhelming. What was uplifting to learn was that there have been many organizations, ranging from international bodies such as the IPCC (Intergovernmental Panel on Climate Change) to local groups such as TCAN (Toronto Climate Action Network) that focus on learning about, advocating on, and actioning positive climate change. There is hard work being done around

the globe to strengthen environmental practices that protect our natural resources. What was a hard pill to swallow though was that although there is so much information available, there is a mass amount of people who are unaware of the gravity of the situation.

One recurring theme identified in the research and that I've personally observed in my own life is the number of people who believe they are not affected by climate change. While it is true that developed countries will bear less of the short-term weight when it comes to natural disasters and climate-change losses, there have been severe atypical impacts that have happened right here in southern Ontario. In an interview, University of Waterloo environmental sciences professor, Blair Feltmate, remarked, "As a result of climate change and extreme weather events, in short form, Toronto is going to become hotter, wetter and wilder in terms of weather," (Charles, 2016). In the past decade, Toronto has seen an increase in severe rainfalls, ice storms, and high-wind storms. This increased frequency pattern extends to the rest of Canada - within the last few years we have had significant events such as the 2016 October Rainstorm in Newfoundland and Labrador, the 2017 Spring Flood in Quebec, and the 2017 and 2018 Wildfires in British Columbia (DFAA, 2018). The Federal Disaster Financial Assistance Arrangements program was launched in 1970, and it has contributed over $4.8 billion to the provinces to financially help with the recovery of environmental disasters (Rabson, 2017). Almost 40% of these costs, 1.8 billion were since 2010 which does not include figures for at least 17 events that occurred since 2014 (Rabson, 2017).

The question then becomes "why do people not engage?" Is it because of laziness? Selfishness? Not having access to the right resources or education? Is there a lack of pro-environment political or social influences? Are people really that ignorant? There were many questions I

asked myself, and when I was reflecting on what was coming to mind, I realized that my perspective was quite bleak.

I invested time and resources into investigating what the root cause is. OCADU's Strategic Foresight and Innovation program taught me that there are different frames of interpretation when trying to understand the global issue of climate change. Working to understand these frames allowed me to see an opportunity for building a stronger narrative for climate change - one that would encourage a population removed from the severe effects of environmental degradation to understand their global impacts and partake in positive ecological citizenship.

Ecological or environmental citizenship was brought to the academic stage in the early 2000s by Andrew Dobson when he published his book *Citizenship and the Environment*. This new type of citizenship was constructed after a thorough investigation of political and environmental theory and is centred around an obligation to improve one's environmental responsibility by reducing one's ecological footprint (Dobson, 2003). This kind of citizenship carries the status from the public sphere to the private one as energy consumption, and waste production takes place at home in developed nations (Revkin, 2012).

My hopes with this MRP is to illuminate the importance of narratives and their rhetorical structures in social issues to garner positive individual action in an attempt to improve the ecological citizenship amongst people who have already accepted climate change as a scientific reality.

Introduction

Introduction

A Look Backwards..

The science of climate change dates back to the 19th century with publications made as early as 1859 where John Tyndall showed that molecules of water vapour, carbon dioxide, and ozone are the best absorbers of heat radiation (Graham, 1999). What Tyndall had demonstrated for the first time was that gases in the atmosphere absorb heat at different degrees - in other words, he had discovered the molecular basis of the greenhouse effect (Black, 2011). Fast forward a few decades to 1896 when Svante Arrhenius published a paper measuring how carbon dioxide acts as a heat-trapping blanket for the planet's atmosphere and contributes to the greenhouse effect (Sample, 2005). By the 1960s and 1970s, scientists began to study geochemical cycles involving minor carbon and hydrogen compounds and catalogued a variety of sources for methane (CH_4) in the atmosphere (Weart, 2008). However because scientists believe natural swamps and soils primarily produced methane, they never attributed it to causing a direct effect on the climate or biosphere (Weart, 2008). A similar occurrence happened with ozone (O_3) and chlorofluorocarbons (CFCs) as they were seen as curiosities by scientists and not worthy of further investigation. During this same period of time, James Lovelock first documented evidence of CFCs in the atmosphere and inspired the research which led to both the discovery of

the ozone hole as well as the prohibition of CFCs in the late '80s with changes coming into effect in the '90s (Lovelock, 2008). Scientist Veerabhadran Ramanathan demonstrated that "adding one molecule of CFC to the atmosphere

would have the same greenhouse effect as adding more than 10,000 molecules of carbon dioxide," (Nuzzo, 2005). These discoveries engaged additional scientists which led to the scientific conclusion in the late 1980s that CFCs (together with methane and other trace gases) have a role as similar and impactful as carbon dioxide (CO_2) in climate change (Weart, 2008).

From the first research on climate change in the mid-1800s to today, there have been other discoveries about human involvement in the changing environment. One of the leading scientific bodies is the Intergovernmental Panel on Climate Change (IPCC), an international body for assessing the science related to climate change. They were assembled in 1988 and have released five reports to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation ("IPCC Factsheet: What is the IPCC?", 2013). The Fourth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) in 2007 confirmed climate change as unequivocal. This relates to the popular statistic that has been circulating in the past decade which states there is a greater than 95% probability that the current warming trend of our planet is extremely likely to be the result of human activity since the mid-20th century (IPCC, 2014). The warming of our planet has had many impacts ranging from global temperature rise to ocean acidification. On the following page there is a summary of some of the biggest hitting climate-change related issues:

GLOBAL TEMPERATURE RISE

The global temperature record represents an average over the entire surface of the planet. This measurement mainly depends on how much energy the planet receives from the Sun and how much it radiates back into space—quantities that change very little. The amount of energy radiated by the Earth depends significantly on the chemical composition of the atmosphere, particularly the amount of heat-trapping greenhouse gases (Hansen, Ruedy, Sato, & Lo, 2010).

According to an ongoing temperature analysis conducted by scientists at NASA's Goddard Institute for Space Studies (GISS), the planet's average surface temperature has risen approximately 1 degree Celsius during the last century. This change is primarily driven by increased carbon dioxide and other human-made emissions into the atmosphere. Last year was the fifth consecutive year in which global temperatures were more than 1.8 degrees Fahrenheit (approximately 1 degree Celsius) above late nineteenth-century levels (NASA, 2019). Since the industrial revolution (using base years from 1880 to 1920), the five warmest years on record all have taken place in the last five years (See Annual Global Mean Surface Temperature Ranking, Figure 1) (NASA, 2018) (Sato & Hudson, 2019).
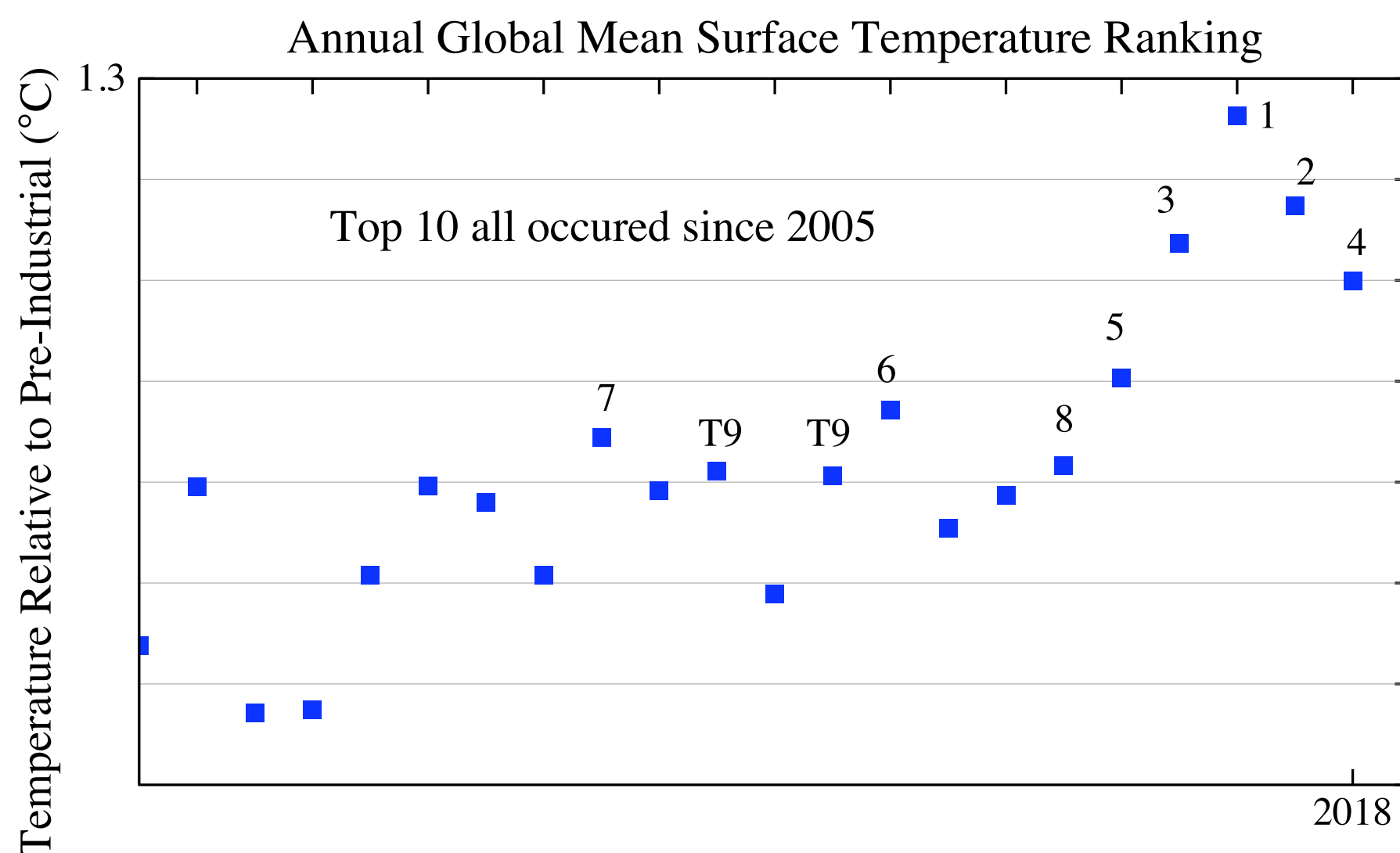
Figure 1. Annual Global Mean Surface Temperature Ranking (Source: http://www.columbia.edu/~mhs119/Temperature/)

WARMING OCEANS

There is high confidence amongst the scientific community that ocean warming dominates the increase in energy stored in the climate system. More than 90% of the energy that has been accumulated between 1971 and 2010 is stored in the planet's oceans with only about 1% stored in the atmosphere. On a global scale, the water closest to the surface (the upper 75m) has warmed by 0.11 [0.09 to 0.13] °C per decade over the period 1971 to 2010 (IPCC, 2014).

Warming oceans impact a range of ecosystems from polar to tropical regions. One of the major concerns is how this is affecting the breeding success of marine animals as the warming is affecting food-chain-important species such as plankton, jellyfish, coral reefs, and many types of saltwater fish (Laffoley & Baxter, 2016).

By damaging fish habitats and causing fish species to move to cooler waters, warming oceans are affecting fish stocks. For example, in East Africa and the Western Indian Ocean, ocean warming has reduced the abundance of some

fish species by killing parts of the coral reefs they depend on, adding to losses caused by overfishing and destructive fishing techniques. In South-East Asia, harvests from marine fisheries are expected to fall by between 10% and 30% by 2050 relative to 1970-2000, as the distributions of fish species shift (Laffoley & Baxter, 2016).

SEA ICE COVERAGE

The amount of ice coverage is a vital climate feedback. A decrease in ice coverage causes an increase in sunlight absorption by the darker ocean, so the less ice, the more absorption of sunlight by the ocean occurs which causes more sea ice melting (Sato & Hansen, 2019). It is likely that there has been about a 40% decline in Arctic sea-ice thickness during late summer to early autumn in recent decades and a considerably slower decline in winter sea-ice thickness (IPCC, 2014). This decrease in ice coverage can also be observed by measuring the sea ice extent at the minimum months (warm months) compared to the maximum months (cold months) for both the Arctic and the Antarctic (See Sea Ice Extent at Minimum Months, Figure 2 and Sea Ice Extent at Maximum Months, Figure 3) (Sato & Hansen, 2019). The sudden and substantial decrease of Arctic sea ice in 2007 and 2012 has been a cause for concern due to how it can amplify additional climate feedbacks (Sato & Hansen, 2019).
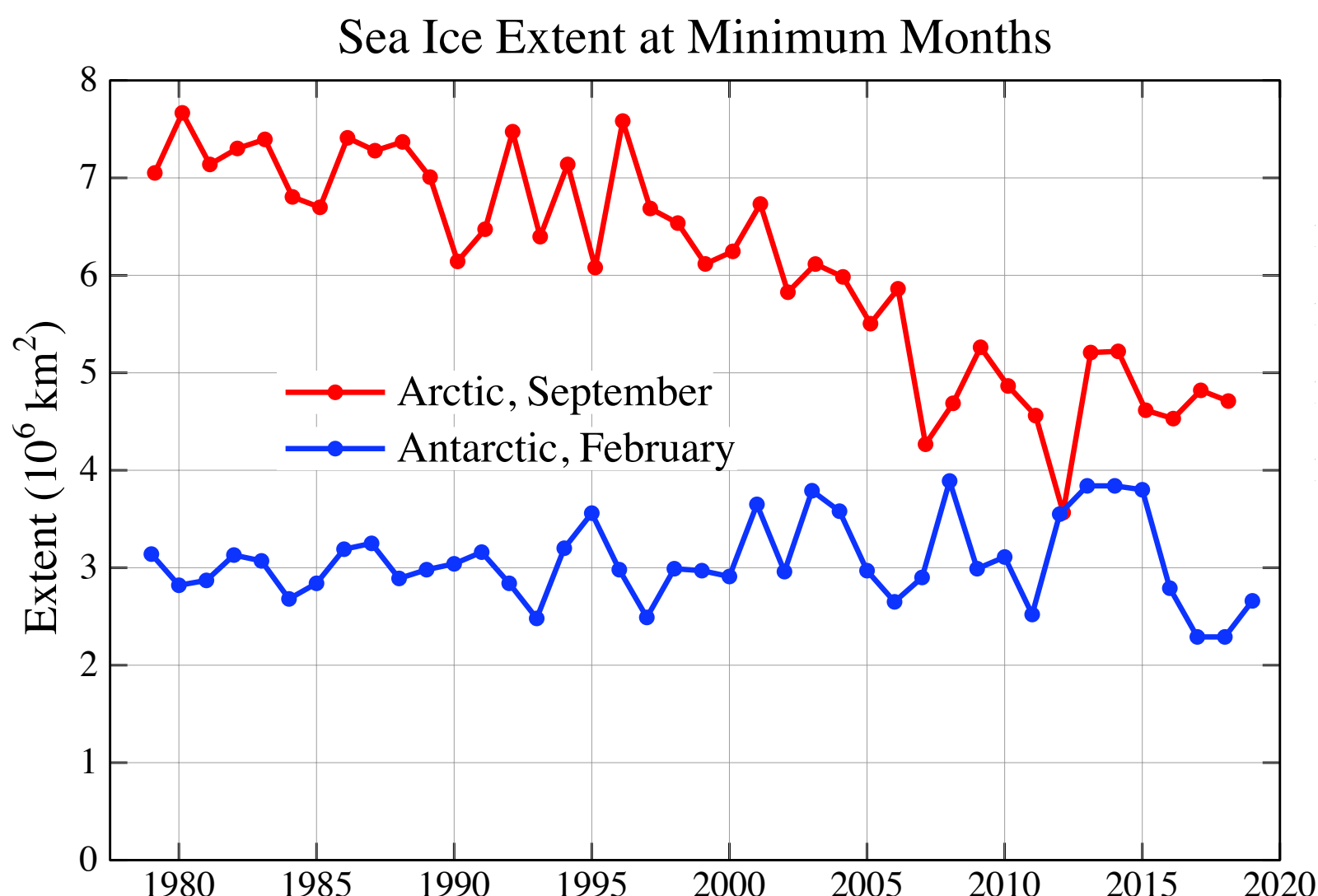
Figure 2. Sea Ice Extent at Minimum Months (Source: http://www.columbia.edu/~mhs119/SeaIceArea/)
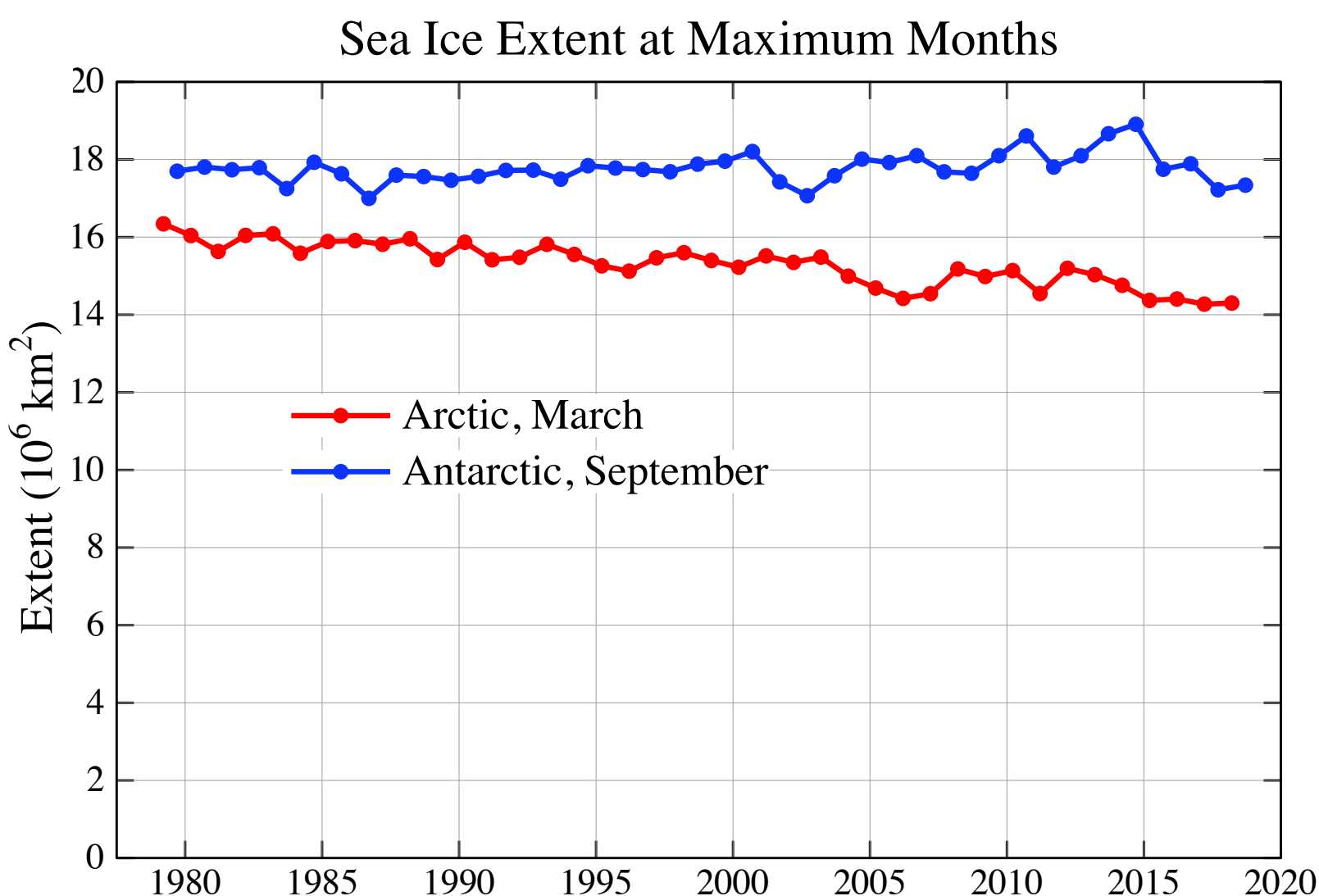
Figure 3. Sea Ice Extent at Maximum Months (Source: http://www.columbia.edu/~mhs119/SeaIceArea/)

The greenhouse effect increases the heat absorption by the ocean which is a dominant physical process causing the disintegration of ice sheets - known as another climate feedback. The melting ice shelves and increased rate of discharge of ice into the ocean further accelerates the ice sheet disintegration process (Sako & Hudson, 2018). The two figures below show the decrease in ice mass for Greenland and Antarctica - traditionally areas of the globe that have significant ice coverage (Sako & Hudson, 2018) (See Greenland Ice Mass Change, Figure 4 and Antarctica Ice Mass Change, Figure 5) (Sako & Hudson, 2018).

Climate scientists argue that ice sheet change is expected to be a "slow" climate feedback. How rapidly ice sheets disintegrate is one of the most uncertain and important climate issues. The dominant physical process causing ice sheet disintegration is the absorption of heat by the ocean (due to an increasing greenhouse effect), resulting in the melting of ice shelves, and thus an increased rate of discharge of ice from the ice sheet to the ocean. Once this process gets well underway, it may be challenging to prevent accelerating ice sheet disintegration under its impetus (Sako & Hudson, 2018).

(a) Greenland Ice Mass Change
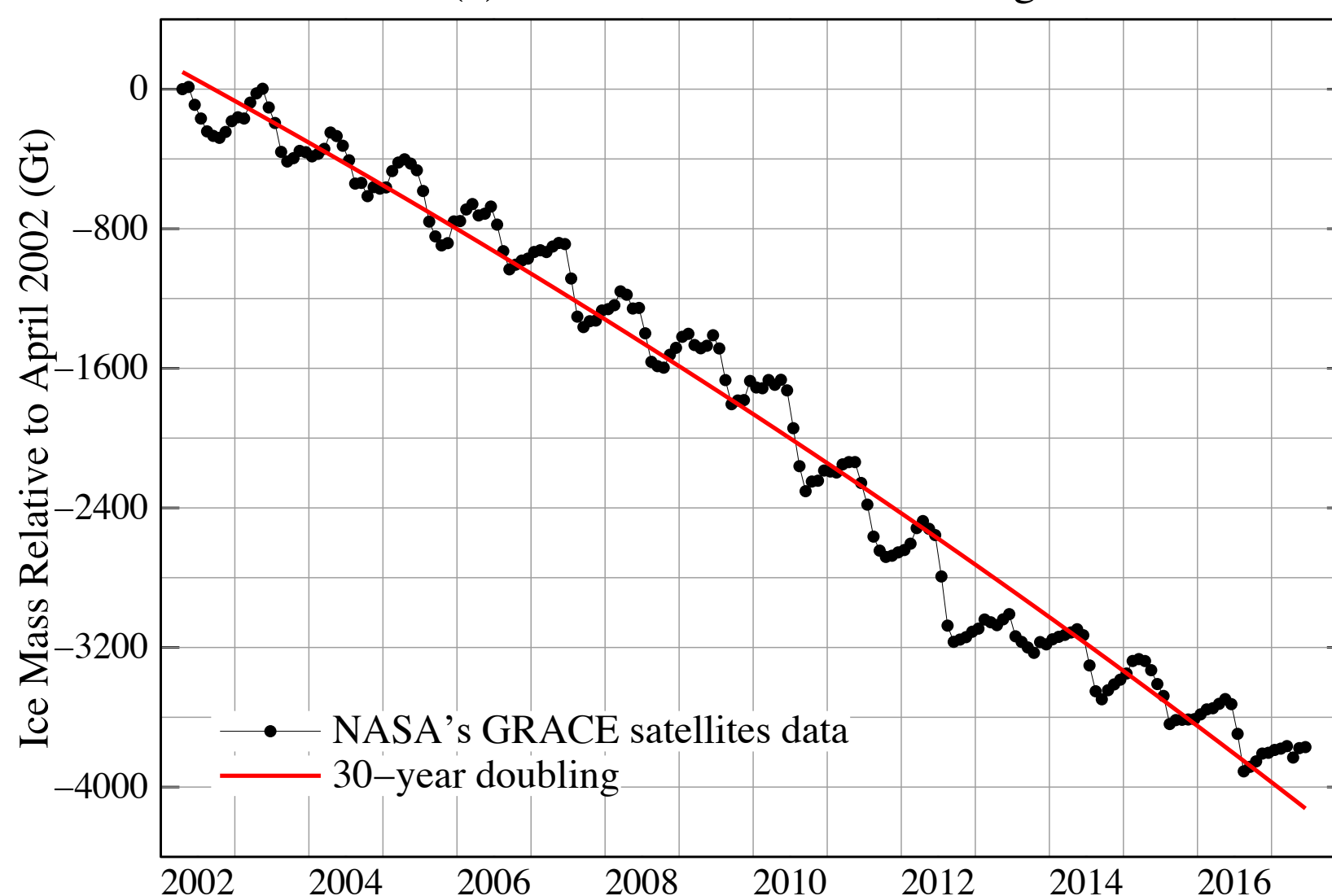
Figure 4. Greenland Ice Mass Change (Source: http://www.columbia.edu/~mhs119/IceSheet/)

(b) Antarctica Ice Mass Change
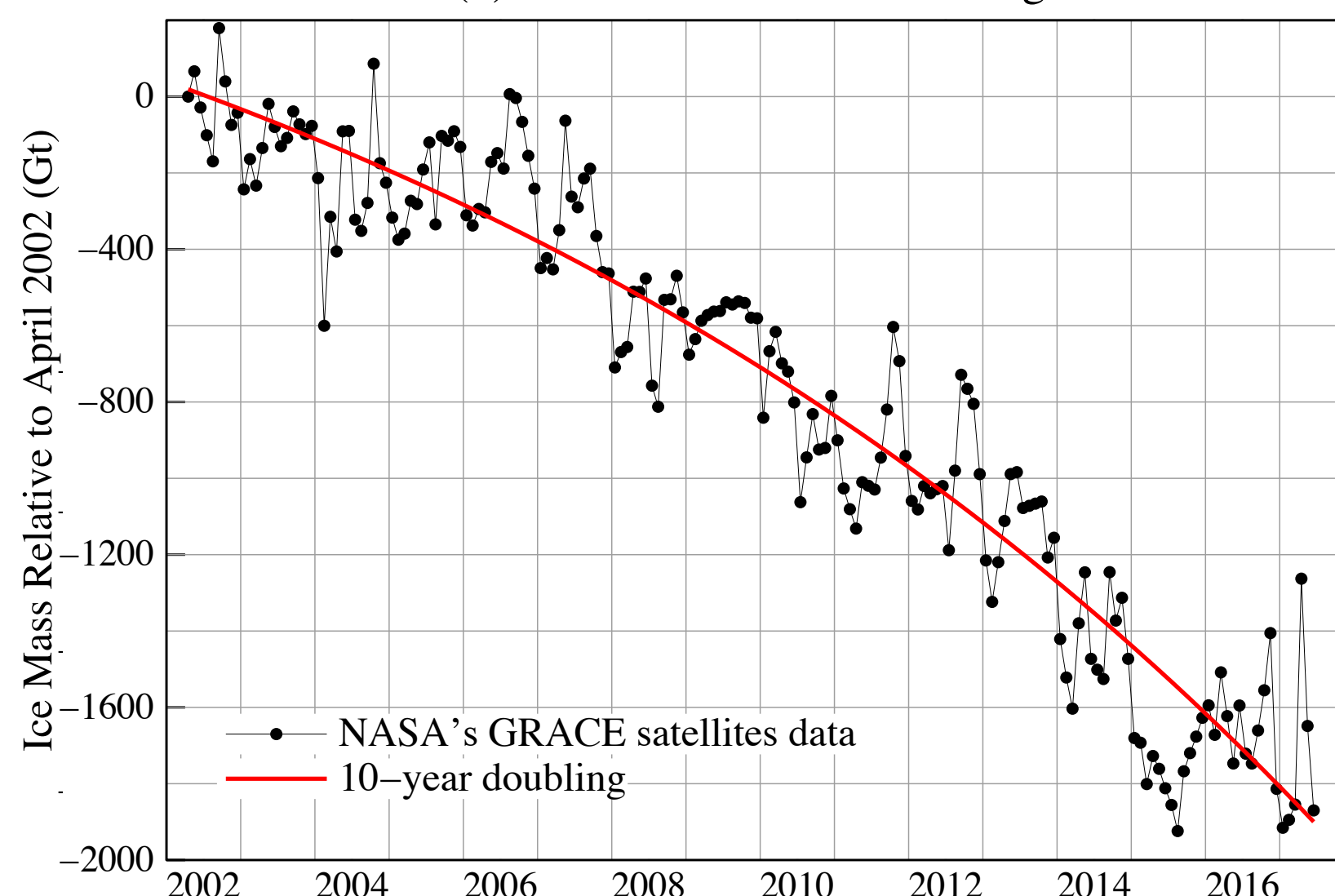
Figure 5. Antarctica Ice Mass Coverage (Source: http://www.columbia.edu/~mhs119/IceSheet/)

SNOW COVER DECREASE

Similar to the ice sheets decreasing, there has been a reduction of the snow cover. The Physical Science Basis report from the IPCC states with very high confidence that the extent of Northern Hemisphere snow cover has decreased since the mid-20th century. Northern Hemisphere snow cover extent decreased 1.6 [0.8 to 2.4] % per decade for March and April, and 11.7 [8.8 to 14.6] % per decade for June, over the 1967 to 2012 period. During this period, snow cover extent in the Northern Hemisphere did not show a statistically significant increase in any month (IPCC, 2013).

SEA LEVEL RISE

Global mean sea level rise is caused by an increase in the volume of the global ocean. This is caused by three leading factors: 1) The warming of the ocean (thermal expansion), 2) the loss of ice by glaciers and ice sheets, and 3) the reduction of liquid water storage on land (Gregory, 2013). From 1990 onward, the rate of sea level change increased from 1.4mm/year in the earlier decades of the 20th century to approximately 3.3 mm/year (See the Global Mean Sea Level Change, Figure 6) (Sato & Hansen, 2019). This accounted for a global average sea level rise between 0.1 and 0.2 metres during the 20th century (IPCC, 2014).
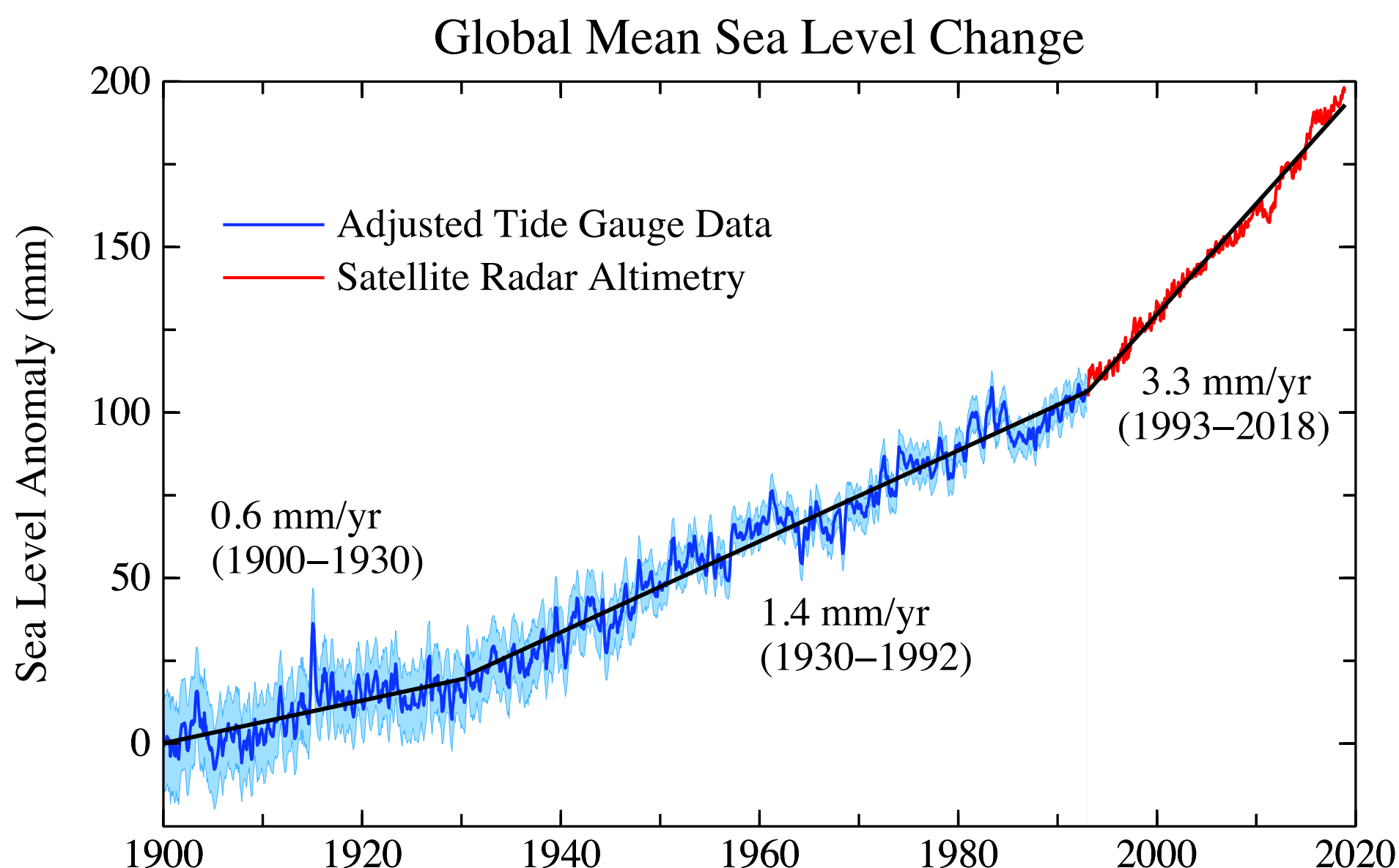
Figure 6. Global Mean Sea Level Change (Source: http://www.columbia.edu/~mhs119/SeaLevel/)

OCEAN ACIDIFICATION

Ocean acidification occurs when seawater absorbs carbon dioxide (CO_2) from the atmosphere over an extended period which then causes a reduction in the pH of the ocean (National Oceanic and Atmospheric Administration, 2012). The IPCC has high confidence that the pH of ocean surface water has decreased by 0.1 since the beginning of the industrial era, corresponding to a 26% increase in hydrogen ion concentration (IPCC, 2013).

The IPCC stated that carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed ~30% of emitted anthropogenic carbon dioxide, leading to ocean acidification (IPCC, 2013).

The earth's atmosphere has changed and each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850 (IPCC, 2013). This has contributed to many changes in extreme weather and climate events since around 1950. The IPCC states that it is very likely that the number of cold days and nights has decreased and the number of warm days and nights have increased on the global scale. They also state that the frequency of heat waves have increased in large parts of Europe, Asia, and Australia. Similarly, there have been more land regions where the number of significant precipitation events have increased than where they have decreased. This can be observed in North America and Europe where the frequency or intensity of heavy precipitation events have increased (IPCC, 2013).

In Canada specifically, there have been studies that observed weather patterns that fall outside of their traditional trends. The Canadian Institute of Actuaries compiles an Actuaries Climate Index - a joint effort by insurance organizations across North America. Their report measures and analyzes six climate-related components: 1) High Temperatures, 2) Low Temperatures, 3) Heavy Rainfall, 4) Drought, 5) High Wind and 6) Sea Level. Each of these components are based on measurements from an extensive network of meteorological and coastal tide stations in the United States and Canada and compares data over a 30-year reference period from 1961 to 1990. In the fall of 2017, a report was released that revealed a slow, gradual increase in extreme weather events in Canada ("Actuaries Climate Index Data", 2017). Between 1961 and 1990, extreme weather fell outside the range of normal variability only five times within 30 years - however in the last 10 years, that happened 12 times (The Canadian Press, 2018).

Climate scientists argue that ice sheet change is expected to be a "slow" climate feedback. How rapidly ice sheets disintegrate is one of the most uncertain and important climate issues. The dominant physical process causing ice sheet disintegration is the absorption of heat by the ocean (due to an increasing greenhouse effect), resulting in the melting of ice shelves, and thus an increased rate of discharge of ice from the ice sheet to the ocean. Once this process gets well underway, it may be challenging to prevent accelerating ice sheet disintegration under its impetus (Sako & Hudson, 2018).

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Across Canada, the number of above-average hot days has exceeded the normal number every quarter since the winter of 2015. Similarly, the average number of days with heavy rain or snow has been outside of the variable range since the spring of 2013 (since the winter of 2008 for Ontario and Quebec) ("Actuaries Climate Index Data", 2017).

For context and to better understand the economic, social, and environmental that these weather pattern changes are having on areas in Canada, below is a list of some of Canada's most extreme weather stories from 2017 and 2018 according to the Government of Canada.

British Columbia's longest and most destructive wildfire season

Across the Southern British Columbia interior, the wettest spring was followed by its driest summer on record - leading to the longest, most disastrous wildfire season in the province's history. The intense wildfires forced 50,000 British Columbians to leave their homes.

In 2017 the BC Wildfire Service reported 1,265 fires across this area which burned 1.2 million hectares of timber, bush and grassland - this equates to an area twice the size of Prince Edward Island. In 2018, nearly 2,000 wildfires ignited across the province. By August 8, there were 460 simultaneous wildfires a day with 25 of notable size (Climate Change Canada, 2019).

To gauge economic impact, in 2017, total firefighting costs exceeded $500,000,000, and insured property losses reached close to $130 million (Climate Change Canada, 2017). The Government of Canada did not report the total cost of the 2018 fires yet.

Impacts to Prairie Harvest

As stated by the Government of Canada, "Prairie growers and ranchers faced enormous challenges during a tough growing season. With the frost line two-metres deep in places, the long, cold spring kept farmers off their fields until mid-May. Then came drought through the southern and central Prairies where, between April and August, they received less than 60 percent of the average rainfall," (Climate Change Canada, 2019).

Spring flooding in Quebec and Ontario

In April of 2017, several major, slow-moving weather systems soaked Quebec and Eastern Ontario with record rains.

In Montréal, April rains totalled 156.2 mm – the second wettest in 147 years. Both Ottawa and Montréal had their wettest spring in history – 400 mm or more with records dating back to the 1870s. This lead to flooding occurring in hundreds of communities, forcing 4,000 people to leave their homes.

According to the Insurance Bureau of Canada, the spring flooding in April and May resulted in 15,750 claims and $223 million in property damages (Climate Change Canada, 2017).

Dry and Hot Weather in the West

A massive heat wave prompted the record-breaking summer temperatures across the Canadian West. Southern regions between the British Columbia (BC) Interior and the southeastern Prairies faced their driest summer in 70 years, with many areas recording less than half their average rainfall during the growing season.

The hot weather was accompanied by dry weather. Across the West, no other summer as far back as 1948 has been so dry. This had severe impacts such as all-time high increased electricity usage, attendance at outdoor attractions, fish in low river flows which heated up, and more. The head and droughts affected crops across the prairies. Livestock also suffered, as watering holes and grazing land dried up, with hundreds of cattle dying from dehydration (Climate Change Canada, 2017).

Ontario and Quebec Winds

On May 4th in 2018, a quick squall line of thunderstorms rushed through southwestern Ontario. Hurricane-force gusts produced record wind speeds for May - the fastest being 126 km/h in Hamilton; and 117 km/h in

Montréal. In Quebec, 285,000 people lost power while in Ontario, 300,000 lost power. The Insurance Bureau of Canada stated it was the country's costliest storm in five years with total losses estimated near $1 billion (Climate Change Canada, 2017).

However, despite climate change being established in the natural sciences world, it has generated limited intentional public action, behaviour change, coherent policies, and regulatory tools for the planet (Brace & Geoghegan, 2011).

Climate Change as a Wicked Problem

A wicked problem is categorized by having innumerable causes, being tough to describe, and not having one "right" answer (Camillus, 2014). These kinds of issues stand out because traditional processes cannot resolve them. Environmental degradation, terrorism, and poverty are classic examples of wicked problems (Camillus, 2014).

Climate change has again and again positioned itself as a wicked problem in our global systems. It is exceedingly multivalent, open to limitless interpretations, integrated into a vast number of economies, and is influenced by additional wicked problems. The current narrative of climate change is fragmented in the sense that many powerful voices are competing for people's attention and action.

Of many global problems, climate change is often cited as the most serious threat facing humanity today. Based on Horst Rittel conditions of a "wicked problem" which he outlined in 'Dilemmas in a General Theory of Planning' (1973), climate change can be labelled as a wicked problem. The impacts of climate change will affect all countries and regions around the world, albeit in different and uncertain ways. Developed countries have contributed the majority of greenhouse gas (GHG) emissions since the industrial revolution while, developing countries are the most vulnerable to the impacts (Parry, Canziani, & Palutikof, 2007). From where our planet stands right now, individuals in developed nations need short-term loss in order to mitigate longer-term loss (Marshall, 2014).

Lack of Widespread Public Movement Inspired by Climate Data

Research suggests there is widespread concern about climate change and support for climate policy in North America and Europe (Corner, Shaw, & Clarke, 2018). However as mentioned above, there has not been a substantial movement to reverse the overall negative effects of climate change. There have been attempts over the last few decades, but even the congregations and conferences that happened at global scales did not incite mass public change. A few examples are:

- KYOTO PROTOCOL
  This international agreement was the world's first emissions reduction treaty. The Kyoto Protocol was adopted in 1997 and came into force in 2005 - setting emission limitations and reduction targets for 37 industrialized countries (Assessment of First Phase of Kyoto Protocol Published, 2016). Despite setting these goals, greenhouse gases continued to rise. The first accounting period took place between 2008-2012. Canada pulled out of the accord in 2011; however,

based on 2013 GHG results, the country was 26% above the 2012 Kyoto target (Climate Change Connection, 2013).

COPENHAGEN ACCORD

In 2009, the Copenhagen agreement was established to limit global warming to 2 degrees Celsius and set an aspirational goal of reducing global emissions at least 50 percent by 2050 (A Copenhagen Climate Agreement, 2017). Despite buy-in from participating countries, GHG emissions continued to rise. In 2013, Canada was already above the Copenhagen target by 17% (Climate Change Connection, 2013).

PARIS AGREEMENT

The COP21 meeting took place in November 2015 and took effect on November 4, 2016. The goals of the Paris Agreement was to limit the global temperature rise to 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius (The Paris Agreement, 2018). However, despite the unification of the 55 countries who ratified the agreement, there are signs that these goals will not be achievable.

In October 2018, the IPCC released a report stating that the planet is well on its way to 1.5 degrees Celsius and will meet that temperature increase within the next couple of decades. Additionally, in order to limit warming to 1.5 degrees Celsius above pre-industrial levels by 2100, the emissions of greenhouse gases need to be reduced rapidly in the coming years brought to zero around mid-century (Temperatures, 2018). Based on current emission patterns and policies, a temperature increase of 3-3.5 degrees Celsius is more likely within the next few decades (Temperatures, 2018) (See Climate Action Tracker December 2018, Figure 7) (Temperatures, 2018).
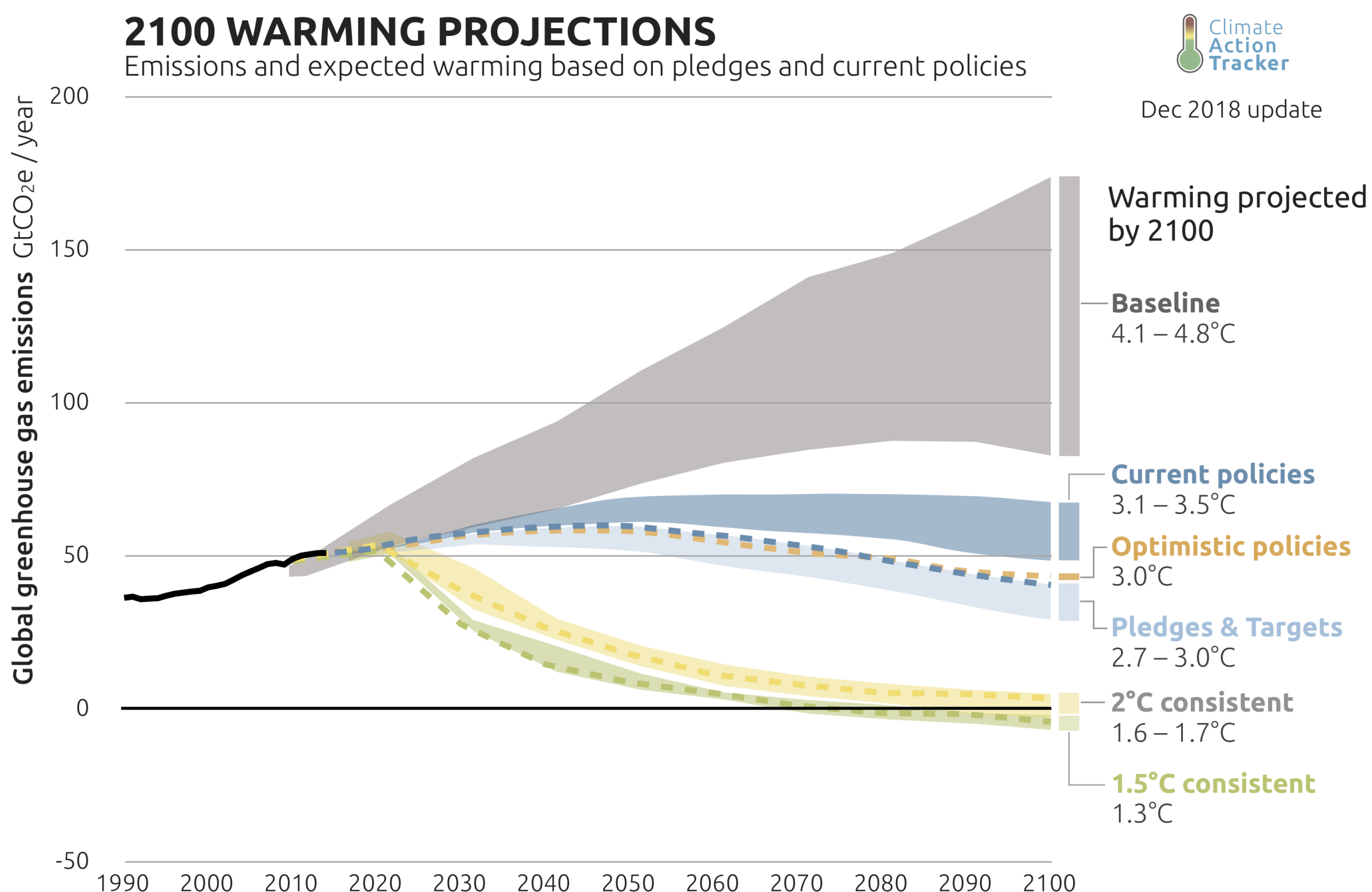
Figure 7. Climate Action Tracker December 2018 (Source: https://climateactiontracker.org/global/temperatures/)

When looking at why widespread action has not occurred, it is important to acknowledge that the science of climate change has been thoroughly established and accepted by various scientific leaders and political entities. Despite this, mass public movements that contribute to decreasing GHG emissions and lower global warming has not yet occurred. Barriers for this will be detailed and explained in Chapter Three.

Research Question

In order to motivate environmentally-friendly behaviour change, what components of the climate change narrative need to be included when presenting to individuals who have accepted human-caused climate change as a reality?

The Goal of this MRP

This MRP is meant to explore if using rhetorical narrative structures in tandem with design-thinking methods, can encourage people to improve their environmental citizenship (explained in the subsection below). Additional goals of using strengthened narratives are: 1) to help others build a foundational understanding of the scientific realities surrounding climate change and 2) build empathy from viewers for the planet and its affected systems.

Desired Behaviour Change

The concept of environmental citizenship is still in its infancy and hence does not have a concrete expression within the context of people's lives. For example, the duties of an environmental citizen could be inclusive of activities such as recycling or making sustainable purchases. On the other hand,

individual choices such as having the right to live a green life can also be affiliated (Bell, 2005). For this paper, the kind of environmental citizenship that will be referred to is one centred around individuals reducing their ecological footprint in a private sphere (as opposed to typical citizenship public spheres). This is because energy consumption and waste production take place at home (Revkin, 2012). Specific actions include, but are not limited to, reducing consumption, choosing non-fuel dependent modes of transportation, eating less meat, choosing locally-sourced and environmentally-conscious produce, recycling materials, and reusing objects when possible. These individual actions may seem minor in the grand scheme of global climate change, however, they are critical as they have a cascading effect. Once specific actions are adopted, it will impact the individual's lifestyle which will contribute to a value shift and connecting to other platforms and individuals who share similar mindsets. This momentum will then grow to have larger-scale impacts such as changes at a political and/or social level. These institutionalized changes will spark feedback loops which further makes certain actions more accessible and encourages the adoption of eco-friendly lifestyle changes. This helps pave the way for others to come onboard and continue building the momentum for higher-level political and corporate change (see Figure 8). This concept is explained more thoroughly in Chapter Four.

FEEDBACK LOOPS

ACTION   LIFESTYLE   BUILD   POLICY
                CHANGE   MOMENTUM   CHANGE
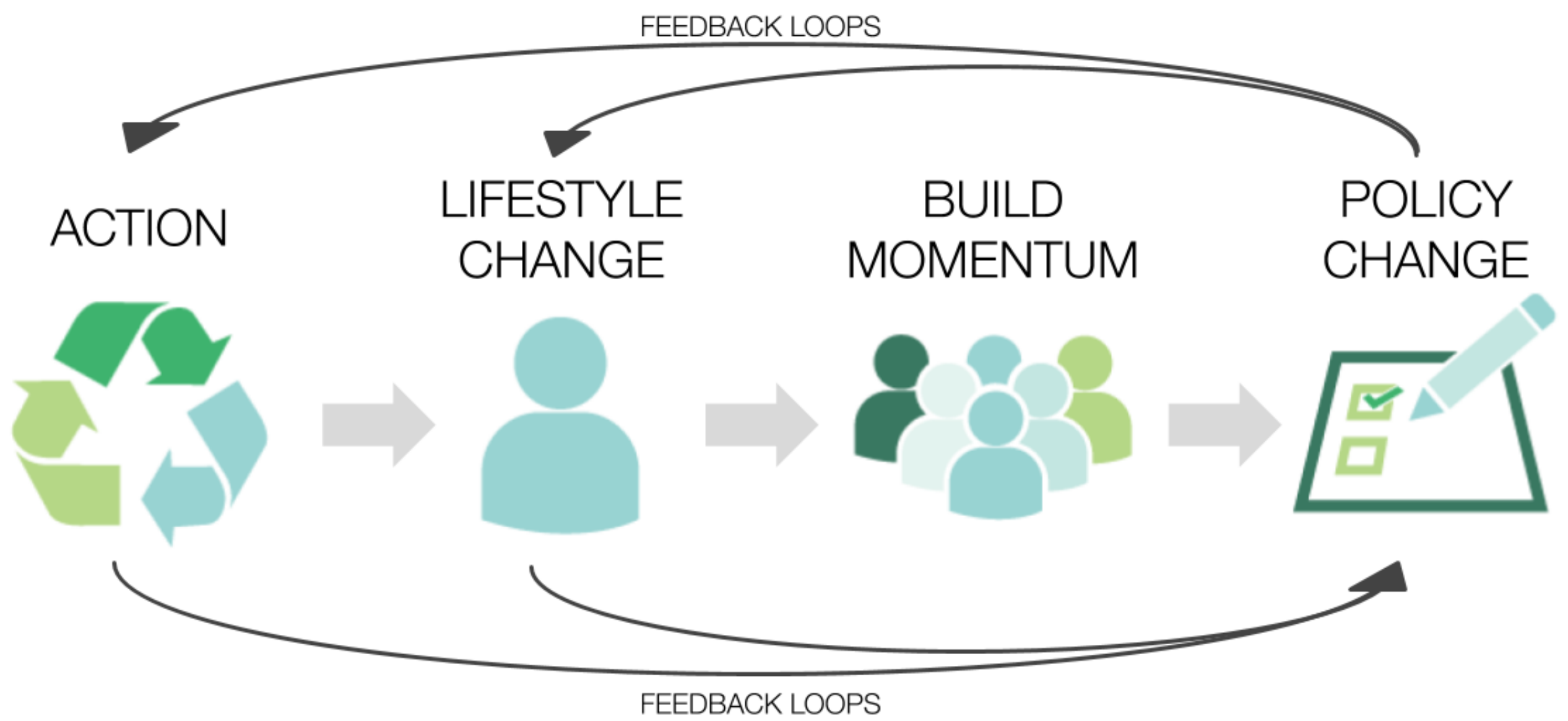
FEEDBACK LOOPS

Figure 8. Environmental Citizen Action Process and Feedback Loops (Icons Source: https://www.flaticon.com/)

Chapter 1

Why Narratives Aren't Just For Children

Stories. This unique packaging of information has the potential to mean something different to every single person. For some, stories can be used to escape into the thrilling and inviting world of writers. For others, it can be a method of portraying dreams of what the future can hold, or hold space to allow introspection of what has happened in the past. Through stories, the world is filled with heroes and villains, archetypes that people can learn from and either emulate or abandon. Stories are a lens in which people can connect with the realities of the world without being directly involved.

The ability to parse information via a story is deeply rooted in people's foundational learning systems and personality development (Shea, 2003). Katherine Nelson was an American developmental psychologist; she emphasized that the consciousness of a child can be expanded through "multiple social realities, communicative discourse, and the human disposition to narrativize events and impose meaning on people's actions" (Shea, 2003). Nelson positions narratives as a crucial developmental stepping stone when a child enters into the linguistic world. From a young age, stories provide a crucial tool to absorb new concepts, learn lessons, understand different environments and how to navigate them. In today's digital age, information is widely accessible. However, in order to make strides in sharing climate change narratives, enacting change, and sparking new conversations, narratives need to be packaged in a way that effectively enhances the framing of the problem.

How to Define a Narrative

The following two definitions provide context for how narratives are used in this paper. These definitions belong to Melanie Green and Timothy Brock's Five Theoretical Postulates, pulled from their article titled: *The Role of Transportation in the Persuasiveness of Public Narratives.*

> 1. Narrative persuasion is limited to story texts (scripts) (i) that are in fact narratives; (ii) in which images are evoked; and (iii) in which readers (viewers') beliefs are implicated.
> 2. Narrative persuasion (belief change) occurs, other things equal, to the extent that the evoked images are activated by psychological transportation, defined as a state in which readers become absorbed in the narrative world, leaving the real world behind, at least momentarily.
>
> (Green & Brock, 2000)

These additional definitions assist in understanding the power that narratives can have and the components required in order to achieve the goal of using them to persuade opinions and beliefs.

The Role of Narratives

In 2014, Ogilvy, Nonaka, and Konno published an article, *Toward Narrative Strategy*, summarizing how stories give meaning and direction to our lives. The authors identify stories as an interchangeable medium that is rooted in shared language and which caters to primal human instincts and comfort.

Words comprise a language, which is a shared social construct that facilitates learning between people (Ogilvy, Nonaka, and Konno, 2014). The authors recognize that words are one of humanity's greatest and most powerful tools as they can be descriptive and performative if used within the proper contexts. Narratives assist people in attaining self-knowledge and additionally, self-identity by providing a lens in which they can engage with and develop a meaningful relationship (Ogilvy, Nonaka, and Konno, 2014). This gradually leads the individual to get involved in the plot with the intention of 'fitting into the story'. Without this active narrative participation, effective user commitment is difficult to achieve which directly impacts the implementation of a narrative. Additionally, the authors show that evidence-based approaches limit the amount of inspiration and devotion - two crucial components for any change-based strategy.

Narratives Intrinsically Resonate With Humans In the book *Thinking, Fast and Slow* by Daniel Kahneman, the author describes two systems that drive choices: System One is fast, intuitive, and emotional; System Two is slower, more deliberative, and more logical (Kahneman, 2015). The reason Daniel Kahneman invites the reader to think of the two systems as agents within the mind is because this approach naturally resonates when people are processing information. Kahneman succinctly describes this occurrence with: "the mind—especially System One—appears to have a special aptitude for the construction and interpretation of stories about active agents, who have personalities, habits, and abilities" (Kahneman, 2011). This supports the concept of narrative building and the immediate impact a strategy has on an individual when framed as a story.

The above summary of Daniel Kahneman's work strikes at the heart of narrative theory, which has consistently found that narratives are more effective at persuading than drier forms of communication such as lists or abstract text (Jones & McBeth, 2010). Within the history of climate change communication, metrics such as global temperature targets or atmospheric concentrations of greenhouse gases are the go-to topics for discussing climate change however they are unlikely to be understood (Corner, Shaw, & Clarke, 2018). The science of climate change is challenging to grasp for most lay audiences which then causes the information to not be personally relevant to a majority of the public (Moser, 2016). This concept will be elaborated on in Chapter Three.

Narrative Transportation

Narrative transportation is a derivative of a previous narrative scholarship called *The Narrative Policy Framework* by Michael Jones and Mark McBeth (Jones & Mcbeth, 2010). As a quick summary, this tool assesses the extent to which individuals exposed to a story are "transported" into that story (Jones, 2014). The Narrative Policy Framework [NPF] hypothesizes that as narrative transportation improves within the narrative, the reader will (i) have a more positive affect for characters within the story; and (ii) will make the story more persuasive (Jones & Mcbeth, 2010). In order to achieve narrative transportation, a proper framework must be followed which includes the structural components of narrative: a setting, a plot, characters (heroes and villains), and a moral of the story.

Once the framework for narrative transportation has been achieved, a familiar process takes place where the reader/viewer temporarily suspends their engagement with the world around them and falls into the story (Green & Brock, 2000). There is no limit to the medium that can take on this framework and initiate the process - novels, movies, news coverage, or even friendly conversations. One of the most important potential effects of narrative transportation stems from how emotionally attached, and motivated readers are. This level of

immersion may cause the reader to become less aware of real-world facts that contradict assertions which are presented in the narrative - even when it is established that the narrative is not real (Green & Brock, 2000). The process described can lead to the reader's beliefs changing based on how attached they feel to the story - specifically the protagonist. This circumstance was identified within the same journal article as 'protagonist attachment'.

Protagonist attachment is described within narrative transportation as when an individual finds a narrative more persuasive based on how much they identify with or are sympathetic to a character in a narrative (Green & Brock, 2000). Michael Jones illustrated that transportation is a significant predictor of positive evaluation of the protagonists in an experiment. This test was designed to examine how far a narrative's structure shapes climate change policy preferences. The experiment shared various cultural narratives to gauge how people would act based on the story they heard. Respondents of all types had a positive emotional reaction to the hero character and the more the participants liked the hero, the more likely they were to accept that climate change was real. This acceptance was described as the respondents acknowledged that climate change posed a problem not just for them, but for society as a whole - and they were willing to act upon their thoughts of the narrative. Jones' data found that the hero of the story acts as a crucial driver of the overall persuasiveness of a story.

A key takeaway from the research conducted by Jones was the relationship between a participant being able to picture the events in the climate change story, and how attached they were to the hero character. The higher the personal affect for the hero was, the more likely the respondents believed that climate change was real, that it posed a threat, and that they needed to take some sort of action to deter it from happening. In addition, a respondent's self-reported willingness

to support the policy solution increased in tandem with how secure their attachment was for the hero character. Once the respondent was transported, they were more likely to identify with the main character and be open to accepting the morale of the narrative and any related pieces of information (Jones, 2014).

Applying Narrative Strategy

French philosopher Paul Ricoeur outlines a three-step path for how users digest narratives in his *Time and Narrative* (Ricoeur & McLaughlin, 2009). His three stages describe a process where a reader of a story internalizes, configures, and actualizes what is told in the story. His three steps are as follows:

1) Prefiguration: entails the process by which the reader understands the story's overall plot based on his/her knowledge

2) Configuration: concerns the process in which the reader interrelates events happening in the story and understands them as a meaningful whole

3) Refiguration: refers to the process in which the reader reproduces the story in the real world

The work outlined in this MRP will use Ricoeur's model to try and understand what climate change narratives will help people move through each of the three steps effectively and result in the highest amount of willingness to change individual behaviours in favour of the environment.

The Narrative of Climate Change

Climate change is a global problem that does not provide much certainty or immediacy compared to a majority of other, and more familiar, problems. Rob Nixon, the author of *Slow Violence and the Environmentalism of the Poor* frames the vulnerability of climate change as 'slow violence'. This term refers to attritional violence that occurs gradually and out of sight as it typically deals with delayed destruction that is

dispersed across time and space (Nixon, 2013). This temporal dimension influences individuals to pay attention to hard-changing capitalism while ignoring the eroding, slow-changing environmental and social conditions (Nixon, 2013). There are many competing realities and different ways that it affects different populations on the planet. The "thawing cryosphere, biomagnification, deforestation, the acidifying oceans, and a host of other slowly unfolding environmental catastrophes" (Nixon, 2013) have affected our ability to comprehend the scale of climate change fully and hence, makes it challenging to have a unifying narrative structure that results in active environmental citizenship.

Using the principles of the Narrative Policy Framework as a base, the next two sections will dive into what the current narratives of climate change are, what elements are useful, and what needs to be improved. The ideal outcome through all of this learning is to be able to understand the elements are at play and will contribute to effective climate narrative structures.

Chapter 2

What are the Current Narratives of Climate Change?

As mentioned in the previous chapters, there are many competing impacts that fragment the climate change narrative. Due to that, multiple climate change narratives have progressed and evolved over the last few decades (starting with global warming and developing into the complex system of environmental, scientific, economic, and political climate change impacts).

Different narratives have been structured based on the audience that is receiving them. Depending on the group, the requirements and crucial components of the narrative shift. For this paper, the audiences for which climate change action is to be inspired has been grouped into three broad categories.

> 1) Climate Change Deniers: People who do not believe that climate change is human induced and dispute it.

> 2) Climate Change Believers: People who believe that the change in the climate is human-induced, but their actions and lifestyle do not reflect the ideal changes that would be needed to reduce climate change increasing and escalating.

> 3) Climate Change Warriors: People who believe in the human impacts on the climate and have adapted their lifestyle to reduce their environmental footprint and keep it at a deficit.

Each of the three categories above need different tools and approaches as the opinions and personalities within the groups vary drastically. For example, the narrative needed to educate and inspire climate-friendly actions for the Deniers group will differ from the narrative applied to the Warriors group. This paper will focus on the narratives that pertain to the middle category: Human-Induced Climate Change Believers.

For the past century, the planet's changing climate has predominantly been rooted in scientific evidence and discoveries. Climate change communicators were predominantly scientists who relied on their science and data to lead the story-telling of what was happening to our planet to a broader, public audience. The strategies have evolved and shifted to the multi-media, multi-faceted approach that we have today to not only connect with more audiences, but also to combat the political and corporate efforts to dissuade affirmative climate action. In this section, the evolution of different climate change narratives that are popular in society today will be explained.

Historical Overview of Climate Change Communication

As was mentioned at the beginning of this paper, the science of climate change dates back to the

19th century with publications made as early as 1859 when John Tyndall proved the scientific components that would lead to climate change (Graham, 1999). Since then, the science of climate change continued to grow and more and more scientists contributed to the field, further establishing the realities of climate change in the natural sciences world. What was missing though, was a connection to a public audience that was disconnected from the scientific realities.

Since the mid-to-late 1980s when anthropogenic climate change emerged on the public agenda, public communication that was aimed to convey the learnings of this topic witnessed a steep rise (Moser, 2010). However, the majority of early communicators were physical scientists and environmentalists — professional groups not familiar with social science scholarship (Moser, 2010). As a result, the majority of communication was still focused on the scientific findings and synthesis reports published by well-respected thought leaders in the field - i.e. the Intergovernmental Panel on Climate Change. Similarly, coverage of high-level conferences or policy meetings would also be communicated at a global level - for example, meetings of the United Nations Framework Convention on Climate Change (UNFCCC) and the Conference of the Parties (COP) Third Meeting where the Kyoto Protocol treaty was established (Golinsky, 2014). Where it started to shift was when there was coverage of particularly severe extreme weather events started to be covered and were being connected directly to climate change (Moser, 2010).

Today, after years of steady scientific progress and consensus within the scientific community, there is an improved public awareness (at least in many developed countries) as media practices have evolved. However, concern, sense of urgency, and importance vary significantly across societies and populations, and understanding of

the causes and the potential ramifications remains limited (Moser, 2010).

Below is a summary of related components that contribute to the overall climate change narrative. While these influences on their own are out of scope for this MRP, it is important to note the impact it has on the climate change communication ecosystem. The following categories have been adapted from Susanne Moser's Climate Communication work. Through her work, she has identified six influential forces which have emerged from the climate communication landscape.

■ 1) POLITICS
The political narrative has had multiple internal influences as it can be impacted from local to global governmental policies, in tandem with adapting to current political discourse and public opinion. One quick look at history and it is evident that the historical record is filled with examples where narratives have been strategically generated by governmental actors to shape beliefs or restrict and contain them (Jones, 2014).

Several countries, provinces, and governing institutions have launched top-down climate change and energy-related communication campaigns which pursue an extensive range of goals (e.g. climate education, pro-environmental behaviour change). There are leaders who have pursued this course (the United Kingdom, Canada, Japan, the European Union and the United Nations Development Program (Moser, 2016). Other countries - such as the United States - have not organized a unifying and central communication program and outreach efforts - but have instead experienced active "bottom-up" climate change communications. An issue with this is that without an overarching plan to help coordinate these efforts, the outreach and

communication tactics are largely uncoordinated and something contradictory (Moser, 2016). It has been observed that politicians adopt a "last in, first out" stance toward environmental issues which means that when times get difficult, these issues are dropped (Nixon, 2013). Additionally, the results from preventative or remedial environmental action are usually only realized in the future, and payoff rarely delivers within electoral cycles results - further discouraging politicians from making it a priority (Nixon, 2013).

The barriers that have prevented the effective implementation of environmental protection policies typically steps from right-wing political influences and corporate agendas (Klein, 2015). For example, anti-climate change lobbyist groups (such as the Heartland Institute) oppose the scientific consensus on climate change. They do not dispute that climate change itself is occurring, but rather try to create distance between human involvement by advocating that human activities are not driving climate change and the amount of climate change that is occurring is beneficial (Pilkey, Pilkey, & Fraser 2011). These groups have an influence within the climate skeptics community and continuously try to influence governments and policymakers.

There have however been strong political movements that have originated with strong advocates. These grassroots movements have inspired climate policies, bilateral and unilateral agreements, voluntary commitments by industry, investors, governments which all played influential roles in the lead-up to 21st Conference of the Parties in Paris 2015 (Moser, 2010). There have also been milestone victories such as the defeat of the Keystone XL pipeline which originated from pressure exerted by Canadian and US activists and garnered widespread public attention.

2) CLIMATE

As mentioned in the introduction section of this paper, there have been notable climatic extremes in the past few decades which have captured global attention and brought awareness to certain environmental realities. Events such as Superstorm Sandy (2012) or Typhoon Haiyan (2013), extreme-heat events in India (2015), and the west-coast fires in Canada and the US (2017 & 2018) have contributed to crop failures, extensive infrastructure damage, and tragic loss of life (Moser, 2016). The changing climate has become an advocate of its own as it forced people to acknowledge that large-scale changes are happening. These instances will only increase in severity as our planet has already passed the 400 ppm CO_2 concentration threshold (compared to the pre-industrial level of 280 ppm which the planet hovered around for the previous 10,000 years) (Jones, 2017). To put that into perspective, the IPCC created various scenarios that would depict potential future situations. One of their more pessimistic scenarios is that the planet continues on its current trajectory and emissions peak around the year 2080 leading to an atmosphere of about 700 ppm with an accompanying temperature increase of more than 3 degrees Celsius (IPCC, 2013). The IPCC's most pessimistic scenario is where the population booms, technology stagnates, and emissions keep rising to a point where the atmosphere is about 2,000 ppm by 2250 (IPCC, 2013). The atmosphere of that scenario was last seen during the Jurassic period when dinosaurs roamed and an apocalyptic temperature rise of 9 degrees Celsius would occur (Jones, 2017). Showcasing extreme climate events such as the one in the IPCC scenario can affect people emotionally and lead to empathetic-driven responses.

3) SCIENCE

There have been many incremental scientific

advances, notable discoveries, as well as landmark climate change assessments that have occurred since 1859 when John Tyndall made the first notable one. The IPCC released its fifth comprehensive assessment in 2013 and 2014, and the United States released its third Climate Action Report in 2014 with extensive outreach efforts and media coverage (Moser, 2016). These reports are used as tools to guide communications and inform policymakers, scientists, corporations, and the general public. As stated before, the narratives that are predominantly scientific and rely on data and technicalities to communicate do not intuitively connect with a majority of audiences.

4) TOOLS/CHANNELS/MESSENGERS

Media plays a crucial role in communicating any global narrative. The rise in technology has served as a catalyst for the impacts of different mediums and the voices that speak through them. Traditional mass media outlets have helped construct and magnify the current climate change discourse. However, communication entities are bound to report a balanced view which mandates them to provide both sides of the issue equal 'facetime' - regardless if one side is an extreme minority opinion that contradicts proven science (Moser, 2016). Additionally, the professional media seem aware of the importance of a policy story's ability to grab the public's attention, which actively contributes to shaping public policy (Jones, 2014).

What has changed in the last decade is that the mass public now has the autonomy to use media to share their opinions with their networks. Their varying thoughts assimilate different frames, venues and tools, and push past the boundaries of traditional curated news approaches. Social media directs the attention to different audiences while relying on a broader range of messengers to move the needle on public opinion related to climate change (Moser, 2016).

5) ACADEMIA

Moser describes the fifth influential force as climate communication science as a multidisciplinary branch of academic research in its own right. Over the past two decades, there have been movements in the academic field including longitudinal and comparatives studies of changes in public perceptions, understanding, and opinions (Devine-Wright, 2013). This has made the field more diverse and theoretically more contested which increases the sophistication and professionalization of climate communication research (Moser, 2016).

6) EXTERNAL FACTORS

There are a few additional external factors which impact the climate communication landscape. These are typically contextual, foundational, and often unrelated factors which distract people's attention from the climate. Examples of these factors can be the political culture of a nation, electoral turnover, political destabilization, politically or publicly consuming events such as heightened terrorism, fears, pandemics (eg, Ebola), the ongoing refugee crisis in the Middle East and Europe, as well as larger economic technological or cultural shifts and events in specific industries, nations, or regions of the world (Moser, 2016). Similarly, there are institutions and advocacy groups that take an active stance and deny the scientific evidence for man-made climate change. For example, The Heartland Institute and the Cato Institute are American libertarian think-tanks that promote skepticism about man-made climate change (Klein, 2015). These institutions also usually have ties to fossil-fuel pro-advocacy groups (or in some cases directly to fossil fuel companies), who use financial influence towards dismantling

scientific evidence for climate change in hopes to delay pro-climate action (Klein, 2015). These various influences have the power to create non-hospitable environments for climate communication as their messages are also competing for the limited attention spans of today's social and global audiences.

In addition to the above influencing factors for the climate communication landscape, there are separate - but equally important and relevant - individual landscapes which play a role in how the narrative is consumed and interpreted by individuals.

The Individual Landscape

Many influences and occurrences happen at an individual level which can guide someone's commitment to environmental preservation (e.g. individual actions such as adopting fuel-efficient modes of transportation and reducing meat consumption). While this subsection could include a range of topics from human psychology, to sociology, to history, it will focus on a specific set of key concepts related to what impacts change. Additionally, it will provide the reader with context to environmental issues as seen through an individual and psychological lens.

Two well-respected psychologists and scientists, R. Ornstein and P. Ehrlich, stated that the human species is genetically predisposed to ignore gradual environmental deterioration (Ornstein, Ehrlich, 1989). Some of the realities surrounding climate change are expected to occur or reach their climax beyond the average length of a human's life. Essentially, humans are incapable of looking to the future and recognizing climate change as a threat - which leads a majority of people not to act at all. In his book, Rob Nixon introduces the importance of 'writer-activists' who have attempted to combat the lack of foresight commonly displayed by people. These environmental figures are exemplified for using their "imaginative agility" to help people visualize

the media-marginalized causes that have stemmed from the slow violence of climate change (Nixon, 2013). These writers fulfil an unmet need of giving imaginative definition to the realities of an issue by conveying "perception, emotion, and action" (Nixon, 2013) which promotes a sense of urgency, understanding, and the need for individual action.

The concept stated by Ornstein and Ehrlich is also established in Stephen Gardiner's article A Perfect Moral Storm. Stephen Gardiner explains how three problems converge in the global, intergenerational, and theoretical dimensions of climate change. In the first of the three problems, the Global Storm, Gardiner explains why there is a fragmentation of the dominant understanding of climate change. Through the dispersion of causes and effects, the fragmentation of international agency, and the inability of institutions to enact widespread global policies, the system has been built in a way that makes it difficult for individuals to grasp the big picture. (Gardiner, 2006) The Global Storm is then followed by the Intergenerational Storm where Gardiner describes the effects of human-induced climate change as being pervasive but severely lagged. The reason for this is because the effects of increased greenhouse gases in our atmosphere take a very long time to be realized and accepted by people outside of the scientific community. The last storm that Gardiner speaks of is the Theoretical Storm which relates to the lack of theoretical aptitude showcased by our society. As also mentioned through Ornstein and Ehrlich's work above, people are generally ill-equipped to deal with the many problems that deal with the long-term future. Gardiner uses this to illustrate that even our best theories often face difficulties addressing fundamental issues and it only is further complicated when converged with the Global and Intergenerational Storms (giving way to moral corruption) (Gardiner, 2006). Gardiner's "moral corruption" can be interpreted as psychological and personal barriers to people effectively consuming climate change narratives.

These barriers, amongst others, are further defined and explained in the next chapter.

There are a few more narratives and related factors that could be included in this section such as Aboriginal rights and their claim/ protection of the land, the work that has come from wildlife advocacy and protection gr and the current municipal, provincial, and federal policies regulating climate-related activities for public and private groups. However, due to the binding of scope for this paper, they wer included.

Chapter 3

Why are the Current Narratives Not Enough?

Climate change does not communicate itself. The planet does not have a voice, and neither do its nature-based constituents. Trees affected by forest fires, fish impacted by ocean acidification, or stranded polar bears on melting glacial pieces cannot walk into governments or corporations and plead with how the combination of actions from our societies are negatively impacting them. Many points of view may be shared on behalf of invested groups. However, as convincing as these narratives may be, large scale action still has not occurred.

As mentioned in the previous chapter, early communicators of climate change were people deeply entrenched in the scientific and data-driven side of climate change - professional groups that were not taught how to communicate their work with a public audience. The efforts to mobilize audiences consisted of relaying information in an attempt to educate people about the science of climate change. However as proven throughout history, this approach created a disconnect between people's concerns and attitudes about climate change and their climate-relevant behaviours (Moser, 2010). While some people may assume that is the primary driver - that communication efforts were heavily data-driven - there are other factors at play which

need to be recognized in order to grasp the full picture. The very nature of the climate problem and how humans interact with the climate poses new challenges, barriers, and stumbling blocks when connecting to audiences.

In the previous section, current climate realities were discussed from different points of view. This section is meant to shed some light on the non-climate-related issues that create barriers for engagement and why change is difficult as a means of creating empathy and inspiring action for every person who has or will be exposed to climate communications.

Change Is Hard

For anyone looking to change a person's opinion or behaviour, it is first essential to understand what goes into an opinion or behaviour forming in the first place. Social science literature shows that worldviews, values, and social norms dictate how people receive information and apply it to our own lives is well understood (Corner, Shaw, & Clarke, 2018). Other prominent factors are at play such as the importance of the messenger, social and psychological predisposition, how information is processed, and perceived discomfort - all which are topics which will be discussed later on in this section.

DxVxF>R

Dissatisfaction with the Status Quo x Vision of positive possibility x First steps in the direction of the vision > Resistance to Change

Dissatisfaction with the status quo:
Determining the need for change - it must be clear why things need to change. It needs to be articulated why it is unacceptable and undesirable to conduct business in the same way. If there is no dissatisfaction with the present situation, then there is no motivation to change.

Vision of positive possibility:
Articulating a desired future - Ensuring that people fully understand and can picture their future as part of a changed organization and can see their place in the new realities of that specific future.

First steps in the direction of the vision:
Assessing the present and what needs to be changed in order to move to the desired future - Making sure that every person understands what they need to know what to do to prepare themselves for the change and what steps they need to take in order for this change to be successful.

Resistance to change:
Getting to the desired future by managing the transition - using any support system or tool necessary to help appropriate the process and lessen any resistance.

One of the common references used when understanding change is Richard Beckard's change equation. Although this was first developed for organizational development, the equation can be applied to why change is difficult at an individual level. A quick summary of the equation can be found on the next page:

The remaining part of this section, including the contents of the *Values and Beliefs, Psychology, and Discomfort* sub-sections, is adapted from a previous school project from OCADU's Masters of Design Strategic Foresight and Innovation program, specifically an Independent Study project that took place over one school term.

Constantinescu, A. C. (2016, December 16). *But I like making garbage: An analysis of individual action and inaction towards climate change.*[Scholarly project]. *In OCAD Open Research Repository.* Retrieved October 31, 2018, from http://openresearch.ocadu.ca/id/eprint/417

The figure on the next page provides a high-level overview of the three categories of internal and external factors which lead to increased resistance to change (See Factors Which Lead to Increased Resistance to Change, Figure 9).

1) Values and Beliefs: Audiences have existing values and beliefs which are defined through previous life experiences. These have the ability to influence their attitudes and behaviours in specific situations.

2) Psychology: In this context, psychology involves the reasoning and processing of an individual when exposed to various types of information.

3) Discomfort: Since modern recorded history, people have not encountered climate change to such extreme degrees than they have during these past few decades. This has caused a high level of unfamiliarity, reluctance to accept, and discomfort.

1) VALUES AND BELIEFS

Convenience

Throughout our history, society has favoured over-consumption as a means to achieve convenience and success (Lazarus, 2009). The argument for convenience-led action stems from the evolution of the human species. Popular behaviourist and social philosopher B.F. Skinner stated that humans are innately compelled through evolutionary processes to act in egotistically oriented ways and with short-term gains in mind (1978). People may see the path of least resistance to accomplishing a task or goal and will take it regardless if its a more climate-damaging option than a method that is less impactful. This could stem from the individual prioritizing their needs and preferences over the needs of the planet - e.g. choosing to drive as opposed to taking public transit to work, choosing to have recycling in one's home, buying local food.

In 2016, Liam McGrath and Thomas Bernauer conducted a study that examined how the different framing of efficiency, effectiveness, and ethicality toward carbon offsetting influenced people's opinions (Bernauer & Mcgrath, 2016). It was identified that the best way to motivate people is to explain to them the dangers of not taking action. This differs from simple reframing as it describes the importance of including a repetitive core message of basic climate science and the catastrophic risks created by inaction. This study looks in particular at what happens if people stop talking about the "benefits of reducing climate change risks (the conventional justification)" and focus instead on other benefits, such as "Technological innovation, green jobs, community building and health benefits (Bernauer & Mcgrath, 2016)." It is through this approach that a reframing of present convenience to future convenience (by outlining efficiency gains) takes place.

Figure 9. Factors Which Lead to Increased Resistance to Change (Icon Source: https://www.flaticon.com/)

Lack of Environmental Interaction

Interactional Theory suggests that an interactive exchange between an individual and the characteristics of the social and ecological environment influence the outcomes an individual derives from an experience (Altman & Rogoff, 1987). Place attachment - a relationship formed by interacting with the environment - explains how individuals form powerful affective and cognitive bonds with special resource settings (Altman & Rogoff, 1992). These two theories, when applied to the environment, work in tandem to explain that if an individual spends time in nature, they can gain a greater sense of belonging which enables greater motivation for action to protect those spaces and their resources. In Toronto, there is a general insulation of most modern, urbanized individuals from the climate and its related physical environment as most live, work, learn, and play most hours of the day in climate-controlled buildings (Moser, 2010). Individuals move in protective vehicles through vastly human-altered landscapes and spend little time in attentive, observing, or interactive modes in nature making it

difficult to notice subtle, incremental environmental changes (Moser, 2010). Furthermore, this impedes frequent connections to nature which hinders the ability for individuals to form powerful affective and cognitive bonds with special settings, and as mentioned above, willing them to preserve and protect it (Hammitt, Backlund, & Bixler, 2006).

Sacred Values

It is common for individuals to associate their sacred values with the environment as a spiritual and religious connection with a higher power or God (Lakoff, 2010). As described by Randolph Haluza-DeLay in his paper Religion and climate change: varieties in viewpoints and practices, "religion includes beliefs, worldviews, practices, and institutions that cross borders, time, and scale from the level of individuals to transnational and transhistorical movements" (Haluza-Delay, 2014).

Religious attention was drawn to climate change due to the growing amount of attention to environmental concern in the mid-20th century (Haluza-Delay, 2014). Due to the fragmentation of religions and that some religions are not institutionally organized, no comprehensive account of religious engagement currently exists. However trends have been observed, and climate change has engaged religious groups - making some groups active in the climate justice movement. Below is a summary of how different religions have recently approached climate change:

Catholicism

Despite traditional approaches to resource use from Catholics, there is a broader shift occurring that encourages environmental protection. In September of 2015, Pope Francis made a plea for nations to act now on climate change

while addressing the realities that face our planet (Maibach, Leiserowitz, & Myers, 2015). This combats the previous position of the church (a position that many people would still align to) where man is positioned above nature in a moral hierarchy and that nature is there purely for human use and exploitation (Clayton & Opotow 2003).

Buddhism

As mentioned before, some religions do not have a specific institutional form which makes it difficult to measure how each branch views climate change - this applies to all three major branches of Buddhism. A case study for Buddhist Bhutan from Randolph Haluza-DeLay's paper attempts to draw a relationship between the two. In Bhutan, Gross National Happiness [GNH] is the governing philosophy of the nation as the fourth King of Bhutan declared that it was more important than Gross Domestic Product (Givel, 2015). GNH is founded in 9 domains and "Ecological Diversity and Resilience" is one of them - addressing some of the impacts of climate change (such as glacial lake outflow flooding) (Haluza-Delay, 2014).

Indigenous Cultures

On this planet there are approximately 370 million indigenous peoples, representing as many as 5,000 different indigenous cultures, occupying 20% of the earth's liveable area (Environment For Indigenous Peoples, 2018). Indigenous groups have an exceptional bond with the planet. The ancestral lands that indigenous tribes are bound to "are the source of cultural, spiritual and social identity, and form the basis of their traditional knowledge systems" (Environment For Indigenous Peoples, 2018). Due to land scarcity, limiting

governmental policies and environmental degradation, climate change is a genuine threat to their way of life and existence.

Additional Interpretations

Haluza-Delay provides additional examples of how different religious groups have a varied interpretation of climate change impacts:

"... other methods of research produce more nuanced perspectives on eschatological framing. For the community members in New Guinea, environmental changes were signs of the world's end and probably a sign of societal breakdown. Mozambique Christians saw climate change as part of the will of God, as did indigenous spiritualists in Ghana, (but for a different analysis of the cultural efficacy of traditional, Christian, and Muslim religions. Among crab fishermen of the East Coast of the United States, unpredictable weather is understood as a reminder that God remains in control of creation, and a moral exhortation to avoid excess and greed. Muslim farmers in Burkina Faso interpreted efforts to predict rainfall as a lack of humility and trust in God."

(Haluza-Delay, 2014).

The below statement from Haluza-Delay's paper captures how religion provides a framework of community which adds another layer to how people are engaged and influenced by religion:

"While many tend to consider religion as beliefs, the organization of faith is an important part of the influence on individuals. Members become part of a collective body with a varied set of ties to other believers. It could be that beliefs about climate change are not a function of demographics or affiliation, but of

associational characteristics, that is, individuals are influenced by whom they spend time with and listen to. Such a consideration is a fundamental sociological insight."

(Haluza-Delay, 2014)

■ 2) PSYCHOLOGICAL

Choice Reasoning

At the crux of our decision making, we are influenced by core psychological occurrences that impact our priorities, are affiliated with our sense of convenience, and feed on our comfortability with risk. Being faced with risk once assessing situations and data may lead to increased resistance even when faced with the opportunity of change. The below heuristics showcase how people may act when making personal decisions about climate change.

Loss Aversion

Loss aversion suggests that people become attached to their current level of prosperity and feel entitled to maintain that status (Feygina, Jost, & Goldsmith, 2009). This relates to climate change as people treat a potential loss from the status quo as more significant than a potential gain from the status quo (Rachlinski, 2000).

Risk and Choice

People make riskier choices in the face of losses compared to in the face of gains. In other words, people do not want to lose now for benefits they may receive later (Marshall, 2014).

Temporal Dimension

The human species has evolved to think in the very short term and maximize their interests (Brownlee, Powell, & Hallo, 2013). By thinking mostly in the present, people prefer immediate rewards and discount future gains, which is detrimental to the health of shared environmental resources (Wilson, 1984). In addition to

this, early signs of a changing climate are detected in regions of the planet where most people do not live—the Arctic, at high elevations, on coral reefs and other ecosystems not visited or continuously observed by mostly urbanized populations (Moser, 2010). These temporally and spatially distant and disconnected issues have to then compete for people's attention who are being distracted by current physical needs, professional demands, economic necessities, or social obligations (Moser, 2010).

Paralysis and Fear

Social divides that exaggerate small differences and widen the divides between people can cause a person to be ignorant or even become "paralyzed" with fear about a particular subject (Marshall, 2014). Similarly, it is argued that individuals have a finite pool of worry. Filling the pool too much can cause emotional numbing which acts as a protective indifference to issues that are not of immediate personal concern (Marshall, 2014).

Information Processing

When people are exposed to new information, various systems occur in data-related functions of their brains. These interrelated and dynamic processes include sensation, perception, learning, thinking and memory – all which influence the mindsets (aka frames) people have about climate change. The following list of what happens when information is digested can explain how individual resistance may build up when people are looking to change individual climate change behaviour.

Cognitive Dissonance

Cognitive dissonance is the ability to ignore evidence (e.g. empirical evidence of climate change) that is contrary to existing held beliefs by an individual (e.g.

climate change is a hoax) (Wicklund & Brehm, 1976).

Biased Assimilation

Individuals may attempt to reduce the psychological tension from cognitive dissonance by enacting biased assimilation - a process where a person vehemently defends a held belief against contradictory evidence (Rachlinski, 2000).

Confirmation Bias

Confirmation bias occurs when people look for information that is consistent with what they already think, want, or feel, leading them to avoid, dismiss, or forget information that will require them to change their minds and, quite possibly, their behaviour (CRED).

Psychological Stress Theory

Psychological stress theory indicates that denial is a likely response to a threat perceived as uncontrollable which is how many people feel about climate change (Lazarus, 2009).

Illusions Of Optimism

Beliefs in the efficacy of individual actions may be influenced, or conversely contradicted by illusions of optimism. Most mainstream functioning people often overestimate their positive qualities, skills, and abilities to control and react to events (Taylor & Brown, 1988).

Innate Optimism

Innate optimism has allowed humans to assume a moderate degree of risk because some acceptance of risk promotes discovery and invention, and ultimately survival (Gardner & Stern, 2002).

Invisible Causes

The greenhouse gases emitted from industrial factories, the agriculture industry, or any other fossil-fuel-using machine, are invisible. This lack of

visibility does not allow for the human brain to register the scale of impact which influences the immediacy of actions required (Moser, 2010). This then may cause people not to have a clear connection to what is causing some the consequences of climate change - for example when there are changes in the atmosphere, in weather patterns, and different ecological cycles and systems.

Global Views and Psychological Distancing

As mentioned in an earlier section, go-to metrics such as global temperature targets or atmospheric greenhouse gas concentrations may cause a disconnect between the communicator and the person receiving the information. The use of global statistics or long-term trends can reinforce perceptions that the problem is an abstract technical issue that is unrelatable because it has little to do with people's everyday lives (Corner, Shaw, & Clarke, 2018). Psychological distancing can occur as people may dismiss climate change as a personal/local problem and only see it as something that matters at some distant point in the future for people who live far away (Corner, Shaw, & Clarke, 2018).

Climate Change Data and Statistics

One common error is the inability for people to distinguish large numbers. In the book Damn Lies and Statistics, the author Joel Best showcases this by explaining how people interpret money amounts. A very small child may be pleased by the gift of a penny, a slightly older child understands that a penny or dime cannot buy much but that a dollar or ten dollars can buy some things. However, adults who know what they can do with ten dollars, one hundred dollars, one thousand dollars, even one hundred

thousand dollars, have their imaginations start to fail them when they think of a million, a billion, or a trillion dollars - essentially the big numbers start to blend together (Best, 2012). The struggle of grasping the differences between big numbers lends itself to how people uncritically accept social statistics as they often feature big numbers - as is the case with causes that impact systems at a global level such as a changing climate.

This argument also applies to numbers that are difficult to quantify and are intangible. For example, in the August 2018 issue of the National Geographic, a popular channel focusing on science, exploration, and storytelling that targets the mass public, there was an article published titled "Half of the Great Barrier Reef Is Dead". While that is an eye-catching title as it implies a terrifying reality, it does not provide relatable information or context on how the average reader should interpret those numbers to understand the scale of impact. In April 2018, Nature Journal wrote that 29% of the 3,863 reefs comprising the world's largest coral reef system - The Great Barrier Reef - suffered a catastrophic die-off due to the heat waves of 2016 and 2017 in that region (Hughes, et al., 2018). While this statistic does not have as much shock and awe, it does provide the user with information to assist them in creating their own accurate frames of understanding the issue.

Ambiguous Communication from Media

Another related side-effect of ambiguous communication, especially when it stems from media coverage, is that it can be perceived the information being sensationalized and negative. This potentially reinforces perceptions that mitigation attempts will be ineffective and

thus likely to inhibit future progress or policy development (Eagle, Hay, & Low, 2018). The proliferation of climate change information intermediaries such as blogs, government, and other websites to translate climate science has, by some accounts, failed to address this need for climate change mitigation and adaptation decision support, despite good intentions. This suggests that communicators may not be targeting their intended audience or tailoring their climate change risk communications appropriately (Bostrom, Böhm, & O'Connor, 2013).

Inadequate Economic Signals Indicating The Need For Change

The expression "vote with your wallet" is common when it comes to public issues as it encourages people to showcase their priorities in a monetary-driven economy. This has not been an option available for climate change as such signals have been missing from the equation. The 'free' emission of carbon is an example of how the market has failed to capture the actual cost of goods and services (Klein, 2015). Other economic signals such as tax incentives tend to be too weak to penetrate diverse populations (Moser, 2010).

Delayed Or Absent Gratification For Taking Action

Due to the irreversible carbon dioxide that is currently in our atmosphere and the rate it is being injected at, it is virtually certain that no individual alive today will see the Earth's climate return to pre-industrial concentrations of greenhouse gases and temperatures (Solomon, Plattner, Knutti, & Friedlingstein, 2009). This would be the case even if massive emission reduction efforts were undertaken in the next few months. The people who are currently advocating for a healthy planet are doing

it for the benefit of future generations - hence creating an extreme delay in observed gratification (if any).

■ 3) DISCOMFORT

Many elements of climate change are largely intangible (e.g. gradual change and atmospheric gases; IPCC 2007). In reaction to this, most people rely on their beliefs about science and external sources of information to formulate beliefs and attitudes toward climate change (Hulme, 2009). That being said, climate change is different from other environmental issues because of issues of scale, uncertainty, and complexity, as well as temporal delays and the ethical considerations (Parry, Canziani, & Palutikof, 2007). These varying factors cause an intangible discomfort within an individual's psyche as there are different degrees of how this information gets digested.

Connections

A hallmark of effective environmental education and interpretation is connecting participants to concepts and resources, by facilitating compelling experiences well beyond providing facts and information (Tilden, 1977). In place of these connections, these issues are disconnected from an individual's schema of being.

Uncertainty and Fear

People use different psychological methods to cope with various climate-related realities. Social feedbacks also amplify and/or solidify the views that an individual takes on climate change. When people feel threatened and isolated, they can adopt a range of strategies to diminish their sense of internal fear: denial, uncertainty, playing down the threat, fatalism, and anger toward the communicator (Marshall, 2014).

Knowledge Deficit Model

The knowledge deficit model involves educating individuals about the process to obtain scientific data (the scientific method), how scientific findings are interpreted, and the benefits that science can bring (Allum, et. all, 2008). For many years researchers have used the knowledge deficit model to explain public resistance to science, which is underpinned by fear, ignorance, and superstition (Brownlee, Powell, & Hallo, 2013).

As a summary, people's actions and instigating change at an individual level may be influenced by:

1) Previous life experiences
2) An individual's current social systems
3) An individual's values and beliefs
4) How the individual digests the knowledge that is presented to them
5) How comfortable the individual is with discomfort and uncertainty

The next section will build on the above and explain how these learnings can be applied to the process of building a climate change narrative. It will also discuss what the overarching goals for building the narrative are and what "success" might look like if incorporated successfully.

Chapter 4

The Goal: Ecological Citizenship

In the previous two sections of this paper, the area of climate change narratives that fall within the scope of this MRP was covered with an additional analysis of what barriers (internal and external) exist that impede people from absorbing messages that encourage climate-mitigating actions. These two sections were written to emphasize the importance of including elements of those realities in any climate narratives. The goal of constructing a solid and comprehensive narrative is to convey the importance of action and educate people on pertinent facts - essentially equipping people with the information, sense of ownership, and encouragement to become more eco-responsible. The following section will further explain these various goals and the benefits that can be realized if achieved.

Ecological Citizenship

The concept of ecological citizenship was formalized in Andrew Dobson's book Citizenship and the Environment. In this work, Dobson developed an original theory of citizenship, separate from the two traditional citizenships, liberal and civic republican. This additional type is called "post-cosmopolitan citizenship," and ecological citizenship is an illustration of it. The premise of this citizenship rests on shifting current behaviour towards more environmentally friendly actions using incentives and disincentives to reduce individual impacts to the planet and build momentum within communities to influence higher-power political and corporate action.

To best describe the difference between how an individual can react when faced with a political disincentive, Dobson includes the perspective of Ludwig Beckman. Beckman's thoughts speak to an example of how citizens react to the Congestion Charging Zone in London, England. For those who are not familiar with this regulation, London drivers who enter a specific downtown zone between the hours of 7:00 am and 6:00 pm, Monday to Friday, have to pay an £11.50 daily charge (Transport for London). The license plates of cars are identified and recorded by cameras which are stationed at entrances to the zone (See Figure 10). While the £11.50 charge disincentivizes people to drive in the city's congested area, the financial penalty invites attempts to get around it. Beckman states that in reaction to the financial charge, there is a temptation for people to purchase means of making the numbers on the license plates illegible to cameras. Dobson then writes:

Fig 10. London Fare Zones (Source: Google Maps: https://www.google.com/maps/d/u/0/viewer?
msa=0&dg=feature&mid=1eIjWEQyO-
PchgJUttxBBkYqvPxE&ll=51.49280340511747%2C-0.17372399999999288&z=10)

"Consumers react to superficial signals without caring about, understanding, or being committed to the underlying rationale for the incentives to which they respond. Ecological citizens on the other hand, would harbour a commitment to the principles and would 'do good' because it is the right thing to do."

<div align="right">(Dobson, 2003).</div>

Similarly, Dobson uses another example of Italy's car-less city days where a similar fine is applied. Dobson then predicts that if the car-less city days regulation was removed, that the traffic levels would return to their pre-fine levels within a few weeks or months. The "success" of the regulation is superficial as it only temporarily changes people's habits and practices and the desired behaviour only lasts as long as the incentives and/or disincentives are in place (Dobson, 2003). This is also outside of any additional external influences that may affect long-term decision making.

The goal is to have long-term behaviour change which engrains itself in people's lives. This is where Dobson's ecological citizenship provides a

potential approach. From Dobson's description, ecological citizenship focuses on how to build a sustainable society by focusing on the state of the 'ecological footprint' - a term commonly used to define the impact of human activities on a section of biological land and water (Dobson, 2003). Ecological citizenship provides a normative framework where people are aware of how they conduct their lives in relation to their environmental impact and make responsible choices based on that knowledge (Wolf, Brown, & Conway, 2009). The behaviour change which drives this sense of responsibility is rooted in knowledge and empathy and is the result of a complex negotiation between "living standards, knowledge of causes of and contributions to climate change, and perceived intensity of greenhouse gas emission" (Wolf, Brown, & Conway, 2009).

Characteristics of Ecological Citizenship

There are different ways to look at ecological citizenship which helps to understand the different characteristics based on how it is

interpreted. The traditional way that Dobson describes the concept is as a normative political theory which is rooted in positive environmental practice (Dobson, 2003). As mentioned in the sub-section above, this approach focuses on changing behaviour and being a motivating force so people can adopt sustainable lifestyles and living standards. This view adopts a relationship that is legal-based between a community and its members.

There is however an additional lens that sees Dobson's concept as a broader definition of citizenship as opposed to the traditional legal identity described above. In Derek Heater's book, Citizenship: The Civic Ideal in World History, Politics, and Education, the author elaborates on this definition of citizenship and writes how it belongs to its moral category and has its own social identity in tandem with its political one (Heater, 2004). In the book, Heater sets up this position with the following passage:

> "'The nature of citizenship', Aristotle declared, '... is a question which is often disputed: there is no general agreement on a single definition.' Yet the terms 'citizen' and 'citizenship' are in constant use throughout the world today: the concepts are central to everyday political discourse. It is therefore good enough for 'citizenship' to be a 'Humpty-Dumpty' word, in danger of crashing into gradments while asserting that it means just what it chooses to mean? Surely not. Citizens should know what their status implies; and they should understand when politicians abuse the term by according the whole concept only a partial range of attributes. It is, moreover, important to understand the complexity of the role of citizen and to appreciate that much needs to be learned if civic rights are to be exercised, civic duties are to be performed, and a life of civic virtue is to be pursued. The citizen, in short, much be educated: and no teacher can properly construct the necessary learning

> objectives if semantic confusion surrounds the very subject to be studied."
>
> (Heater, 2004).

The passage above speaks of two important attributes about citizenship (which extend to ecological citizenship). The first is that the term 'citizenship' has evolved to mean very different things within our modern political landscape. As much as it has grown though, citizens still must understand what the term means to them in order to ensure that others are adhering to it for their benefit. This leads to the second point which focuses on education. As emphasized in Heater's passage, the role of the citizen is complex. Ensuring that members of a group (community, city, nation) have a proper understanding of the word will help excel their role within the group and maintain standards for peers and other members. It is through the identities and attributes mentioned above that the term 'ecological citizenship' takes form.

Difficulties of Ecological Citizenship
BOUNDARIES
As previously mentioned in this paper, environmental issues disregard the boundaries of nations or countries and expand across various parts of the globe. However, citizenship is commonly referred to and tethered by those very boundaries. The concept of ecological citizenship is vital to global environmental problems like climate change because it addresses that very issue and advocates for non-territorial ownership of the situation (Wolf, Brown, & Conway, 2009). This is a more holistic and realistic approach for climate change as the environmental situation cannot be remedied without the combined efforts of multiple global parties.

PRIVATE VS PUBLIC SPACES
In the earlier part of this section, descriptions of citizenship alluded to its familiar connection with politics. Traditionally referred to as a component of the public sphere, rebuttals are arguing that some activities from the private sphere do have

citizenly characteristics (Wolf, Brown, & Conway, 2009). Furthermore, Dobson argued that "ecological politics involves aspects of everyday life which involve private and public spaces" (Dobson, 2003). With a bit of ambiguity for what sphere this kind of citizenship lies in, it provides more distractions towards who has ownership and what involvement looks like from public and private parties.

The Bigger Picture

The notion of ecological citizenship is essential because it shifts the mindset of traditional citizens to a version that takes ownership of personal actions while thinking of global impacts. It equips people with knowledge in order to make better decisions that lead to a more empathetic understanding of the world in tandem with placing importance on sustainable lifestyles and living standards.

Why is this important? In October 2018, the IPCC released a dire report informing global audiences that there is about a decade left to stop catastrophic levels of climate change. After this report was released, Vox and the Guardian (popular media outlets) published articles stating that reducing carbon footprints at an individual level does not make much of a difference or impact. The reason for this position is that focusing on individual actions detracts from where individual-focuses need to be - pressuring governments and corporations to improve climate policies and reduce their greenhouse gas emissions (Hackel & Sparkman, 2018). While this position is valid, it misses the motivation that is inspired by adopting personal actions. It can be argued that people taking action in their personal lives helps build the momentum for systemic change. The following is an excerpt from an article posted shortly after the release of the IPCC report which speaks to the social behaviour aspect of this mindset:

> "Research on social behavior suggests lifestyle change can build momentum for systemic change. Psychologists Bibb Latane

and John Darley tested this exact scenario in a now-classic study (Latane & Darley, 1968). Participants filled out a survey in a quiet room, which suddenly began to fill with smoke (from a vent set up by the experimenters). When alone, participants left the room and reported the apparent fire. But in the presence of others who ignored the smoke, participants carried on as though nothing were wrong. Humans are social animals, and we use social cues to recognize emergencies. People don't spring into action just because they see smoke; they spring into action because they see others rushing in with water. The same principle applies to personal actions on climate change."

(Hackel & Sparkman, 2018)

The above speaks to how the actions of others influence behaviour. When individuals make pacts to reduce their carbon emissions or make lifestyle changes for the benefit of the planet, other people will notice, and it will encourage them to also act. This is why getting individuals to embrace ecological citizenship and modify their behaviour is a necessary stepping stone to getting widespread action to occur and get the much-needed political change.

———

The purpose of the above section was to communicate the purpose of trying to educate individuals in hopes of enacting positive behaviour change for the planet. Now that the end goals and the rationale behind them have been established, the next section will elaborate on how the topics of the previous chapters can be combined in an attempt to understand what elements need to be communicated to encourage people to grasp ecological citizenship.
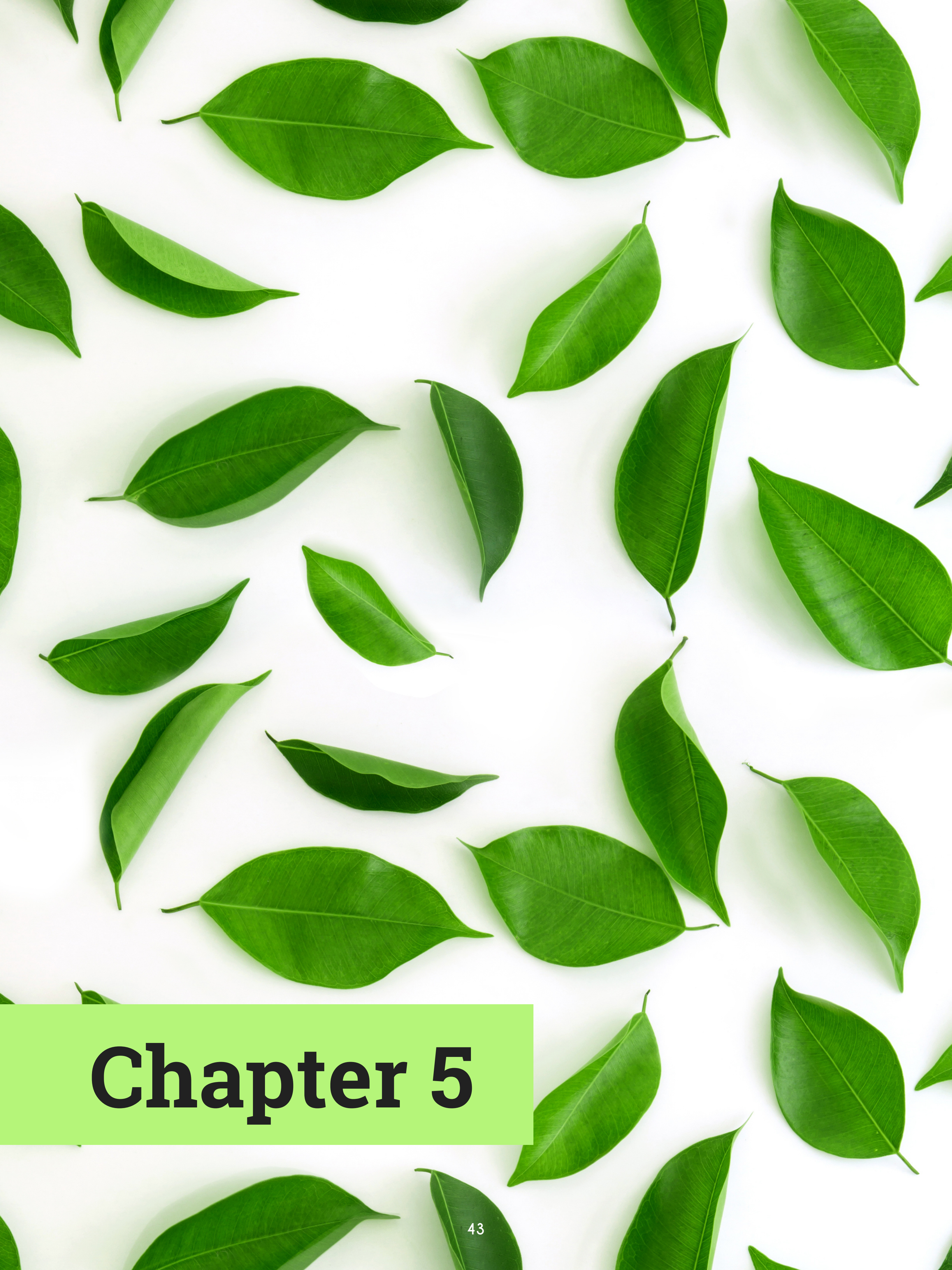
Chapter 5

Building the Narrative: The Study

Over the last few sections, the importance of building a strong narrative for climate change has been illustrated. This narrative needs to have components that will overcome the various barriers it faces in attempts to persuade people to become more active ecological citizens. While the area of educating the masses has not traditionally been a priority for research when it comes to climate change, there have been several studies that have looked at how to communicate the global issue. The research study that was conducted as part of this MRP roots from a few of these learnings and is combined with design thinking principles in efforts to find what components resonate with audiences. It is important to note that the goal of the research is not to gather quantitative data or find conclusive evidence for compelling climate narratives. Instead, the goal is to identify areas of further study and gather points of refinement for future prototypes based on people's reactions to different climate narratives. This section contains a detailed account of the methodology and approach for the study, the climate narratives used, and the results of the study.

Process Methodology

STEP ONE: LITERATURE REVIEW AND SYNTHESIS

The literature review section of the MRP was conducted as part of an independent study from OCADU's Masters of Design Strategic Foresight and Innovation program. The process in this section has been adapted from:

> Constantinescu, A. C. (2016, December 16). But I like making garbage: An analysis of individual action and inaction towards climate change.[Scholarly project]. In OCAD Open Research Repository. Retrieved January 25, 2019, from http://openresearch.ocadu.ca/id/eprint/417

This MRP's core focuses on environmental education and behaviour change. As a starting point for the study, synthesis was conducted of existing research in order to accurately capture the current state of these two themes within their respective communities of practices. This was done by identifying essential readings and going through them to collect pieces of information. Once the related information was gathered from

a variety of sources (academic journals, government documents, novels, podcasts to name a few examples), several themes were identified. These themes were then grouped based on the patterns of data and from there were further merged into synthesis statements.

Using the synthesis statements, additional research was conducted as an attempt to 1) fill identified gaps in the collected research and 2) support any previously existing statements. This was a continuous process and occurred for many rounds as new information would elicit further inquiry. Below is a summary of the initial synthesis statements that were identified:

1. The importance of stories
2. The discomfort from climate change elicits strong psychological responses
3. Convenience is our first priority
4. Developing empathy for the planet and focus is on vulnerability aligns with positive climate change movements
5. We as a species have poor internal foresight abilities
6. People are heavily influenced by the social groups around them
7. Framing: social and governmental
8. Scientists have the greatest amount of power yet have weak narratives which leads to weak influence.
9. The big players are causing the most amount of damage to the small players
10. Governments are not strong advocates for climate change

For this MRP, the research needed to be bound so although themes involving government effectiveness, social influence, and corporate responsibilities were identified, the findings from those paths were not included in this MRP.

STEP TWO: COLLECTING PARTICIPANT DATA (PRE-PRESENTATION SURVEY)

Attendees were asked to answer two surveys – one before the presentation and one after. The first survey was meant to take stock of an individual's current state of knowledge and perception of climate change. Before the participants could view the presentation, they needed to complete a written survey gauging their familiarity with the scientific facts behind climate change (in the form of a 10-question quiz), their ecological footprint behaviours, their awareness of their climate-related behaviours, their willingness to change their behaviour for the planet, and their empathy for the planet.

STEP THREE: USER TEST

Design thinking principles encourage prototyping and user-testing as a way to refine an idea. A user test, in the form of a presentation, was built to see if different components of the climate narrative have an impact on individual behaviour. It was a reflection of all the literature/research that had been synthesized while also being repackaged into digestible visual content to remove barriers of data interpretation.

The presentation included the following sections (See Table 1):

Introduction (3 min)	An invitation was extended for those who attended to keep an open mind. Expectations for the process of the presentation were managed at this part.
Current Climate Snapshot (3 min)	A quick overview of the current impacts of climate change was given. Eg. global temperature rise, snow cover decrease, ocean acidification, etc.
Barriers to Change (5 min)	As a measure to make people aware of some of their barriers, a list of psychological and personal barriers was explained - all to illustrate that many components need to be overcome in order for change to occur

Importance of Narratives (4 min)	This section's purpose was to showcase the importance of language, how narratives can be used as a lens, and how stories can be crafted to build audience attachment. This section also set up the three narrative approaches for the three main climate change topics: Science-Based Narratives, Fear-Based Narratives, and Story-Based Narratives.
Topic #1: Transportation + Discussion (20 min)	The three narrative approaches were used to tell how transportation (at a consumer level) is impacting the climate. The section ended with a few tips on how to reduce negative transportation impacts as well as a discussion about the information presented.
Topic #2: Meat Consumption + Discussion (20 min)	
Topic #3: Consumption + Discussion (20 min)	
Takeaways + Wrap-Up (7 min)	A list of climate-friendly actions was shared with participants including tips on how to ease into changing their behaviour.
Debrief/Social Interaction (30 min)	Participants were asked to stay for 30 minutes after the presentation to share thoughts and opinions about the research study in addition to talking more about the content.

Table 1. Presentation Overview for Research Study

STEP FOUR: COLLECTING PARTICIPANT DATA (POST-PRESENTATION SURVEY)

After the presentation was over, participants had up to 24 hours to complete the second written survey. This survey's goal was to gauge shifts (if any) occurred in core assumptions, beliefs, perspectives, understandings, or desire to change based on their exposure to the presentation's different sections. These results were then compared to the initial survey that was taken before the participants saw the presentation in an attempt to illustrate the effectiveness and impact of the different narrative components for climate change.

Design Thinking Elements

Below is an account of different design-related elements and how they were incorporated to increase comprehension and relatability.

GRAPHIC DATA REPRESENTATION

Ensuring numbers were properly presented was an important area of focus in this study. As previously mentioned in Section Three under *2)*

Psychological - Choice Reasoning vs Information Processing large numbers can be difficult to grasp their immense nature as they sometimes do not provide relatable information or context on how the average reader should interpret those numbers to understand the scale of impact. This was accomplished by converting large numbers into units that are relatable to the participant.

For example, there was a statistic in the *Transportation* section of the presentation that stated that in 2016, Canada released 356.1 megatonnes of greenhouse gas emissions from the Oil, Gas and Transportation industry. Measuring gas is not familiar to the average person as we deal more frequently with measuring liquids and solids. Additionally, a megaton is the equivalent of one million tonnes, which is an exceptionally large number to grasp. An equivalent of the data was then created using a familiar Toronto landmark - the CN Tower. The CN Tower weighs 117,910 tonnes, and 356.1 megatonnes are equivalent to 3020 CN Towers (See Figure 11).
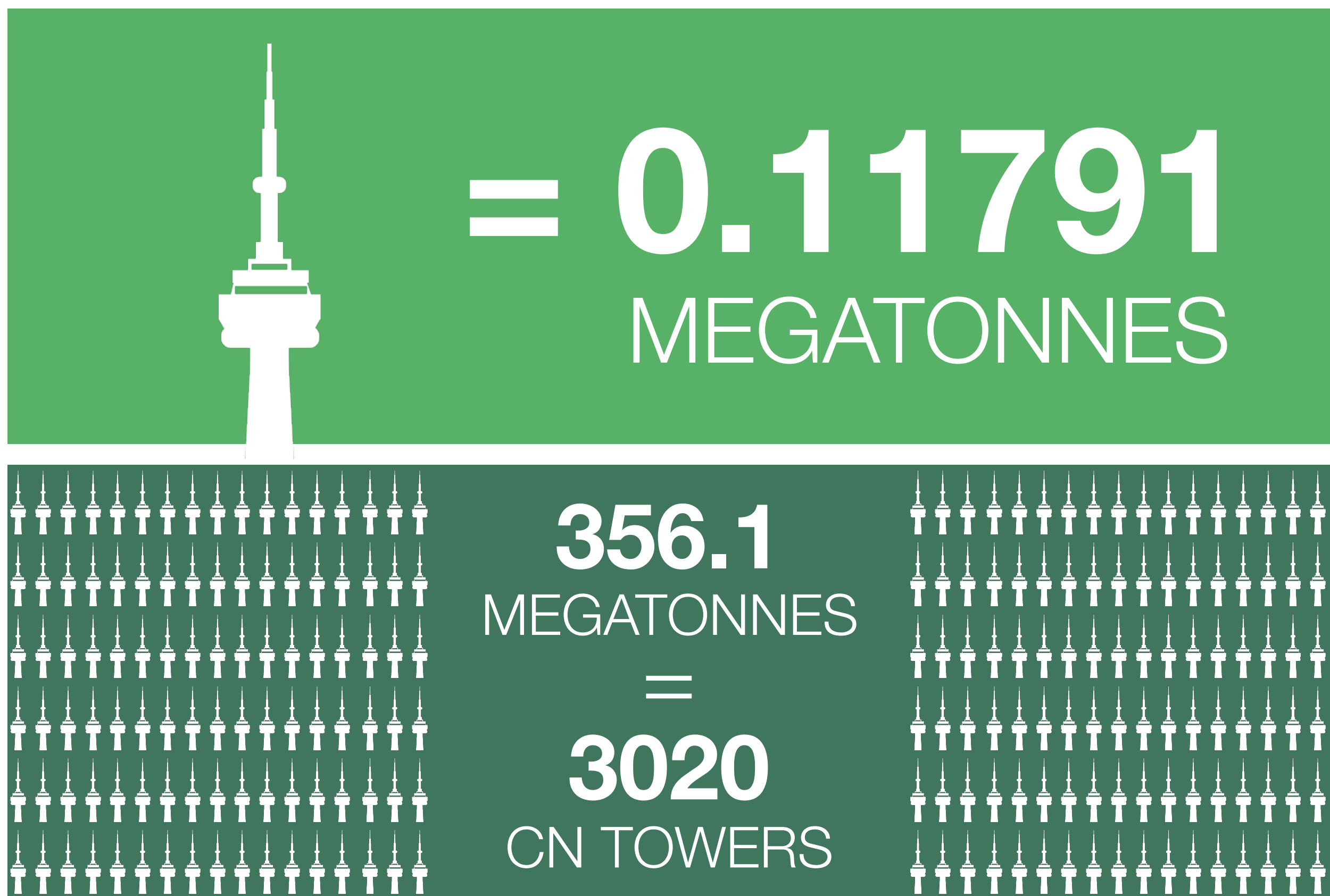
Figure 11. CN Tower Equivalent of 356.1 Megatonnes (Icons Source: https://www.flaticon.com/ | Photo by Ludovic Fremondiere on Unsplash - https://unsplash.com/photos/3XN-BNRDUyY)

VISUAL GRAMMER

In addition to making statistics and data more visual, other visual elements were applied to make content quickly digestible. Theories and concepts were borrowed from Dan Roam whose career focuses on visual literacy and visual grammar. He uses vision science to problem solve using a simple set of visual thinking tools which take advantage of people's innate ability to look, see, imagine, and show (Roam, 2008).

For example, there was minimal text up on the slides of the presentation as most concepts had an icon or visual diagram representing the data or concept.

Example One

Simple icons were used to illustrate different nation's ecological footprint as a measure of available biocapacity per person on our planet

(See National Ecological Footprint Comparison Jan 2019, Figure 12).

Example Two

Building on the proverb of 'seeing is believing', the Story-Based Narratives and the Fear-Based Narratives of each of the three topics predominantly used high-impact images. Some of the messages communicated may not have been familiar to participants, so they needed to be introduced to them.

When walking participants through the Fear-Based Narrative for Consumption, the opening scenes from Disney's Wall-e movie were shown. These images showed deserted urban cities with skyscraping towers made primarily of garbage. These images were shown while referencing Stephen Hawking's theory that humans would make the planet completely

Figure 12. National Ecological Footprint Comparison January 2019 (Icons Source: Keynote Program | Photo by Keagan Henman on Unsplash | Data Source: https://data.footprintnetwork.org/#/?/)

Figure 13. Visual Examples for Story-Based Narratives (Top Left: Photo by nappy from Pexels: https://www.pexels.com/photo/man-wearing-black-notch-lapel-suit-jacket-936072/ | Bottom Left: Photo by Pixabay from Pexels: https://www.pexels.com/photo/black-calculator-near-ballpoint-pen-on-white-printed-paper-53621/ | Right: Photo by Rawpixel.com: https://www.pexels.com/photo/attractive-bar-barista-breakfast-296888/)

uninhabitable by 2600 due to overcrowding and energy consumption (Kharpal, 2018).

When walking participants through the Story-Based Narrative for Transportation, they were shown different visuals that brought the different elements of the story to life. These aid in describing the protagonist's user habits and lifestyle (See Visual Examples for Story-Based Narratives, Figure 13).

DISCUSSION OPPORTUNITIES

Dialogic forms of communication (aka forms of communication in the form of dialogue) can "open minds, deepen understanding, foster empathy, change attitudes, and increase receptivity to policy alternatives whereas not nearly as much impact could be achieved by simply transmitting information" (Moser, 2016). That is why each of the three topics (Transportation, Meat Consumption, and Consumerism) had opportunities for discussion between the participants built-in after all of the narratives were presented.

Narrative Structure

As mentioned above, there were three narrative styles (Science-Based, Fear-Based, and Story-Based) that were used to communicate the realities of three climate change topics (Transportation, Meat Consumption, and Consumerism).

■ 1) SCIENCE-BASED NARRATIVES
This approach focused on facts and data and conveyed the scientific discoveries and ecological realities of climate change. Traditionally, these types of narratives have been shared in academic journals and presented in formats that are not as accessible to the everyday person. As mentioned above, for this presentation, the data was converted into more visually engaging pieces of digestible content. Having data has already been proven not to

be as effective when presented as straight text, so creative liberties were taken to understand if it is the data that is not effective or its presented form.

■ 2) FEAR-BASED NARRATIVES
This narrative style incorporated elements of Foresight Theory where it showcases current realities and potential future realities of climate change. For each of the three climate topics, strong imagery was selected that illustrated how negative trends have impacted ecosystems. Using different computer-generated models and various science-fiction content, potential future scenarios were displayed. All of the imagery was supplemented with related facts about the environment which were read out loud while participants were absorbing the images.

■ 3) STORY-BASED NARRATIVES
The Story-Based narrative was added in as a reflection of Narrative Transportation Theory described in *Section One: Why Narratives Aren't Just for Children.* This approach was meant to appeal to the "mind's special aptitude for construction and interpretation of stories about active agents who have personalities, habits, and abilities" (Kahneman, 2011). In the presentation, the story would center around one or two protagonists and would share their story for how they changed their behaviour in benefit of the planet.

In addition to these reasons above, the three narrative approaches also mirror Greek philosopher Aristotle's three forms of rhetoric available when it comes to persuasion - Ethos, Pathos, and Logos. A quick summary of the three categories is on the following page:

In addition to these reasons above, the three narrative approaches also mirror Greek philosopher Aristotle's three forms of rhetoric available when it comes to persuasion - Ethos, Pathos, and Logos. A quick summary of the three categories is on the next page:

Ethos is used as a means of convincing an audience via the authority or credibility of the persuader.

Pathos (appeals to emotion) is a way of convincing an audience of an argument by creating an emotional response or a moving story.

Logos (appeal to logic) is a way of persuading an audience with reason, using facts and figures.

The above rhetoric forms align with the previously stated narrative styles:

Ethos = Story-Based
Ethos depends on the credibility, authority, trustworthiness and reputation of the protagonist. The audience would feel a sense of belonging as they internalize the behaviour-change of the protagonist in the Story-Based narrative and be persuaded to follow suit.

Pathos = Fear-Based
This form of persuasion focuses on the emotional connection between the audience and the topic. Therefore, a stable emotional environment needs to be created for the audience. The vivid imagery of climate-realities would cause a strong emotional response for the audience and make them receptive to hearing further messages.

Logos = Science-Based
For this form, the information needs to make sense from the audience's point of view, so it needs to be framed in a relevant way. The data and science behind climate change would appeal to logic.

LIMITATIONS OF THE STUDY

Due to the scope of the MRP, certain limitations occurred due to time constraints and binding the research. The presentation started by listing the four main limitations as a way to set expectations with the audience:

■ TEACHING VS. COLLECTING RESEARCH
The purpose of the study was to put together a user-test to see how people reacted to different narratives and what would most influence them to change their behaviour in favour of the climate. By presenting a study, it put the focus on what the participants could give to the research as opposed to what they could take away. Learning still occurred but was limited. It is important to note that there are multiple modes of delivering this information and the approach used in this study is just one of them.

■ REPEATED SESSIONS
Having participants engaged over a longer period of time - for example meeting 3 or 4 times over a few weeks - would provide better insight into how the information in the presentation impacted longer-term behaviour change. The habit formation process has a considerable variation in how long it takes people to reach their limit of automaticity and research would indicate that it can take a very long time (Lally, Jaarsveld, Potts, & Wardle, 2009). The longer the time the participant would be engaged in the educational process, the more time the information could sit with them and be more front-of-mind when making decisions.

■ MORE DISCUSSION
As mentioned in the previous subsection, dialogic forms of communication can deepen understandings and foster understanding of a subject. The research study presentation was kept to 1.5 hours which limited the amount of time people could discuss the content. Having prolonged periods of discussion that

would complement the research would have been more beneficial for invested participants.

■ COMPENSATION

Compensation was added in as a humorous note for attendees. It does, however, have some truth behind it as compensating people for their time could increase their engagement and eagerness to participate fully. For example, 24 participants attended the presentation, 22 completed the pre-presentation survey and 13 completed the post-presentation survey. If participants had been compensated, it would have increased the completion rates of the surveys (depending on the amount of the compensation).

■ NUMBER OF PARTICIPANTS

The one item that was not included was the number of participants. As mentioned in the beginning paragraph of this section, the purpose of this study was not to draw significant conclusions about what would work or not work for climate narratives - the purpose was to identify areas of further study and highlight potential next prototype models. However, having a larger sample size for the data would help make the results more comprehensive and definitive - giving more precise direction for next steps.

RESEARCH RESULTS

In total 22 participants fully participated in the study. These individuals completed the pre-presentation survey and attended one of the presentations that took place. Out of the individuals who attended the presentation, only 13 individuals completed the post-presentation survey. Feedback was also captured during the presentation from all participants.

The research results reflect two categories of data collected: 1) the results from the pre-presentation survey and 2) the results from the post-presentation survey. These two groupings of data will share the quantitative findings as well as the thoughts, opinions, and sentiments shared by participants in the debrief discussion section of the presentation.

■ PRE-PRESENTATION SURVEY

As mentioned in the previous section, this survey was designed to showcase a participant's:

a) Familiarity with the scientific facts behind climate change
b) Ecological footprint behaviours
c) Awareness of their climate-related behaviours
d) Willingness to change their behaviour for the planet
e) Empathy for the planet

Each of the topics listed above had a set of dedicated questions within the survey. Below is a summary of each of the findings from those topics.

a) Familiarity with the Scientific Facts Behind Climate Change

This section was comprised of 10 multiple-choice questions that asked broad knowledge questions about climate facts that have been discussed within the media, at global political conferences, and have been reported on. These questions were meant to measure if the general public had a general awareness of climate change facts. See Table 2 on the following page.

Out of the 22 participants who completed the survey, only 4 people scored above 70% (with none scoring above 80%). The average score was 50% with almost half of the participants scoring 40%. What was interesting to observe was the responses to the 1st question that related to the temperature increase since the start of the industrial revolution. 64% of the participants picked an answer between 0.5-1.5 degrees increase which is a strong correct-answer

compared to other questions. As this topic had significant news coverage in October 2018 when the IPCC released their report - Global Warming of 1.5 °C - it was interesting to learn that not more people knew the answer to the question. Apart from that question, the rest of the responses ranged in accuracy to the current scientific facts (it was found that answering questions about percentages was more difficult for the research participant.

1. The Earth is generally regarded as having warmed about ___ C since the beginning of the Industrial Revolution.	64% were correct
2. What international entity is the most referenced and widely accepted source of scientific information on climate change?	55% were correct
3. Many factors, both natural and human, can cause changes in Earth's energy balance, including:_____	86% were correct
4. How many human deaths per year does the World Health Organization attribute to climate change?	36% were correct
5. How long does it take for carbon dioxide in the atmosphere to disperse?	32% were correct
6. The 5 hottest years on record have occurred within the last:_____	23% were correct
7. The Arctic has warmed more than the rest of the planet, and its ice cover has thinned and shrunk. A big threat is the ice sheets covering Greenland and Antarctica as they hold enough ice to raise seas by more than _____ feet.	18% were correct
8. __ in __ species is at risk of extinction because of climate change.	55% were correct
9. Approximately, how much of all carbon dioxide emitted by humanity has been absorbed by the world's oceans?	50% were correct
10. Climate change will impact the entire population of the planet equally.	82% were correct

Table 2. Ten Multiple Choice Questions and Answers for Pre-Presentation Survey

b) Ecological Footprint Behaviours
This was broken down into major habits around meat consumption, transportation choices, living accommodations, and spending behaviour. When recruiting for this study, it was asked that people participate on the condition that they already believed in climate change. It was an assumption that these individuals would already have environmentally-friendly habits. The next page contains examples that showcase people's habits (see Figures 14,15, and 16):

i) Carbon Footprint:

Question: What type of personal choices do you make to reduce your carbon footprint?

Figure 14. Pre-Presentation Survey - Carbon Footprint Questions and Answers

Note for Figure 14: Small individual choices with fewer barriers scored higher than systemic options. Eg. Using reusable containers has fewer barriers such as purchasing containers and ensuring they are appropriately maintained/cleared (90.9% responded they practiced this habit). This is more common practice compared to switching to a green energy supplier which is engrained in different systems and has a higher price sensitivity causing fewer people choosing this option (13.6%).

ii) Meat Consumption:

Question: How often do you regularly consume:

- ■ Every meal (3+ times a day)
- ▤ Most meals a day (2 meals)
- ▥ Once a day
- ▨ Once every few days
- ▩ Once a week
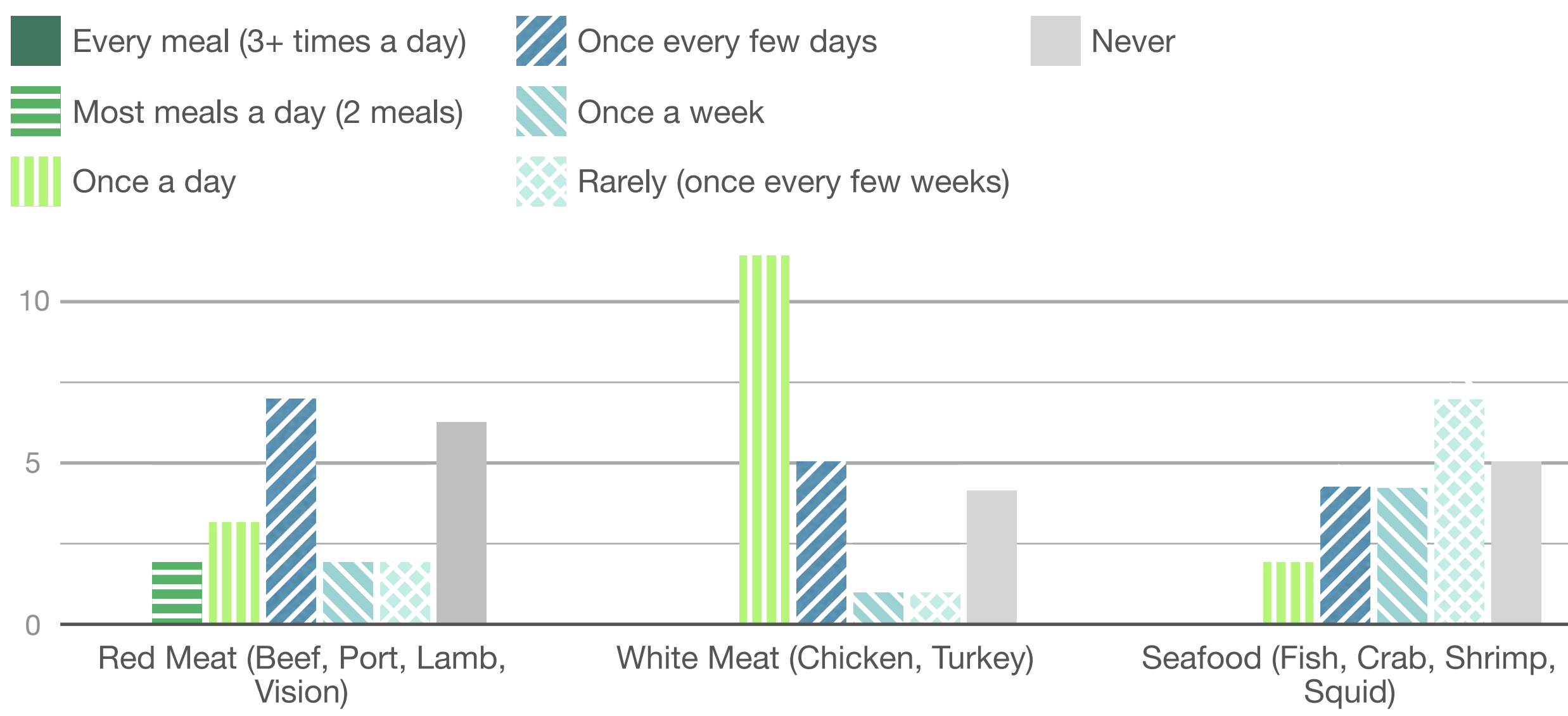- ▧ Rarely (once every few weeks)
- ▢ Never

Figure 15. Pre-Presentation Survey - Meat Consumption Questions and Answers

Note for Figure 15: White meat had the highest consumption amongst participants as it was the type of animal-based protein that had the most amount of consumption by frequency. There were also a few vegetarians who participated in the study which accounted for some of the responses of zero meat consumption.

iii) Transportation Choices:

Question: In the following seasons, what is your comment method(s) of transportation to a regular destination (e.g work, school)?
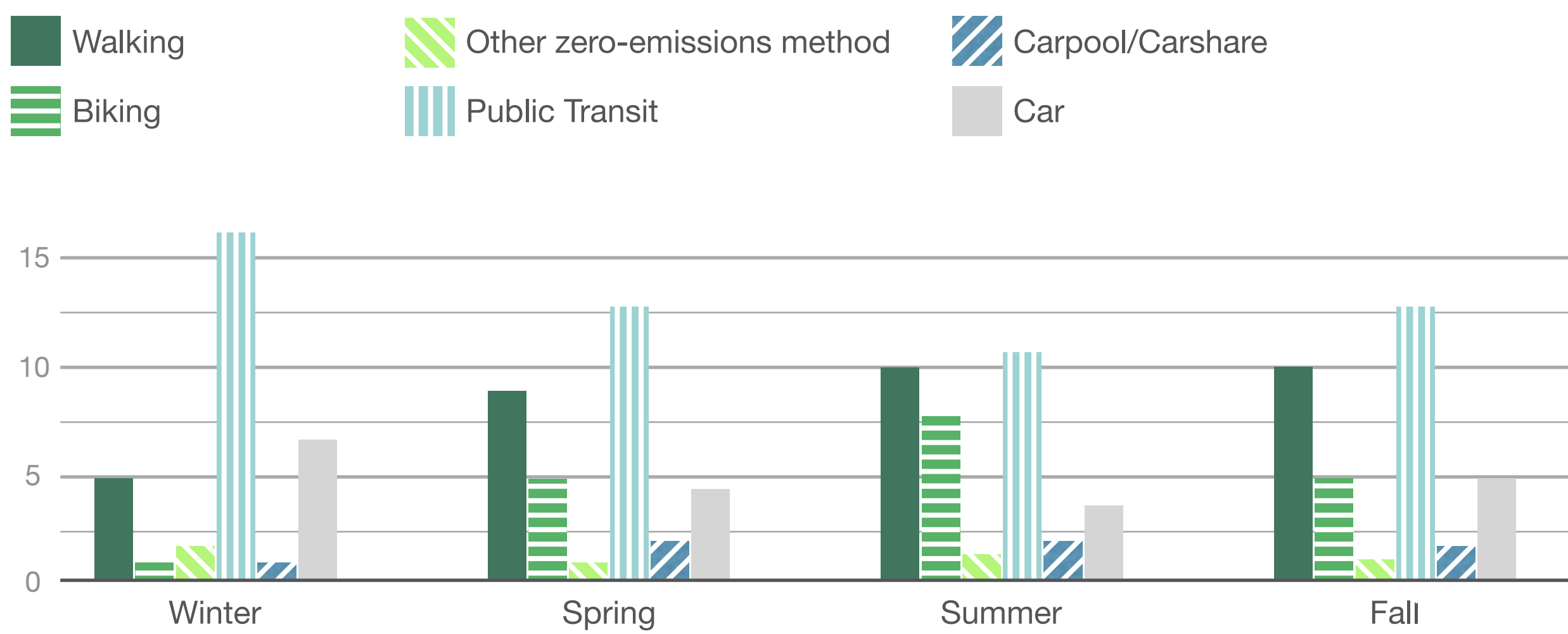
- ■ Walking
- ▤ Biking
- ▨ Other zero-emissions method
- ▥ Public Transit
- ▧ Carpool/Carshare
- ▢ Car

Figure 16. Pre-Presentation Survey - Transportation Questions and Answers

Note for Figure 16: There was a substantial percentage of people who reported taking low-emissions forms of transportation such as walking and biking. The fact that most of these individuals are urban Toronto dwellers and have the options available to them could account for the higher numbers. The seasons and weather also played a factor where more people were likely to take emissions-based forms of transportation (driving, public transit) in the winter whereas people's biking and walking transportation choices increased in the warmer months of Spring, Summer, and Fall.

c) Awareness of Their Climate-Related Behaviours

This section was meant to measure the self-awareness of the participant's actions in relation to the impact they have on the environment. The following figures reflect the answers given by participants related to their awareness (see Figures 17, 18, 19, and 20).
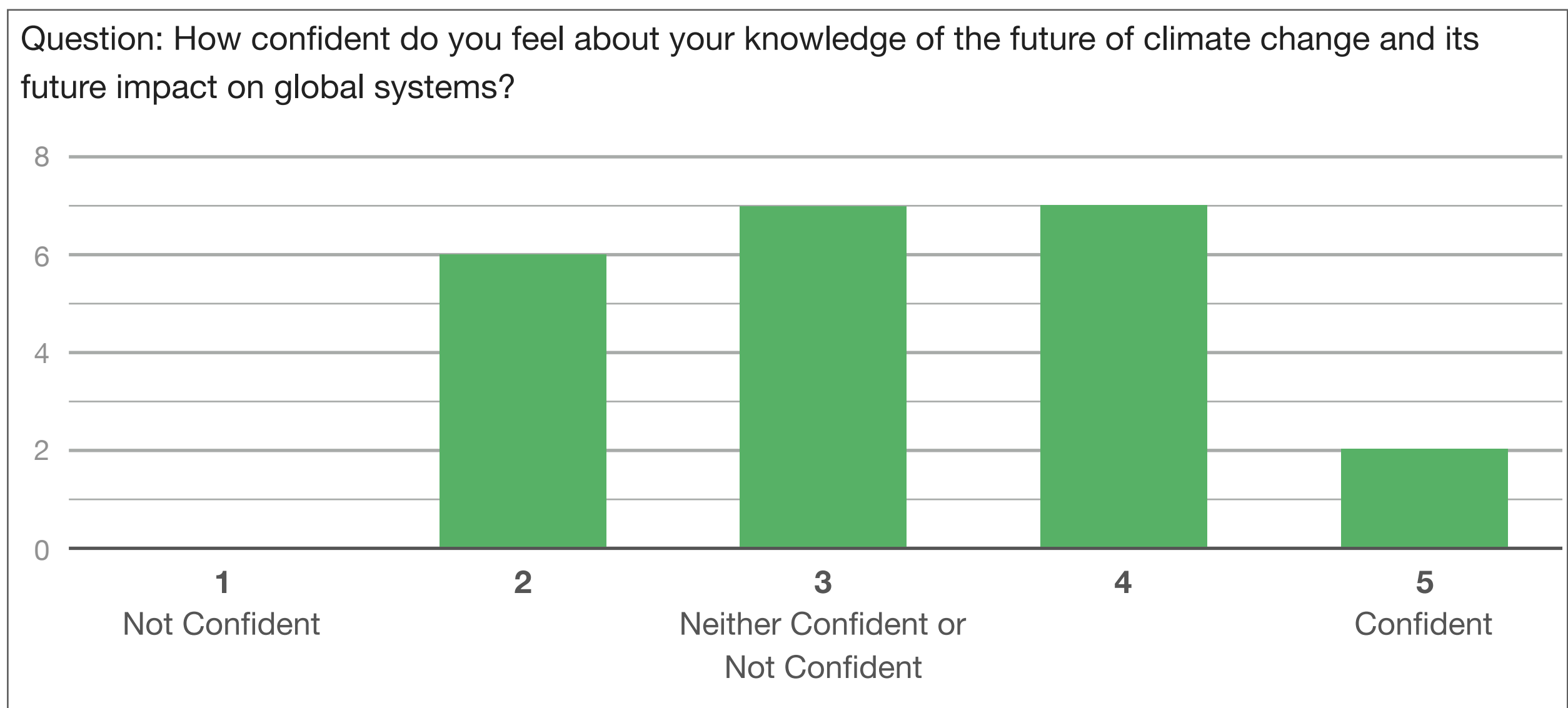
Question: How confident do you feel about your knowledge of the future of climate change and its future impact on global systems?

Figure 17. Pre-Presentation Survey - Climate Knowledge Question and Answers

Note for Figure 17: This question assessed the confidence of the participant and their knowledge of how the future of the planet will look if the current trends of climate change continue (in other words, what would the future of climate change be). Few people felt very confident (2 out of the 22 people), with the remaining 20 feeling not very confident to somewhat confident.
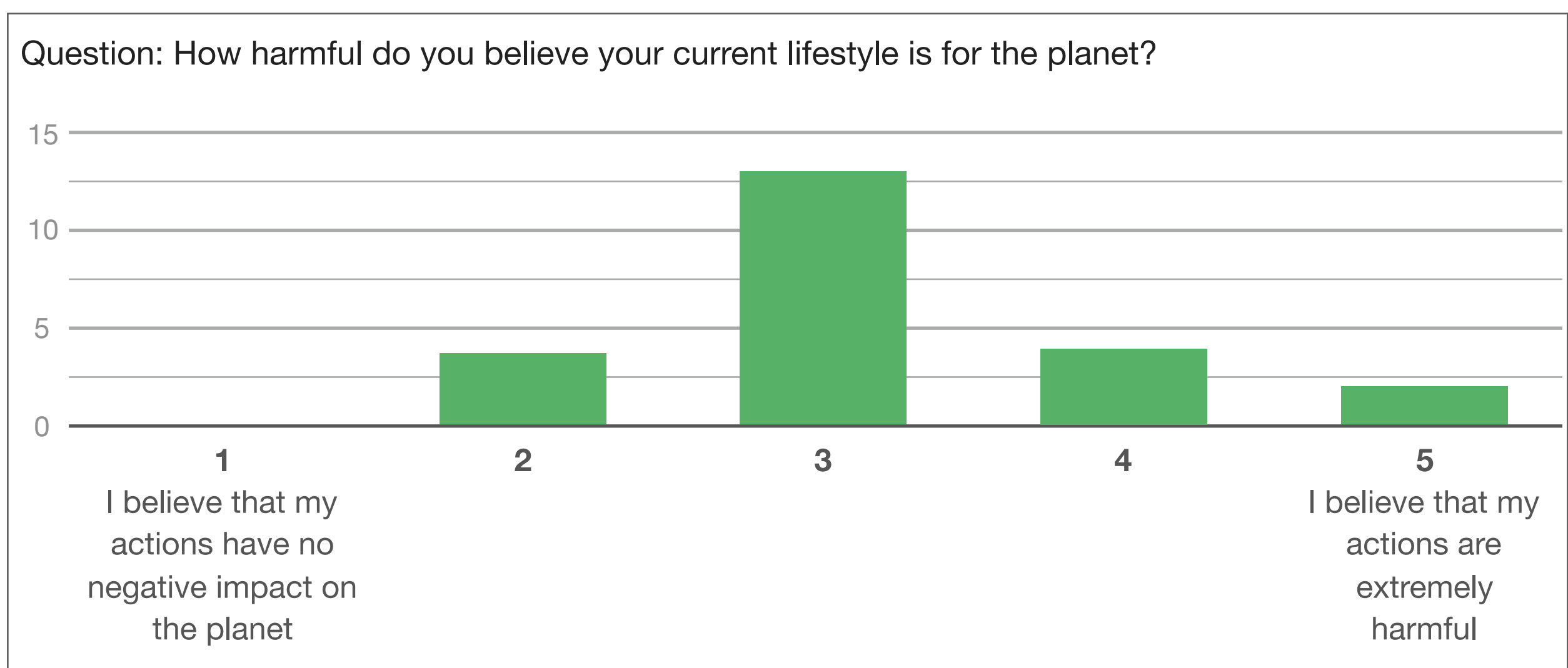
Question: How harmful do you believe your current lifestyle is for the planet?

Figure 18. Pre-Presentation Survey - Current Lifestyle Question and Answers

Note for Figure 18: This question was designed to understand the self-perception of participants and how their actions negatively impact the climate and planet.
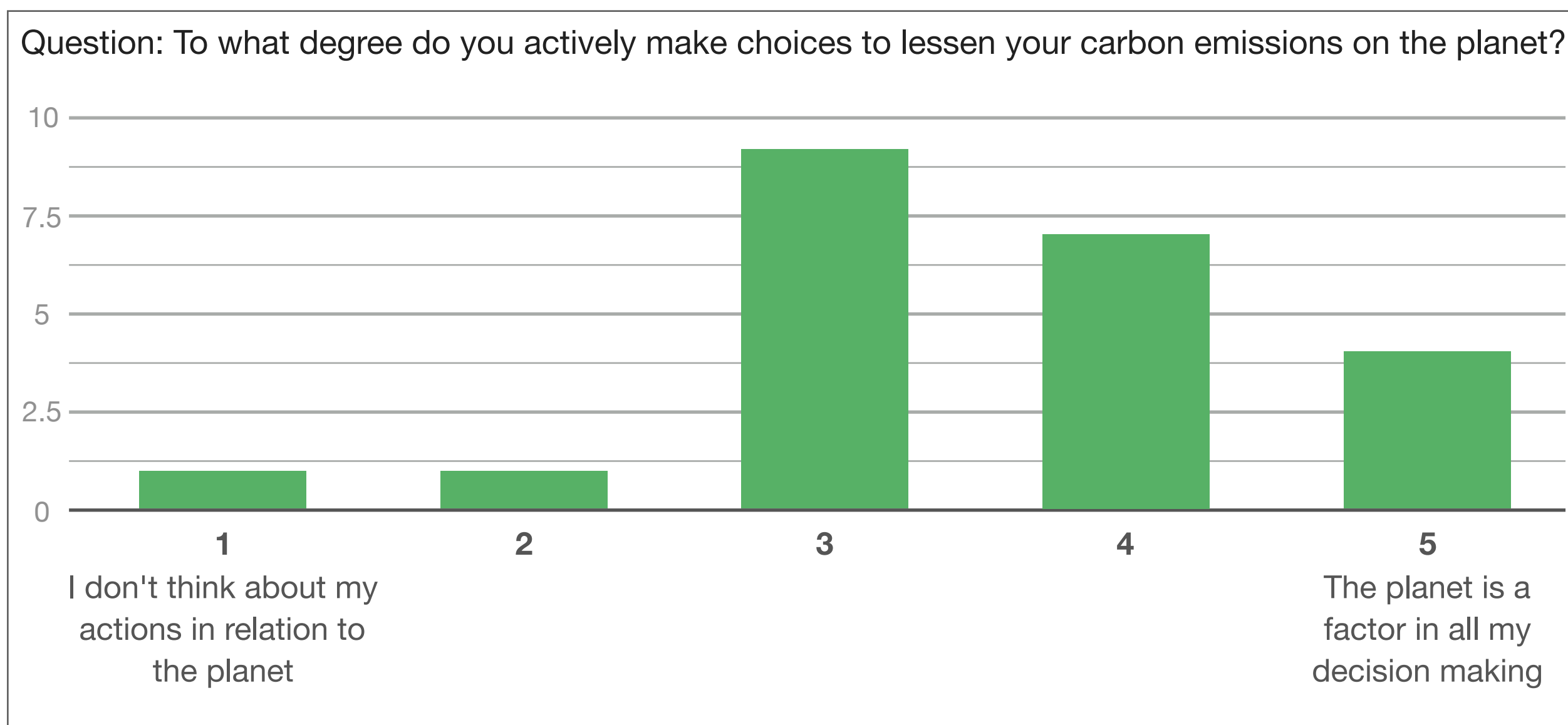
Figure 19. Pre-Presentation Survey - Climate Knowledge Question and Answers

Note for Figure 19: The question above is meant to show how the participant self-categorizes their actions for how mindful they are of the planet.
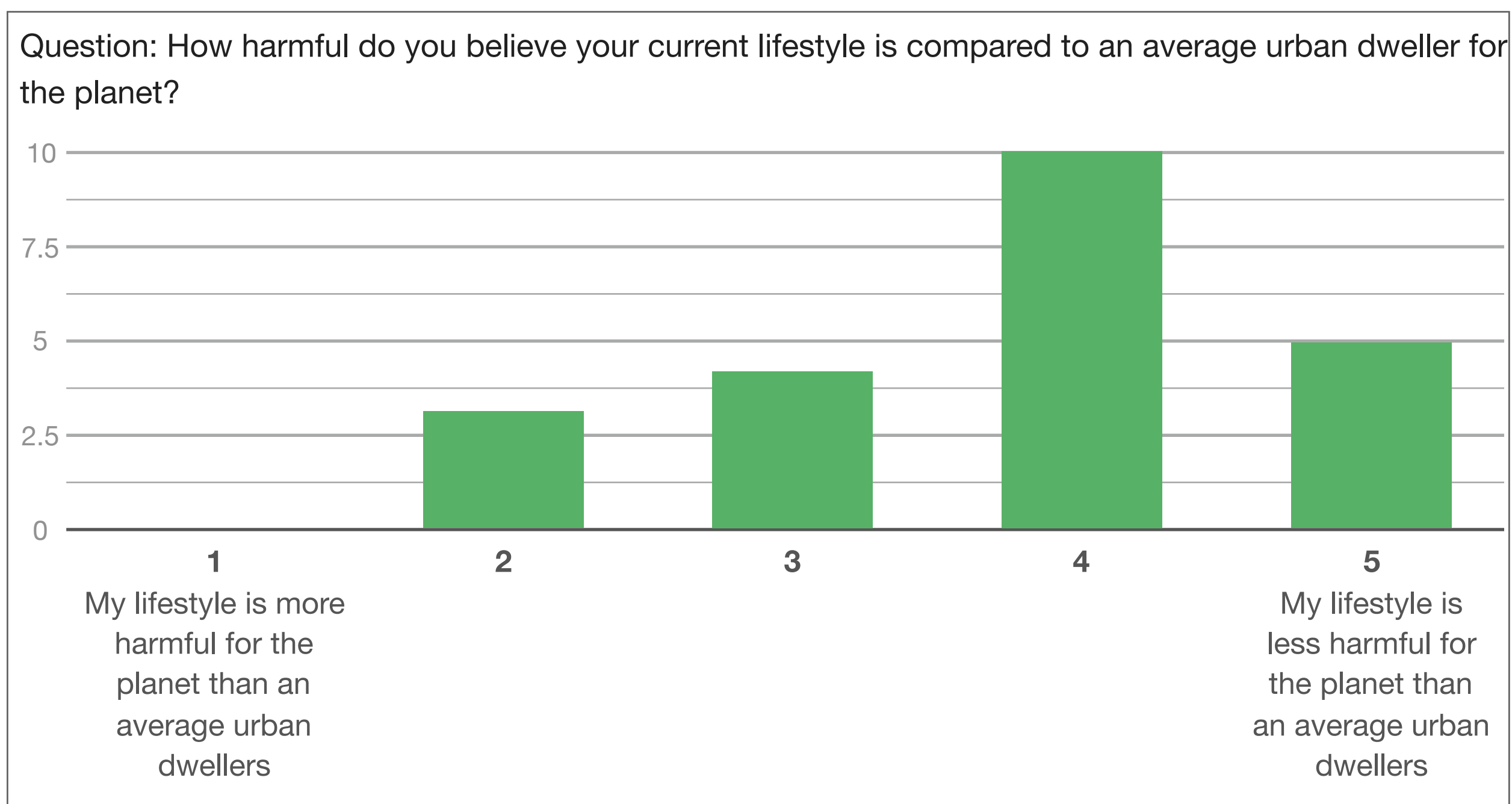

Figure 20. Pre-Presentation Survey - Climate Knowledge Question and Answers

Note for Figure 20: This question was made to show what the participant's thought of the rest of their community members and neighbours (other Toronto citizens). While 72.7% of participants stated that their actions were harmful to fairly harmful, 68.2% of those participants thought their actions were fairly less harmful to much less harmful when compared to the "average" urban dweller.

d) Willingness to Change Their Behaviour for the Planet

The below questions were meant to see how open people were to change their behaviour in addition to assessing if they thought the behaviour was easy to change. The following figures reflect the answers given by participants related to their willingness to change their behaviour.
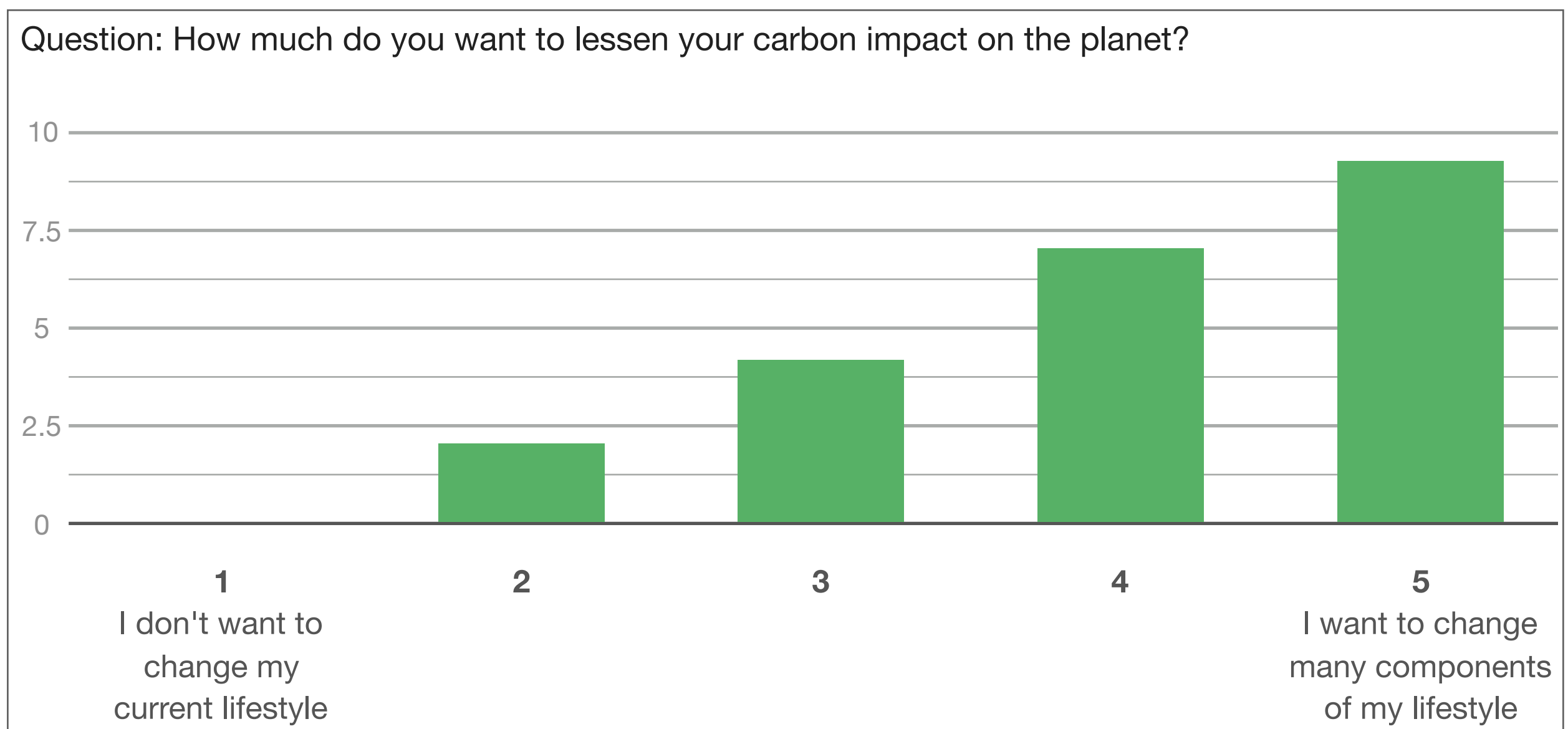
Question: How much do you want to lessen your carbon impact on the planet?

Figure 21. Pre-Presentation Survey - Lessen Impact Question and Answers

Note for Figure 21: More than 72.2% of people were interested in lessening their carbon impact on the planet.

Question: How easily do you believe someone can change their personal actions and behaviour for the environment?
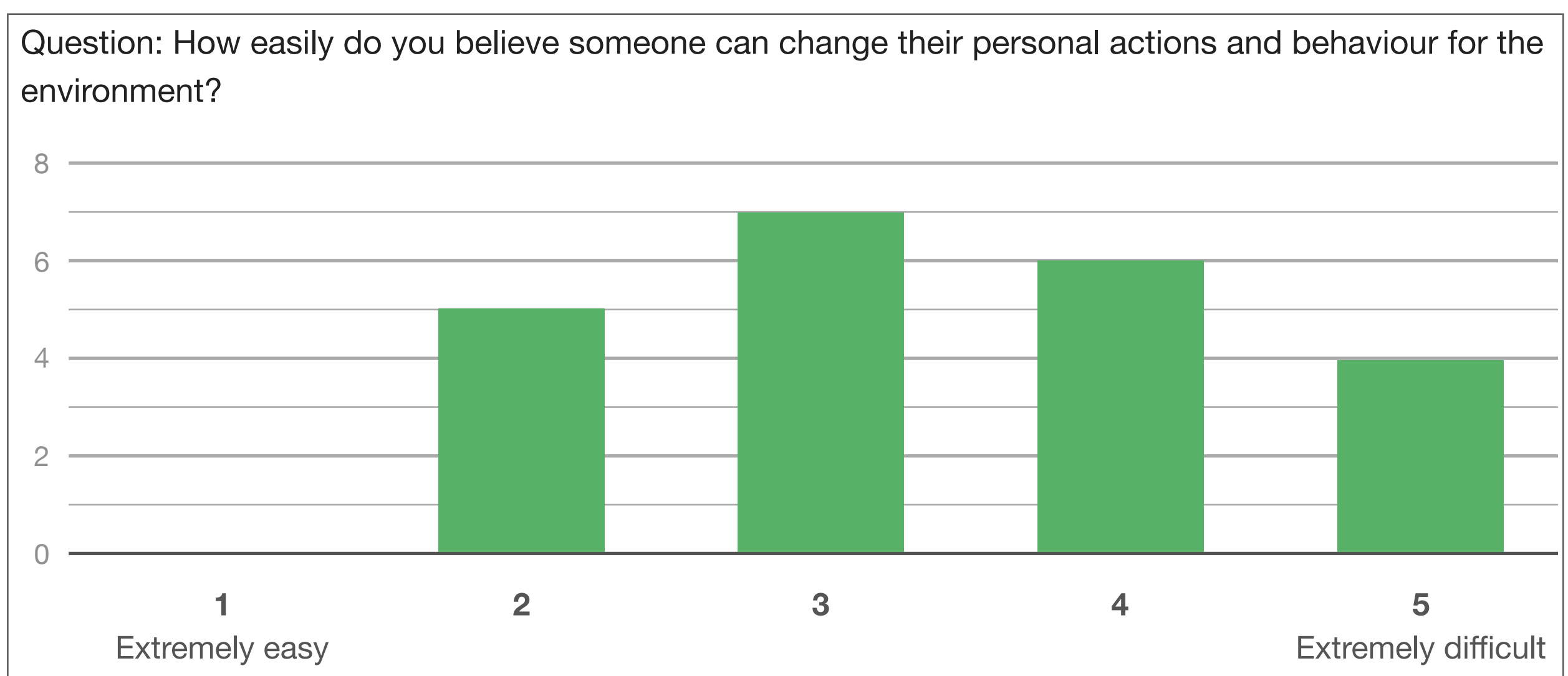

Figure 22. Pre-Presentation Survey - Change Personal Actions Question and Answers

Note for Figure 22: There was a wide range of answers for this question with reasonably equal response rates.

Question: What components do you believe are necessary for individual action to change? Check all that apply.
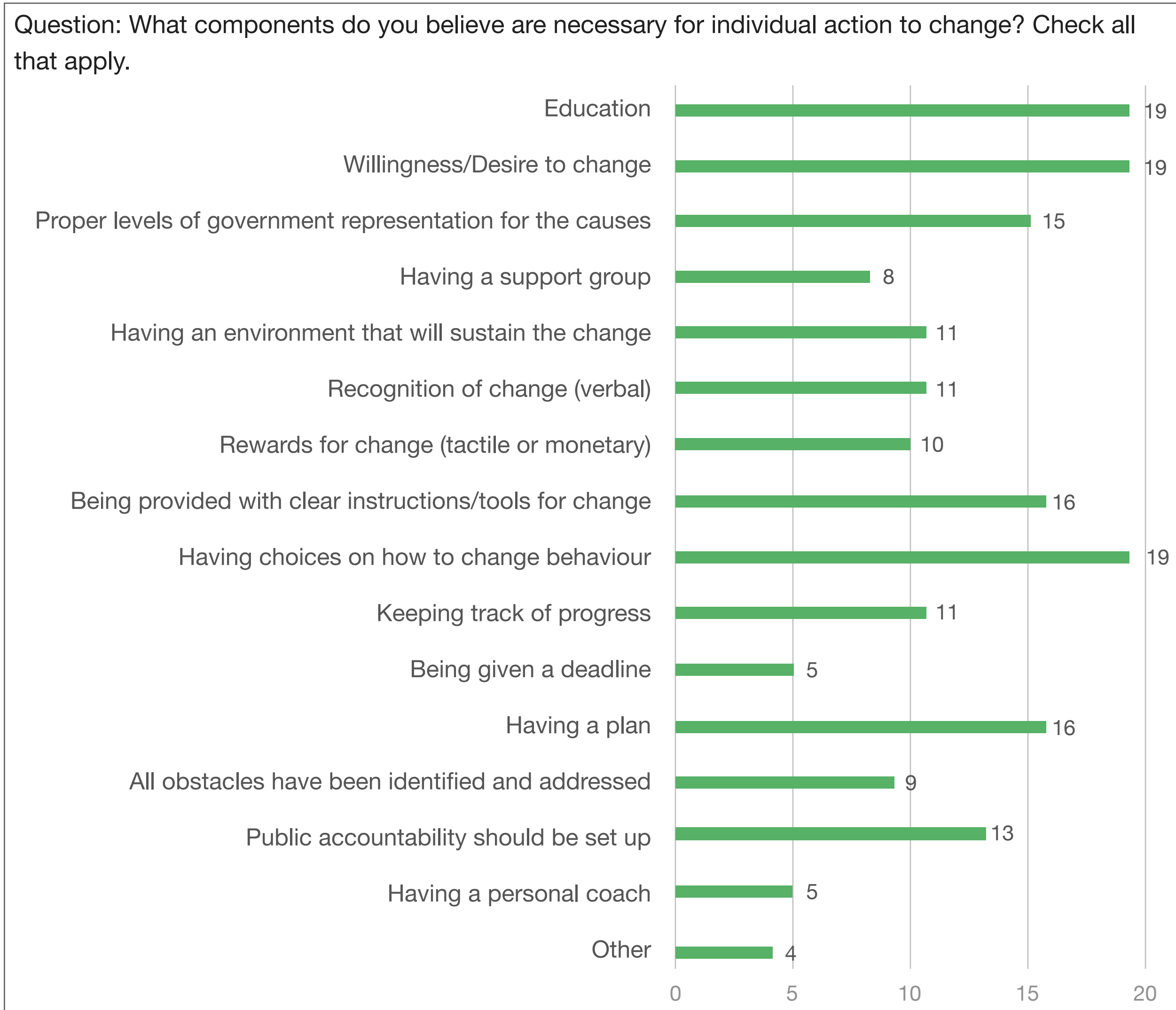

Figure 23. Pre-Presentation Survey - Components for Change Question and Answers

Note for Figure 23: The three most essential components that were necessary for individual action was education, willingness to change, and having choices on how to change behaviour.

■ POST-PRESENTATION SURVEY

This survey's goal was to gauge shifts (if any) occurred in core assumptions, beliefs, perspectives, understandings, or desire to change based on their exposure to the presentation's different sections. As mentioned earlier, only 13 people out of the original 22 survey respondents filled out the second survey.

a) Effective Narratives

As this MRP is focused on building a strong narrative for the changing climate, it was necessary to gauge which of the presented narratives styles engaged participants and resonated with them. The questions in this subsection gauged the interest and effectiveness of the different narratives and components of the research study.
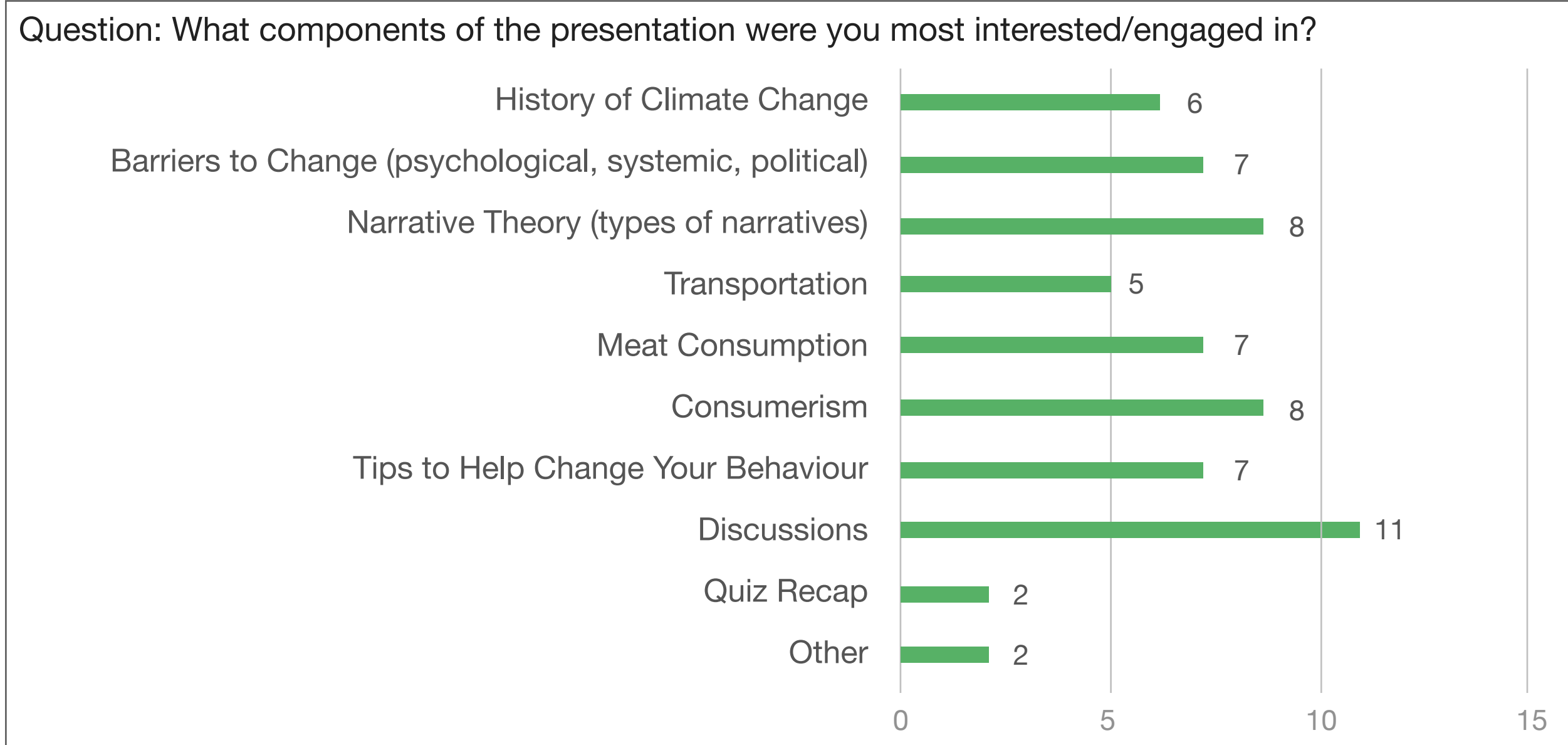
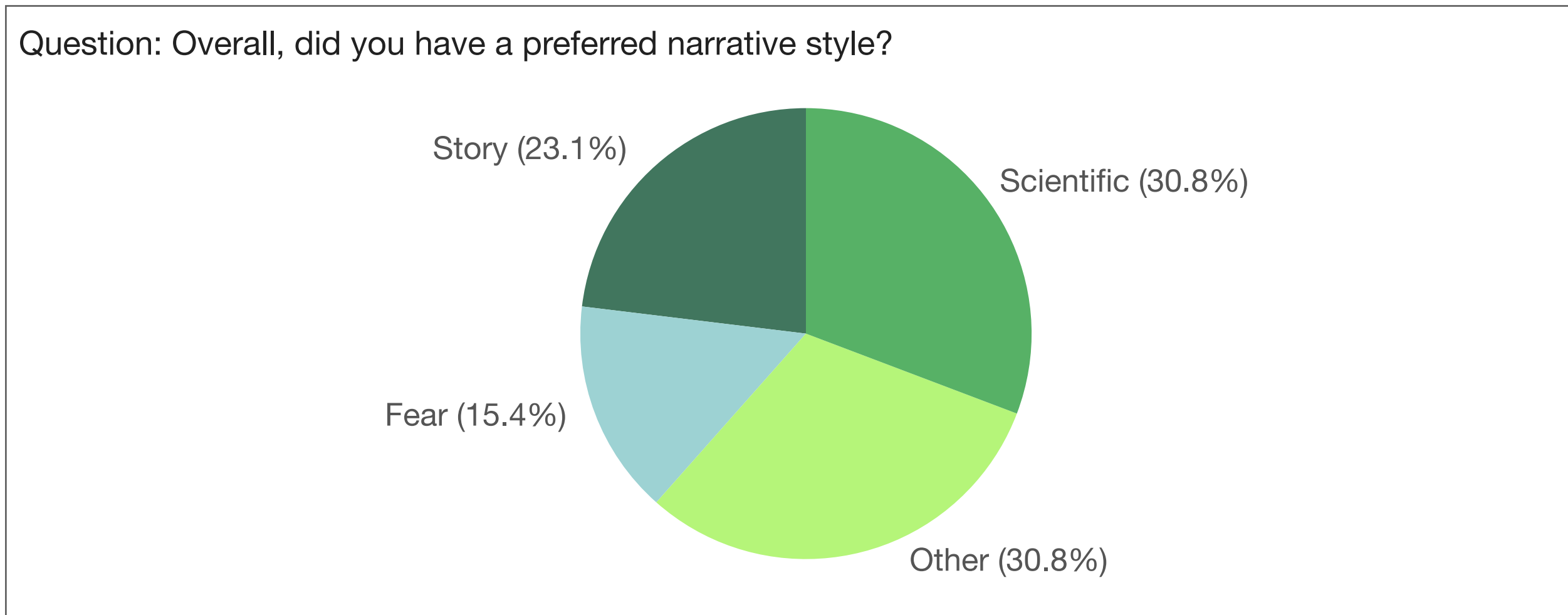Figure 24. Post-Presentation Survey - Interesting Components Question and Answers

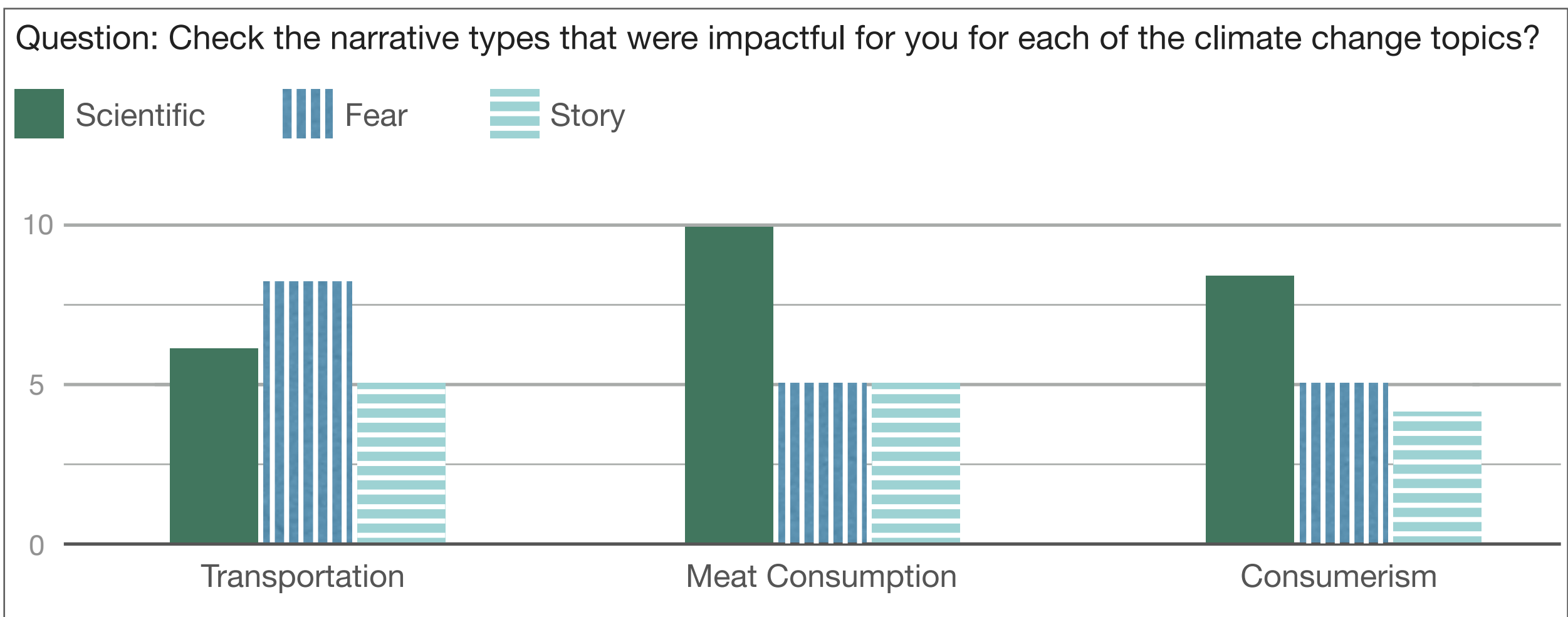Figure 25. Post-Presentation Survey - Preferred Narrative Question and Answers

Figure 26. Post-Presentation Survey - Impactful Narratives Question and Answers

Below there is a list of observations and takeaways from the above responses:

Preferred Narrative: While scientific-based narratives had the most amount of responses, it seemed that all of the other ones were close. Had more participants answered the questions, a different order could appear as any variable increase would impact the percentages.

Learning Styles: Learning styles can play into how information is absorbed and processed by different people.

Logic vs Emotion: The Scientific-Based narratives (appealing to logic - Logos) had a similar impact on the participants as the Fear-Based (appealing to emotions - Pathos).

Discussions: The most engaging and interesting section of the presentation was identified to be the Discussions (by 11 people of the 13 selecting it). Additionally, 6/13 specifically mentioned it in their written responses when asked: "how they best absorbed the information they learned in the presentation".

From the written responses people had a few thoughts about the effectiveness of different narratives types. Two examples are:

"This is such a complex issue within the climate conversation, because of its connections to personal choice, culture and identity. I find the scientific narrative, in this case, to be quite compelling and being reminded of it always inspires me to want to do more. I liked the point that came up around the intersections of other social issues that can be tackled by also addressing meat consumption, including global food consumption and production, animal welfare and health."

"For me, the scientific explanations allowed me to connect to the material and feel motivated to take action in a way that was not overwhelming. The fear-based narratives tended to be more overwhelming, as they communicate powerfully the enormity of the problem. Depending on how much I knew about the topic already, this narrative either invoked a feeling of paralysis or a feeling of wanting to take action. The photography was a powerful way of conveying the story. I did find the story narrative to be easily digestible and an easy way to identify ways of taking action. However, I was left feeling that the story narrative was not enough to capture the gravity of the situation in the way the scientific or fear narratives could."

b) Empathy for the Planet and Willingness to Change

The graphs on the following page illustrate that the Fear-Based narratives and the Science-Based narratives have the most impact for developing empathy for the planet. This is a key stepping stone to encouraging change to happen at an individual level.

The following is a list of observations and takeaways from the responses given in this subsection (see Figures 27 and 28).

Intent for Change: With 84.7% (9 people) stating that they wanted to lessen their carbon impact on the plate by some degree, there is evidence that people were impacted by the content in the presentation to change their behaviour.

Immediacy: People were sharing in the written sections of the answers that they were not aware of how fast things were happening to the extent.

> One individual shared that their biggest takeaway was "That even if we stopped all the fuel emissions now
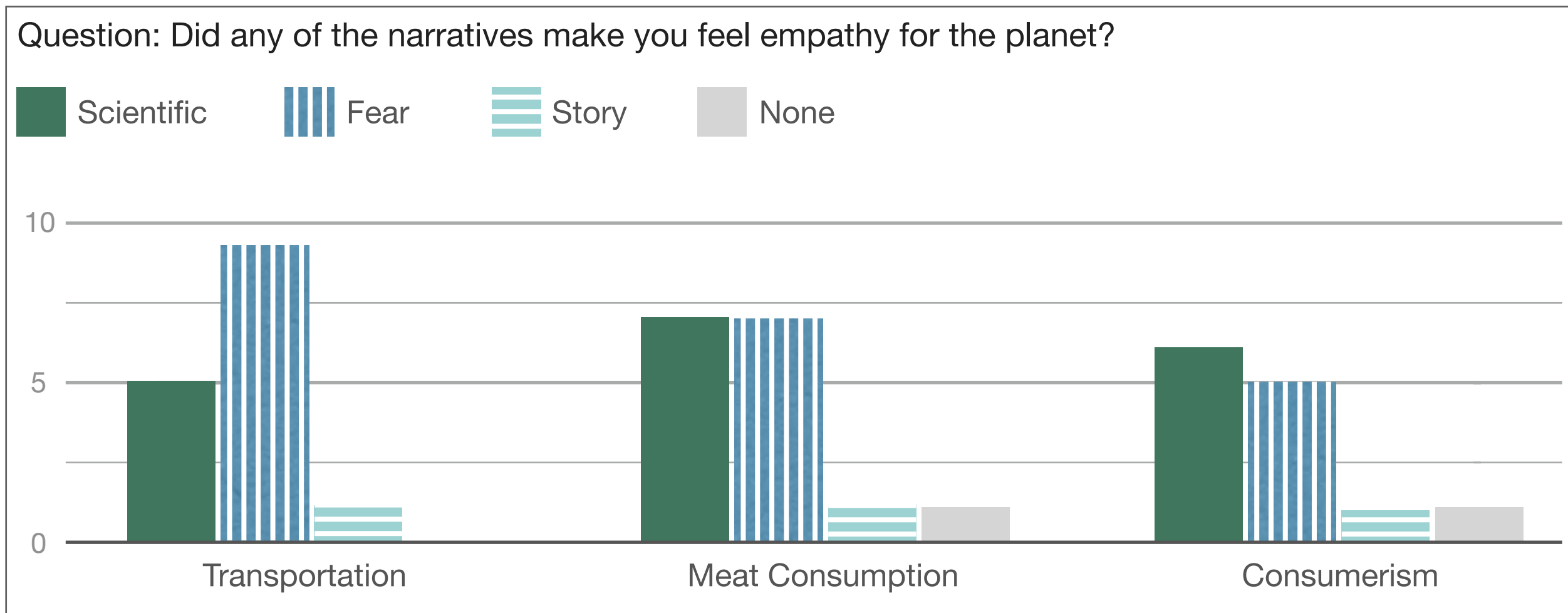
Figure 27. Post-Presentation Survey - Empathy from Narratives Question and Answers
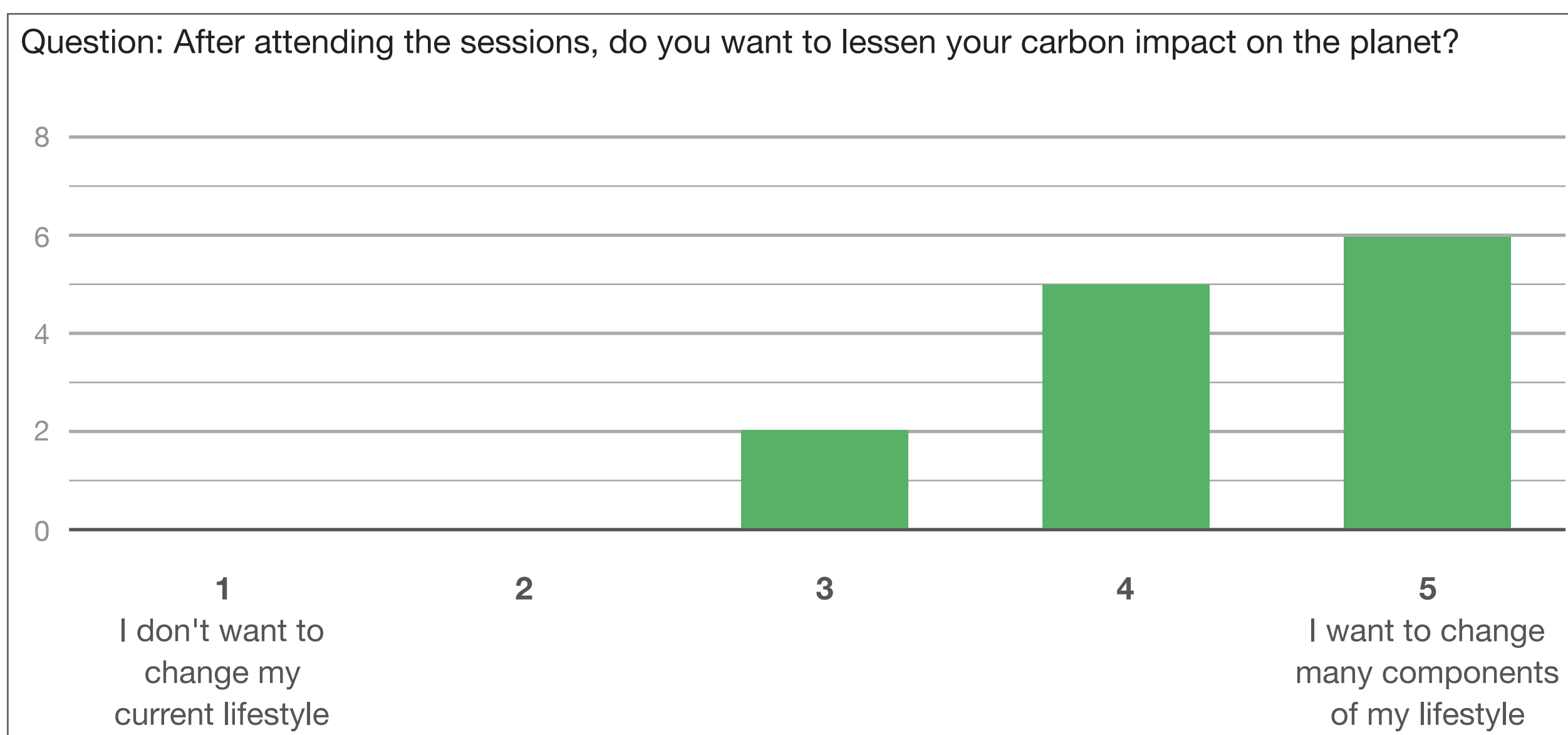
Figure 28. Post-Presentation Survey - Lessen Carbon Impact Question and Answers

the earth would still have an effect for another 80 years. [This highlights] just how important it is to make changes now".

Steps to Change: In the written responses for this written section when participants were asked to list some of their intended approaches people were mentioning a variety of things they can change. Some of these ideas came from the presentation, and some came from suggestions the group made. These included:

- Starting Meatless Mondays
- Ensure that they are recycling effectively / find recycling efficiencies
- Reusing products as opposed to buying new ones
- Choosing to shop online less to avoid shipping
- Bring reusable bags to the store so less ends up in landfills and water systems
- Speaking to others and having conversations with them about the topic

At the end of the post-presentation survey, participants were asked to provide suggestions as to what they would want to see in the presentation. A few of the constructive answers were provided below in addition to verbal comments that were shared during the presentation.

Combining all Three Narratives

There were verbal comments in the discussion section of the presentation and written comments in the post-presentation survey that alluded to the effectiveness of including a combination of all three narratives in a future prototype.

An important note is that this study presented the different narratives in a way that could have led individuals to draw this conclusion. The results of combining the narratives might have been different if the narratives were presented separately in the study instead of together. As evidenced by the quotes from participants, every narrative served a different purpose for them to help build an overall opinion - a comparison they would not have been aware of had they only been exposed to one of the three narratives (as some other studies may have approached it).

Example of Feedback:

"For me, the scientific explanations allowed me to connect to the material and feel motivated to take action in a way that was not overwhelming. The fear-based narratives tended to be more overwhelming, as they communicated powerfully the enormity of the problem. Depending on how much I knew about the topic already, this narrative either invoked a feeling of paralysis or a feeling of wanting to take action. The photography was a powerful way of conveying the story. I did find the story narrative to be easily digestible and an easy way to identify ways

of taking action. However, I was left feeling that the story narrative was not enough to capture the gravity of the situation in the way the scientific or fear narratives could."

"Having the narratives presented side by side allowed for a different thought process which I appreciated."

Showing Both Sides

The Fear-Based Narratives derived from worst-case scenarios, however, there were a few comments that were curious to see the best-case scenarios.

Example of Feedback:

"Would love to see a comparison in the Fear Narrative examples of what happens both when we get it RIGHT and WRONG."

"I would include a secondary section that talks about the outcome of successful combat towards climate change."

Broadening the Scope to Include More of the System

Due to the boundaries set by the scope of the MRP, some parts of the system were not included when talking about the three different topics (Transportation, Meat Consumption, and Consumerism). Areas such as political and economic influences, how technology is being used to help, and further behaviour and psychological research could be shared.

Example of Feedback:

"Maybe a wider discussion on the role of corporations & government in climate change, and if their existing sustainability initiatives have made any progress."

Gathering Input from People Who Do Not Trust Climate Science

This MRP's scope was to test narratives and see what influence they had on people who already believed in climate change and were

interested in applying themselves more. An area of further study and development could be extending the presentation to people who do not trust the science and what narratives they need to hear to enact positive behaviour change for the planet.

Example of Feedback:

> *"I think you really need to test concepts with people who are not already on board with making lifestyle changes. I think the narratives should have a more explicit connection to climate change--especially if used on their own and depending on the audience."*

The findings from this section were informative and constructive in identifying additional patterns and trends. The purpose of conducting a study using a series of mini-prototypes is to gain insights into user behaviour and receive feedback for areas that could use further development. The chapter below synthesizes all of the learnings collected from the study in addition to the knowledge stated in the above sections to form a conclusion about the research question.
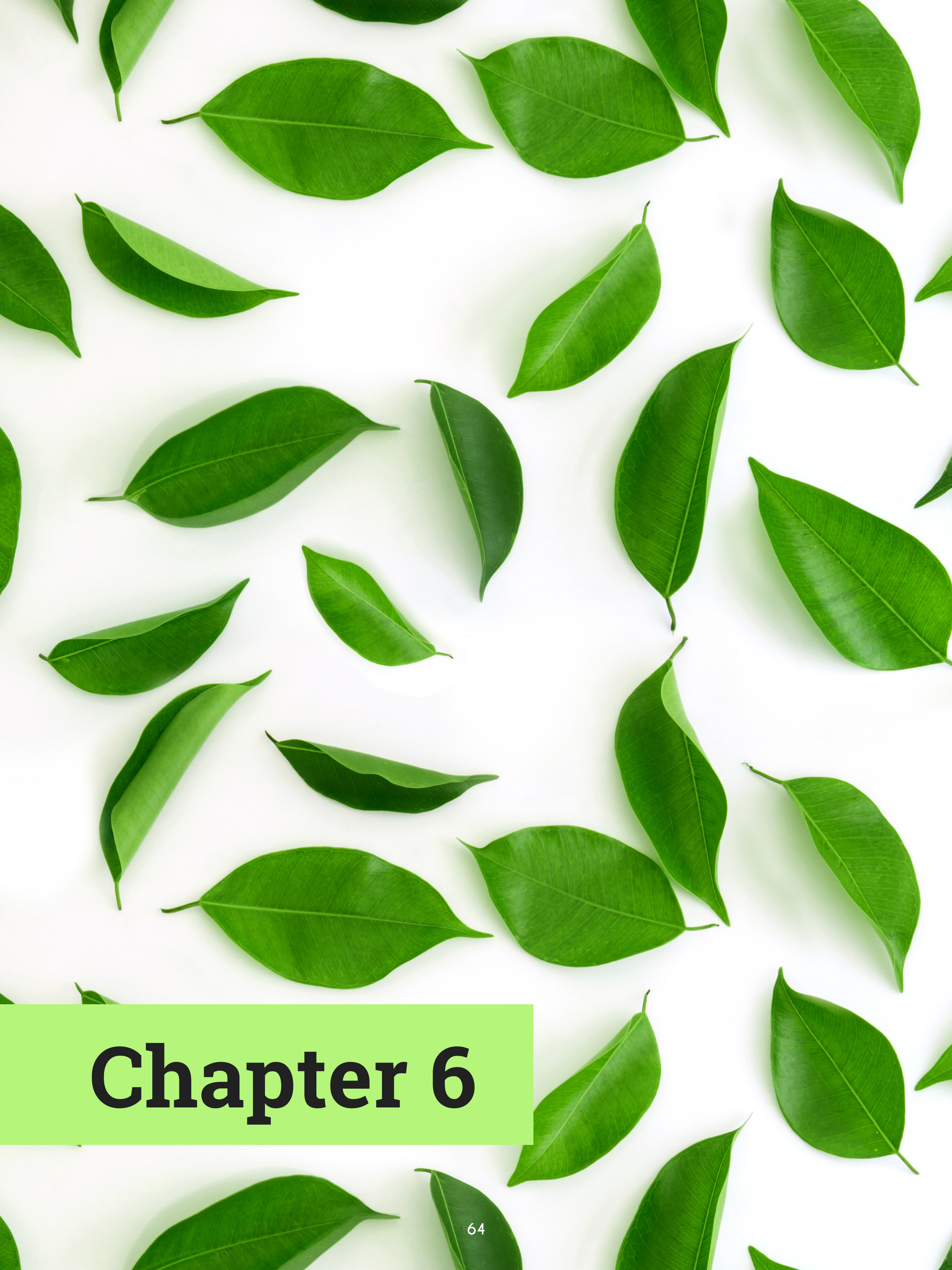
Chapter 6

Conclusion and Next Steps

As stated in the *Introduction* section, the planet Earth is experiencing the significant impacts of climate change, which includes changing weather patterns, biodiversity loss, rising sea levels, and more biological and meteorological events. Ecosystems have been transformed by human actions more rapidly and more extensively in the last 50 years than in any other comparable time in human history with little indication of reparative growth.

The nature of climate change is exceptionally multivalent which enables a limitless range of interpretation. The global issue, familiar to some and foreign to others, is uncanny as it creates discomfort and unease when trying to digest the realities of it. Inhabitants of this planet seek to resolve this tension by framing the problem so that it has a familiar shape and form. For some people, what is happening to the environment may seem abstract and intangible, while others find the statistics that define the climate discourse to be distant from their day-to-day experiences (Corner, Shaw, & Clarke, 2018). There are many influences and a range of

reasons why the layers of climate knowledge may be difficult to digest - many of them not included in this paper (e.g. the political polarization, global support, economic demands). It is the collective hope to find systems, systems, trends, data, and approaches that will solve and correct this wicked problem.

To restate the research question, this paper is working to answer:

> *In order to motivate environmentally-friendly behaviour change, what components of the climate change narrative need to be included when presenting to individuals who have accepted human-caused climate change as a reality?*

This MRP seeks to understand how different components would solidify people's role as positive-impacting actors within the climate change landscape. The subsidiary goals were 1) to build understanding around the scientific surroundings of climate change and 2) to foster empathy for the planet. The following

subsections in this chapter will highlight the important areas of the narrative that will best achieve the goals. It is important to note that the below conclusions are not concrete quantitative findings, but areas of interest that would warrant additional research at larger scales.

Research Study Conclusions: Primary Findings

The below items are the three primary findings that were drawn from the research study and can be applied to (and further refined) in future climate change narrative-based presentations:

■ USING ALL THREE NARRATIVE TYPES

It was identified through feedback from participants that different narratives were able to accomplish different goals. Using the feedback as a base, the below outlines which elements would be best suited for enhancing parts of the overall narrative.

Science-Based Data Visuals = Base + Scale
By transforming the data into visual content, the information itself became digestible which helped communicate the realities and scale of climate change.

Fear-Based Images = Context + Urgency
Providing real-life scenarios helped communicate the immediacy of climate change while presenting scenarios that prompted nodes of urgency for action.

Story-Based Protagonists = Empathy + Steps Forward
The tangible examples showcased by the narrative's protagonists helped make actions accessible and gave ideas on how steps could be taken towards a life that reflects environmental citizenship.

This is different from the original theory that story-based narratives would lead to deeper level connections and ultimately influencing positive behaviour change. A reason for this

may be due to the format of the Story-Based narrative and how it was delivered in the presentation. Having several images of a protagonist and their story explained within 5 minutes would have a lesser impact than a more extended multi-media narrative that could include audio, movement, and dialogue.

These findings align to Aristotle's Rhetoric for Persuasion where it is recommended to use all three modes of rhetoric (ethos, logos, and pathos). Additionally, it aligns with the recommendation the IPCC's Working Group 1 (Technical Support Unit) made in their handbook for IPCC authors: *Principles for effective communication and public engagement on climate change.* This handbook summarizes research findings from social science literature and packages it into a resource for IPCC scientists in their public engagement and communication efforts. The IPCC handbook had references to elements that involve all three narratives from above. Section Four from the handbook is titled *"Tell a human story"* and similar to the Story-Based narrative, it encourages scientists to use anecdotes and stories as "showing the human face behind the science … will help [the author] tell a compelling story (Corner, Shaw & Clarke, 2018). The second section of the handbook delves into Visual Communication and the importance of using data visuals in order for non-experts to understand the science (Corner, Shaw & Clarke, 2018) - aligning with how the Science-Based narrative was presenting in this MRP's study. Finally, while no section in the handbook speaks to Fear-Based narratives, Section Two encourages IPCC authors to provide examples the audience is most likely to be familiar with as a way to establish common ground and form an emotional connection - which is the goal of Pathos/Fear-Based narratives (Corner, Shaw & Clarke, 2018).

A limitation of this approach is that there is no silver bullet narrative. The feedback that was provided was reflective of the participating study groups. Different groups may be comprised of different personalities, learning styles, and opinions which could lead to different preferences.

■ USING VISUALS

The importance of conveying factual information in visual form was touched upon in the previous section. Using visual-rich imagery helps give scientific data context and makes it digestible for the average user. Additionally, visual data provides a frame and gives scale, all while equipping people with valuable knowledge. When comparing the effectiveness of black and white charts filled with climate-related data entries, to visual representations of the data in graphic form that frames the content, the later has been shown to perform strongly.

The one limitation for using visuals is that the represented data is selective and does not showcase the more extensive data-set. This puts the onus on the individual conveying the information to select pieces of data that will adequately encompass the scale and multiple components of the issue.

■ DISCUSSIONS

As mentioned in the findings section of this paper, the discussion section of the presentation was an active part of the experience for participants (84% of participants said the discussion was what they were very engaged with). Including discussions allows for individuals to become active participants in the learning process. This causes more in-depth synthesis of the information to occur as individuals are prompted to contribute to the conversation – causing them to listen to the content, analyze it, and respond to it.

The limitations of including discussions are that they take time and it is challenging to find the right balance of having enough valuable discussion time and enough time to cover essential information within a shorter period of time (e.g. a 1-2 hour presentation). There is also the added risk that individuals who contribute to the conversation may not be as knowledgeable and may misinform fellow participants.

Research Study Conclusions: Secondary Findings

The purpose of using a prototype was to help identify the areas that are effective and resonate to help solidify future models. Similarly, prototypes are just as proficient at pointing out the areas that did not work in hopes of illuminating areas of additional study and testing. The following four findings stemmed from analyzing the gaps in the presentations and identifying potential solutions for them.

■ TIME

Time was a constraint for the presentation as there was a significant amount of material to cover in 1.5 hours. As mentioned above, the discussions engaged individuals which prolonged the duration of those sections of the presentation. An alternative approach would be to allocate more time to the session (extending to 2-3 hours) or breaking up the presentation over multiple days. The multiple day approach would allow for more discussion time in the sessions, time to reflect on the information throughout the time in-between sessions and give participants the chance to apply the material to their lives.

■ QUANTITY OF TOPICS

In this study, three topics were presented in one session (Transportation, Meat Consumption, and Consumerism). This put a strain on time and could have caused an overload of information for the participants.

Focusing on one topic per session would help participants to dive into one topic and explore it more thoroughly.

■ SUCCESS STORIES

The Fear-Based narrative was chosen as it played on one side of the emotive spectrum – capitalizing on the shock that comes from realizing an extreme situation. On the opposite side of that spectrum lies narratives that focus on the positive movement occurring within the climate change field. There are great examples that can be pulled from all around the world that can be used to inspire others to take action. For example, the Youth Climate Strike of 2019 is currently being activated all over the world where younger generations are standing up for the future health of their planet. There are many technological advancements, progressive treaties and laws being passed, and climate wins where members of society are working hard to set strong climate-friendly precedents. These have just as much potential to influence people's motivations and actions as fear-based narratives and are worth exploring.

■ BIGGER PICTURE

As mentioned before, due to the scope of this project, only a fraction of the overall climate change topic was included. Bringing other elements such as political, corporate, technological, and health impacts were requested by some participants and would help paint a fuller picture of the landscape. Additionally, this approach could help further frame different narrative types. For example, individuals may be influenced more if they learned about the health risks or economic impacts associated with climate change.

Next Steps

In addition to the secondary findings listed above, areas of further interest were identified through the research collected. The following topics of additional study would contribute to the overall positioning and strength of the climate change narrative:

Audiences

There are different audiences may require tailored communication that will resonate with them. Appealing to these different audiences can help engage and bring more people together towards the desired goal (Moser, 2010). Further research into practical tools for differentiating between segments would be beneficial.

Developing Helpful Frames for Audiences

Many frames can be applied to the narrative of climate change - avoiding wastefulness, health benefits, balance, etc. Different examples of frames kept coming up in the research, and it would be useful to map out the different wants that part of the narrative can be established.

Developing Strong Metaphors for Audiences

Similar to the paragraph above, different metaphors are used to illustrate weather events, climate impacts and other impacts caused by climate change. Metaphors are powerful tools to build frames for audiences and form a connection. For example, it would be interesting to measure the effectiveness of metaphors such as "heat-trapping blankets" for the greenhouse effect and a "bathtub filling up with greenhouse gases" to convey the stock of different gases in the atmosphere. Once powerful metaphors are identified or created, they can be shared to further understanding.

Immersive Learning

Tilden mentioned that by facilitating powerful experiences, individuals could connect to concepts and resources more effectively (Tilden, 1977). Having the presentation in a setting that parallels the content (a lush green environment) or has elements that can simulate an environment can establish a solid frame for individuals as to what they should work to preserve. Similarly, a setting of environmental degradation could be selected to illustrate climate impacts from human actions further.

Role of Money, Status, and Affluence

Individuals hold different values and money, status, and affluence are sometimes highly regarded goals for individuals. It would be an additional layer of individual insight if these above topics were researched further.

Mental Health

The burden of climate change is a heavy one, and it may impact people's comfort levels if too much is shared. Understanding the relationship between the data and how it impacts people's mental health would be insightful.

Next Steps: Components to Reach Ecological Citizenship

In addition to the findings in the previous sub-section, there are additional factors that need to be considered when encouraging people to develop a more ecologically friendly lifestyle. Chapter Four went into detail about ecological citizenship, which is the goal of compelling narratives. If ecological citizenship is the goal, then behaviour, perception of individual agency, communication, and education are some of the stepping stones to getting there.

Behaviour & Perception

As stated in chapter three many influences can impact information processing, perception, values, attitudes and ultimately, behaviour. In order to change behaviour and to alter the perception that some have towards climate change, these influences need to be taken into consideration.

Agency

It is important to encourage people to believe they can make a difference and to not dismiss the common reactions (such as feeling overwhelmed) when presented with climate knowledge or positive actions. For example, messages such as 'actions aren't as substantial in isolation, but in aggregate are transformative' should be reinforced as a way to scale the issue and make it digestible and obtainable.

Communication

Using elements from all three of the discussed narratives (Science-Based, Fear-Based, and Story-Based), one overarching narrative needs to be created that will provide audiences with many clear, and consistent signals. Simple metaphors, vibrant imagery, visual data, and compelling framing will also need to be included to support.

Education

Effective environmental education and interpretation helps connect participants to concepts and resources through compelling experiences (not just relaying facts and information) (Tilden, 1977). It is essential to assist in conceptualizing the costs of human actions to the environment to promote habitual sustainable practices.

Next Steps: Framework for Future Narratives

The below is an adaptation of Susanne Moser's work from her article: *Communicating climate change: History, challenges, process and future directions (Moser, 2010)*. This list will be used as a framework of questions that should be answered when developing an overarching narrative as it addresses the major challenges and opportunities for effective communication of climate change:

1. What are the specific goals of the communication?
2. Who is the audience (individuals, specific sub-populations, particular interest groups or socioeconomic sectors, etc.)?
3. How is the issue framed? What language, frames, metaphors, images, etc. are used?
4. What information is conveyed and how can the content be made most useful and accessible?
5. Who are the messengers (e.g., politicians, scientists, advocates, pundits, business people, celebrities, people of different ethnic or socioeconomic background and different ages)?

6. Through which channels and through which media and modes does the communication occur?
7. What measurements are in place to check if the communication had the intended effect?
8. What feedback systems are in place to receive comments and paths for additional refinement.

Next Steps: The Bigger Picture

As mentioned in previous sections, only a portion of the overarching climate change topic was represented in this paper. Many other integrated systems have an impact on the outcomes we see in our changing ecosystems, economies, governments and societies. Similarly, it is essential to recognize that when talking about the potential solutions of climate change, there are also many competing realities and narratives that act as barriers (intentionally or unintentionally). These hinder the progress that the narratives outlined in this paper are striving towards - instilling an ecological citizenship mindset for members of society. These counter-narratives are inclusive of realities that stem from limitations of climate-friendly actions due to underprivileged communities while also including anti-climate change propaganda that is supported by well-funded institutions. These types of messages can limit the ability of people enacting positive climate behaviours – regardless of their intention.

The three types of narratives that were used as a framework for this research (Fear-Based, Science-Based, and Story, Based) were meant to educate people and influence them regardless of the opposing messaging and counter-narratives. This paper is meant to illuminate a path forward to engage a group of people who are aware of the issue and are interested in contributing towards a more sustainable planet – the Climate Change Believers group that was introduced in Chapter Two. Apart from the areas of refinement for the prototype, the overarching next steps would be to understand further how this path

forward factors into the other systems and narratives that were not represented in this paper.

The planet has been undergoing numerous transformations over the last several decades due to climate change - with little indication of reparative growth. It is time for a collective and uniform movement that addresses the root causes and harmful impacts of this global issue. The hope for this MRP is to open the doors for others to learn from the research stated and include pertinent findings in any climate narratives. Through these purposefully-constructive narratives can more people begin to understand the gravity of the situation and move towards a more effective and holistic way of living.

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