The Psychology of Effective Climate Change Communication:
A Discourse Analysis

by

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<u>Abstract</u>

The goal of this study is to understand the importance of the psychology of public engagement in climate change communication. There is currently a disconnect between the certainty of the science of climate change and the public perception of the urgency to act. This problem is can be attributed to the lack of effective climate change communication. This thesis will outline the psychological barriers for public engagement and determine strategies for effective climate change communication. Then, the climate change communication of three case studies (350.Org, the David Suzuki Foundation and the Sierra Club) will be analyzed for effective communication. Through analyzing Twitter communication, the communication strategies will examine how the issue is discussed in the Canadian context.

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Chapter 1: Introduction

In the 1980s, the first reports on global warming appeared in the media and few people understood the correlation between greenhouse gases and climate change (Weart, 2016). In the late 1980s, awareness increased through scientist Jim Hansen's confident and widely reported statements that "the global warming predicted in the next 20 years will make the Earth warmer than it has been in the past 100,000 years" (Schiffman, 2015; Weart, 2016). Over time, news about climate change has become more alarming and in-depth. The pressing reality of climate change is now seen as scientifically undeniable, as 97% of scientists agree that climate change is real (Marshall, 2014). However, public engagement in Canada regarding climate change appears to be declining (Schiffman, 2015). One of the reasons for the lack of public engagement may relate to the ways in which information about climate change is communicated: simply sharing the facts of climate science does not appear to be an effective way to motivate action to mitigate climate change. This thesis examines the psychology of effective climate change communication, particularly five psychological barriers to public engagement on climate change and twelve communication strategies that might help to overcome these barriers.

1.1 Overview of the Problem

While scientific reports continue to provide more compelling evidence about climate change, they have not resulted in an increase in public engagement. Paradoxically, Stoknes argues that the more facts there are about climate change, the less action is taken (Stoknes, 2015). Research in the field of psychology highlights several psychological barriers to public engagement on climate change that help to explain this paradox. This thesis will review five

major psychological barriers to public engagement on climate change, Stoknes' "Five Ds": distance, doom, dissonance, denial and identity (Stoknes, 2015).

The intention of effective climate change communication is to make climate science more accessible to the public through appropriate 'framing' of the issues (CRED, 2009). Framing is the setting of an issue in a particular context so that the issue is seen or interpreted in a desired way (CRED, 2009). The ways in which climate change and climate action are 'framed' may significantly change public engagement. In particular, this thesis will examine how the "Five Ds" can be addressed through appropriate framing and communications strategies.

An example of how frames can help or impede climate change communications relates to the Intergovernmental Panel on Climate Change (IPCC) reports. Arguably, a focus on opportunity and hope is more likely to motivate action than the catastrophe frame or a "doom and gloom" frame. Studies show that more than 80% of articles about the IPCC reports used the 'catastrophe frame', whereas only 2% used the 'opportunity frame' to share positive potential for addressing climate change (Schiffman, 2015). This focus on 'doom' may have led some members of the public to become disenchanted by sustained calls to action on climate change combined with feelings of powerlessness to avoid impending doom. Arguably, a focus on practical opportunities to make change would be more likely to engage the public and communications from the IPCC should be focusing on whether it is able to shift the framing of its reports.

Communicating information about climate change to the public in ways that will motivate people to take individual and collective action requires an understanding of Stoknes' five psychological obstacles to public engagement, as well as experimentation with strategies to overcome those barriers. Communications around climate change designed to engage and lead to

action must go beyond the simple sharing of climate science facts as that approach is not an effective way to motivate action that mitigates climate change. In sum, given the high degree of scientific certainty about the consequences of climate change but the low level of public engagement, communication related to climate change has been described as the "largest science communication failure in history" (Brunhuber, 2015). The challenge is to identify better ways to communicate.

1.2 Purpose of the Study

The goal of this thesis is to examine the psychological barriers to action on climate change and to explore the communication strategies that might help overcome these barriers. To convey the urgency of the issue, it is essential to understand the psychology of engaging the audience. This research will examine three case studies of Canadian non-profit environmental organizations that focus on climate change to review climate change communication strategies. The framework for analysis is based on research in psychology on the psychological barriers to engagement and on effective communication strategies to motivate the public to take action to reduce CO_2 emissions.

1.3 Research Question

This study is guided by the following research question: How can the science of climate change be effectively communicated to motivate public action?

1.4 Significance of the study and sustainability

This study develops a twelve-step guide for effective communication strategies related to climate change through the review of five psychological barriers to engagement and the analysis of three case study examples. Like climate change, sustainability is often described as a 'wicked problem', an on-going work-in-progress invoking multiple perspectives (Pryshlakivsky & Searcy, 2012). Key tools for addressing wicked problems include effective communication and education. Climate change communication should be tackled like environmental sustainability education. In 2005, the United Nations launched its Decade on Education for Sustainable Development, aiming to make sustainable development accessible to all by providing education for everyone on how to shape a sustainable future. On key issues like climate change, science communicators were given the opportunity to develop their competencies in collaborative learning and critical thinking skills so as to best communicate this reality. Similarly, science communicators who work in the field of climate change must become more effective in the way they communicate if they are to generate public engagement.

1.5 Limitations

The main limitation of the study will be its scope. The three case studies set out below examine communication strategies and effective methods for public engagement about climate change; however, they focus only on three Canadian non-profit organizations and on their Twitter accounts. A broader geographic analysis and social media analysis would help to draw lessons on effective communications strategies and public engagement in climate change action.

1.6 Definition of Terms

- **Global warming** "refers to the long-term increase in Earth's average temperature" and is one of the effects of climate change. (NASA, 2011).

- **Climate change** "refers to any long-term change in Earth's climate, or in the climate of a region or city. This includes warming, cooling and changes besides temperature", such as annual rainfall and sea levels (NASA, 2011).

- **Public engagement** refers to "a process that brings people together to address issues of common importance, to solve shared problems, and to bring about positive social change" (Bonnemann, 2012).

Chapter 2. Literature Review

Significant research has been conducted on the psychology of climate change communication and its influence on public engagement. This chapter is divided into two sections. First, it will outline the psychological barriers for engagement on climate change. Second, it will examine the research on communication strategies to overcome these psychological barriers.

2.1 Psychological Barriers for Engagement

Five key psychological barriers for public engagement on climate change identified by Stoknes are reviewed below: distance, doom, dissonance, denial and identity. These barriers prevent climate messages from engaging the public. Figure 1 illustrates the barriers, with distance as the first barrier to effective climate change communication.
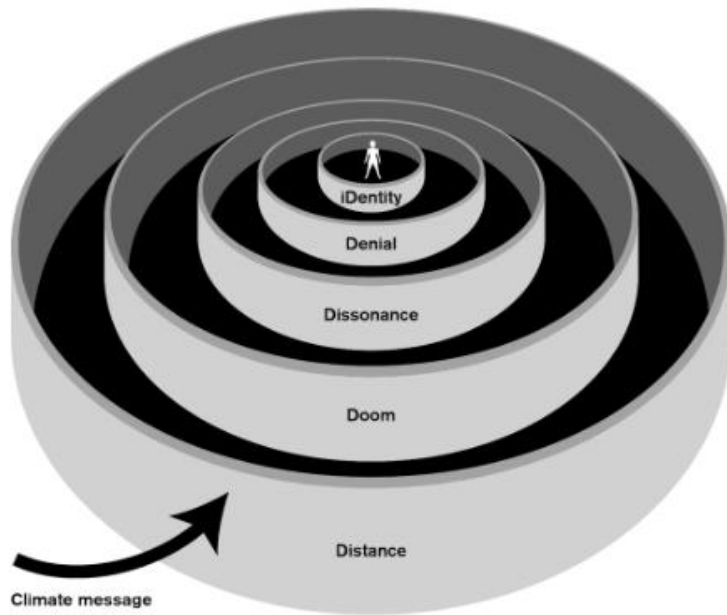
Figure 1. The Five D's: five barriers that block the climate message. (Stoknes, 2015).

Each of these barriers is considered in more detail below.

1. **Distance**

While people consider climate change to be a serious problem, the issue is perceived to be temporally and geographically distant (CRED, 2009). Since the heaviest impacts of climate change will be felt in the future, the public is often distanced through communications strategies that do not impart a more immediate and time-sensitive sense of urgency. Similarly, text and images displaying 'distant' impacts of climate change, such as the polar bear, "arguably 'closed down' the climate discourse around a concept that is remote from people's day-to-day lives" (Corner, Webster & Teriete, 2015, p.6). For most people, "melting glaciers are usually far away, as are the spots on earth now experiencing sea level rise, more severe floods, droughts, fires, and other climate disruptions" (Stoknes, 2015, p.82). Along with projecting into the future,

communication that focus on the reality of distant regions, vulnerable to the effects of climate change, feels far-removed from everyday concerns and is less likely to generate public engagement.

2. **Doom**

The perception of climate change as an impending doom serves as a barrier to public engagement. In the short term, fear of the detrimental impacts of climate change may educate and mobilize, but fear tactics lose their effectiveness in maintaining long-term motivation for action. These tactics can polarize audiences as people with a 'finite pool of worry' simply avoid engagement with worst-case scenarios (CRED, 2009). Quickly, a sense of hopelessness can grow as people anticipate the 'doom and gloom' impacts of climate change in a pessimistic light rather than in a positive frame that tends to increase public engagement (Manzo, 2010).

The doom framing arguably reduces public engagement as it highlights an "arrested state of unprocessed grief over the destruction of the natural world" and "environmental melancholia" due to the pending impacts of climate change (Gregoire, 2016). On a personal and social level, people who are experiencing a sense of loss, either by experiencing changes from climate change first-hand or hearing about the loss others are facing, may be less likely to engage in positive action. In summary, emotional "doom" appeals by climate change communicators may be effective in the short term, but hard to sustain in the long term.

3. **Dissonance**

The inconsistency between what we believe and what we do leads us to feel a sense of dissonance. Cognitive dissonance shows a "conflict between a held belief and evidence that an opposing belief may be true" (Robbins, Bergman, Stagg & Coulter, 2015, p.538). For instance,

fossil fuel energy contributes to global warming, yet we drive, fly and heat our homes with little regret. The cognitive dissonance is generated by our attraction to the conveniences of daily life and the difficulty that attraction presents as we try to align our actions with our beliefs about climate change. Similarly, a study at Yale Law School found that when members of the public became more literate and numerate in climate science, the individuals became more divided in their opinions on the risks of climate change (Yale University, 2012). This shift was due to heightened cognitive dissonance among persons who now understood that their actions did not align with their values. Climate change communications that take into account the impacts of cognitive dissonance are more likely to be effective.

4. **Denial**

Denial is a defense mechanism for avoiding the unsettling reality of climate change and a way to find refuge from fear and guilt. There are various spectrums of denial, from denial that climate change exists to the denial that humans behaviour contributes to climate change (American Psychological Association, 2014). In addition, uncertainty, mistrust and reactance are considered to be forms of denial (APA, 2014). Thus, "denial is based in self-defense" rather than a lack of information on the topic of climate change (Stoknes, 2015, p.82). Even though 97% of climate scientists believe that climate change is human-caused, a study by the University of Montreal found that only 61% of Canadians believe climate change is human-caused (CBC News, 2016 & Marshall, 2014). By negating, ignoring or avoiding the issue, individuals protect themselves from uncomfortable truths.

5. **Identity**

Personal identity, either professional, political or cultural, greatly influences how people filter information. For example, "if people who hold conservative values, for instance, hear from a liberal that the climate is changing, they are less likely to believe the message" (Stoknes, 2015, p.82). Similarly, the Center for Research on Environmental Decisions describes how people seek information on environmental issues that aligns with their beliefs, creating a problem of confirmation bias (CRED, 2009). While those who are already environmentally aware will identify with climate change communication, people who do not already do so may block out opposing sources of information. Personal identity "overrides the facts", particularly when the facts demand change in habits or lifestyle (Stoknes, 2015, p.82).

In sum, the five psychological barriers to engagement on climate change create "concentric circles around the citadel of the self" (Stoknes, 2015). This citadel presents a challenge for climate change communicators. The following section identifies how these challenges can be addressed with effective communication strategies.

2.2 Communication Strategies to Overcome Psychological Barriers

This section of the literature review lists 12 strategies that have been derived from the Columbia University Center for Research on Environmental Decisions Report, Liz Banse's Visual Storytelling Guide with Resource Media, the Yale Report on Climate Change Communication, the communication specialist George Marshall, the social scientist Per Espen Stoknes, and the Futerra Sustainability communications firm. These strategies for climate

change communication are designed to overcome psychological barriers that prevent public engagement on climate change.

1. Tailor to your audience

This is the first lesson in communication, since it shapes the way to communicate about climate change. Tailoring the images and messages to the target audience is one of the 'Seven Rules of the Road by the Visual Storytelling Guide' (Banse, 2013). By personalizing the message, the content of the message becomes relatable to the daily life of the audience. The audience's differences (in education, wealth, occupation, passions, ethnicity, religious motivations, etc.) should be considered in crafting messages on climate change (CRED, 2009). People look for information that aligns with their particular perspectives. This 'confirmation bias' shows how important it is to meet the person's needs while aligning with the behaviour request.

2. Emotional appeal

The human brain has two processing systems: the experiential and the analytic (CRED, 2009). The experiential processing system is the source of emotion and instincts to motivate action, whereas the analytic controls scientific analysis (CRED, 2009). A study on the retention of fact about shrinking glaciers and subsequent willingness to act on climate change tested these two brain processing systems (CRED, 2009). For the experiential side, videos of receding glaciers over time and photographs were shown to the audience and for the analytic, data and graphs were shown. The results of the study show that fact retention, the level of worry and the willingness to act were higher with the experiential processing system (CRED, 2009). Emotions

are important to consider in climate change communications; however, it is also important to note that one of the barriers for engagement on climate change is the feeling of doom. A balance is needed to be effective and not to lead to 'emotional numbing' with overuse. Generally, climate change communicators should balance fact with emotion by ensuring the communication of both analytical and experiential content.

3. **Repetition**

To influence behaviour change, an audience should be reminded more than once of a desired behaviour. The Futerra report lists repetition as a top strategy for engagement. Marketers use 'retrieval cues' to remind what behaviour is encouraged to change (Futerra, 2005). Repetition also appeals to the experiential processing system of the brain, as it is receptive to association and repeated information over time (CRED, 2009).

4. **Careful language**

The language used to describe climate change is often hyperbolic and provocative, while the language for solutions is often 'quick, cheap and easy' (Futerra, 2005). Climate change solutions should use be more heroic language to meet the scale of the problem (Futerra, 2005). For example, the CRED report shows the difference between the promotion and prevention frame, using words like 'nurture, advance, hope, add, join, maximize, support' as opposed to 'obligation, security, cautious, responsibility, minimize, necessity'. These are different frames, but can both be effective. When making scientific communication accessible to the public, terms should be simplified. Using words like 'man-made' rather than 'anthropogenic' and 'methane' instead of 'CH4' are examples to better connect with the audience (CRED, 2009).

5. Powerful imagery and story

Imagery can take the form of visual or text, through images or through descriptive language. Images can show effective scenes that words cannot adequately describe. It is important for the image to "follow the same formula as your messaging – threats need to be coupled with solutions" (Banse, 2013, p.6). The important part is to ensure there is direct correlation in the messaging between images and text and between problems and solutions. Communication specialist George Marshall confirms the importance of storytelling about climate change to make the issue near, personal and urgent (Marshall, 2014). These stories should be personal, vivid, memory-provoking, and witty.

6. Easy behaviour change

Humans are creatures of habit. The natural pattern in decision making is to choose the easier and more familiar option, called the "default effect" (CRED, 2009). An initial way to encourage easy behaviour change is through 'green nudges', as describes Stoknes. For example, actions like recycling, going vegetarian and turning off the lights are initial 'Green Nudges' (Stoknes, 2015). To simplify decision making, people are also prone to relying on one action to 'do their part' and to relieve their worry about climate change (CRED, 2009). This is called a 'single action bias' (CRED, 2009). While the public is initially engaged, the single action is inadequate. To counteract 'single action bias', it is important to further initial inspiration through tiered options that lead to greater public engagement (CRED, 2009). This can happen by communicating options for longer time commitments or larger responsibilities to take on. The desire to listen to a simple message is powerful, since this initial nudge is a gateway to greater involvement.

7. Inspire long term commitment

A key issue for effective climate communications is the need to inspire commitment and public engagement that leads to action over the long term. Longer term commitment also helps to build personal identity, addressing one of Stoknes' five barriers to engagement on climate change. The 'single action bias' described above can also be countered by appealing "to intrinsically valued long-term environmental goals and outcomes", as describes the Yale Report on climate change communication (van der Linden, Maibach, & Leiserowitz, 2015). Finding new scales for measuring outcomes, such as happiness, ecosystem health and nature index, would help with longer term public engagement and the implementation of this communications strategy (Stoknes, 2015).

8. Direct action request

This strategy sets the expectations clearly for an action and offers an opportunity to engage in the decision-making process. Whether to join a protest, attend a sit-in or sign a petition, these direct requests for public engagement enable members of the public to take another step toward deeper commitment. People should be provided such one step at a time opportunities to shift towards active citizenship. A direct action request will facilitate more affective and experiential engagement, one of the six communication strategies set out in the Yale report (van der Linden et al., 2015).

9. Bring the issue close to home

As noted, one of the five barriers to engagement on climate change is distance, both

temporally and geographically. To counteract this problem, an effective communicator should highlight the current impacts of climate change on specific regions that are close to home (CRED, 2009). Extreme weather events, such as flooding, droughts and increased precipitation, are easily understood and relatable to local impacts of climate change. The Yale Report concludes that the strategy to "emphasize climate change as a present, local, and personal risk" is needed for individuals to prioritize the issue (van der Linden et al., 2015).

10. Sense of urgency

Similarly, the need to emphasize the present reality can signal urgency. Humans are not designed to react to threats in the distant future. People "struggle to balance long-range worries with the demands of more immediate concerns" (CRED, 2009, p.15). The Yale study suggests that effective climate communicators should "frame policy solutions in terms of what can be gained from immediate action" to generate urgent attention (van der Linden et al, 2015). For this reason, it is necessary to show how the issue is manifested in an immediate context and how it can be addressed now.

11. Bust uncertainty with fact

The natural variability of climate, the unpredictability of human behaviour and its cumulative impact on the earth's climate are all factors that contribute to the scientific complexity around climate change and a sense of uncertainty. This challenge relates closely to one of Stoknes' five barriers for engagement on climate change: denial. Denial can stem from a variety of sources, including cognitive dissonance and uncertainty about the complexities of climate change. To simplify this complexity, 'mental models' that include incomplete facts often shape opinions

(CRED, 2009). In this context, authoritative and clear predictions offer safety, security, and planning time. Language described as 'confidence terminology' communicated through terms like the IPCC's "very high confidence" terminology help to engage with those whose mental models require clear, authoritative statements (CRED, 2009). To counter the lack of certainty, certain facts can be shared to reflect foreseeable results in the future. However, facts alone do not drive confidence; the way those facts are shared is critical.

12. Encourage group action

Individuals are motivated by collective action in group settings. By constructing social norms that motivate others and passing on the climate message through trusted family, friends and personal connections, climate change is taken more seriously and public engagement increases. The Yale climate change communication report support the strategy to specifically "leverage relevant social group norms" (van der Linden et al., 2015). Society is not composed of "atomized individuals choosing how to act in complete isolation from those around them" (Futerra, 2005, p.5). Rather, the best way to change society's mentality is to change 'social proof' of what is socially acceptable (Futerra, 2005). In addition, social media undoubtedly provide the quickest and most personal way to spread mass information. Social media creates a communication opportunity to spread mass information to groups, drive group norms and encourage group action.

In summary, specific communications strategies can be used to improve climate change communications and overcome the barriers to public engagement. The twelve strategies outlined

above will serve as a framework for the following analysis of climate change communication by three environmental organizations.

Chapter 3. Methods: Framework for Analyzing Climate Change Communication

Both the psychological barriers to engagement on climate change and the strategies for effective climate change communication inform how the following case studies are analyzed. The research question asks, "How can the science of climate change be effectively communicated to motivate public action?" and the following analysis will focus on the communications best practices identified through case studies involving three environmental organizations: 350.Org, the David Suzuki Foundation, and the Sierra Club. The barriers to public engagement on climate change described above will provide a critical lens for observations on whether the three organizations effectively address these challenges to engagement.

3.1 Case Study Analysis

The case study analysis focuses on the communications strategies adopted through Twitter, a social media tool used by all three environmental organizations to motivate public engagement. A tweet contains a maximum of 140 characters, requiring succinct communication of a message in minimal words. People can 'follow' a Twitter account to receive updates in their Twitter feed. The three organizations' Twitter feeds provide an accessible means of engaging the public, generating trending information and gathering a following using hashtags. Hashtags are a label on social media connecting content with the # symbol. The text and visuals that have been tweeted were analyzed based on a two month sampling of all the tweets sent out by the three organizations in November 2016 and January 2017.

3.2 Analytical Framework

A twelve step checklist was used to analyze the tweets from the three case studies. The left column outlines the twelve communication strategies described in the literature review. The next column sets out the number of tweets per strategy used. The following two columns are dedicated to qualitative descriptions of the top five strategies used in the Twitter text and images.

Strategy	# of tweets	Text	Images
1. Tailor to your audience			
2. Emotional appeal			
3. Repetition			
4. Careful language			
5. Powerful imagery and story			
6. Easy behaviour change			
7. Inspire commitment			
8. Direct action request			
9. Bring issue close to home			
10. Sense of urgency			
11. Bust uncertainty with fact			
12. Encourage group action			

3.3 Data collection

To analyze the case studies, every tweet during the two months of tweets were captured by screenshot. This digital photo capture was saved in a folder then counted and analyzed according to the strategies. A qualitative assessment of the effectiveness of the content, both in terms of text and images, was made. For the analysis of text, the storylines and the specific

wording were analyzed. When analyzing images, main themes, icons and stories were described. The top five communication strategies were chosen based on the most number of tweets using this strategy. The content of the postings on climate change were assessed to determine if the organization used effective means of climate change communication, according to the twelve step checklist. A few key examples were described as best practices for climate change communication using Twitter.

3.4 Case Study Selection

The three organizations originally selected for review were the top three environmental non-profit organizations in Canada that address climate change, based on the biggest annual budget, as listed by the Canadian Revenue Agency. According to the Charity Intelligence report of 2010, there are 1,155 Canadian environmental non-profit organizations registered with the Canada Revenue Agency (Grandy, J. 2013). The method used to find the top three nonprofits that address climate change was to do a word search for "climate change" in the description of priorities in the Charity Intelligence Report. Not only did the environmental non-profit organizations have the biggest annual budgets, but their work also focused on climate change.

However, due to the lack of climate change communication on Twitter by the Canadian Wildlife Federation, 350.Org was selected as the alternative. While the Canadian annual budget of 350.Org was not disclosed in its annual report, the American non-profit organization has a mandate specifically about climate change messaging, so it provides a useful point of comparison to the two Canadian organizations. The three environmental organizations prioritizing climate change communication and selected as case studies for this thesis were 350.Org, the David Suzuki Foundation and the Sierra Club.

The David Suzuki Foundation was founded in 1990 to prioritize research and advocacy on environmental issues, including climate change (Grandy, 2013). It spends 30% of its budget on communication and 21% on climate change and clean energy (Grandy, 2013). The rest of the spending is divided equally between marine and fresh water research (14%), terrestrial conservation (13%), province of Québec initiatives (13%), and program management and other (9%) (Grandy, 2013).

The annual budget of the David Suzuki Foundation of $10.6 million differs significantly from the third case study, at $1.6 million for the Sierra Club (Grandy, 2013). Founded in 1963 in Canada, the original organization was started in the United States in 1892 (Grandy, 2013). It is the oldest and largest environmental organization in the United States. In both countries, the key issues that are focused on are climate change, energy policy, water quality and endangered species (Grandy, 2013).

3.5 Limitations

The limitations of reviewing three organizations' Twitter messaging over two months include the fact that Twitter is only a small part of these organizations communications strategies, only a narrow public audience is active on Twitter and sees the tweets of these three organizations, and two months of Twitter content may not be fully representative of these organizations' overall Twitter strategies. Further, the nature of the three Twitter accounts were different as this study focused on two national Twitter accounts (for 350.Org and the David Suzuki Foundation, and one provincial account for the Sierra Club); therefore, comparisons across organizations should take these differences into account.

The three environmental organizations originally selected were all charities. Due to the low number of tweets on climate change for the Canadian Wildlife Federation, however, 350.Org was ultimately chosen, but it is not a charity. This factor influences the political voice that can be shared on Twitter. A more in-depth explanation of this issue will follow in section 4.3 below.

In addition, the Sierra Club's Twitter messages for the month of November were not fully retrievable. When scrolling to the oldest tweet posted, the Sierra Club tweets only started on November 15th. This did not provide the full sample size of the month of November; therefore, an analysis of the Sierra Club's tweets in December was conducted. This content may not reflect the same themes, but the campaigns did carry over from November to December, as will be described below.

Finally, the interpretation of the analysis is subjective due to the nature of the categorization of communication strategies. This should be considered when comparing the qualitative and quantitative data collected, as described in section 3.5.

Chapter 4: Key Findings from Case Studies

The twelve step checklist was used to analyze the effectiveness of current communication strategies as they relate to barriers for public engagement on climate change issues. It provided the basis for identifying the key findings from the case studies outlined below, including suggestions for the improved application of the communications strategies.

4.1 Twitter as a tool for engagement: an overview

Many uses of Twitter include mobilizing individuals, requesting collective group action, and building momentum for a movement (Segerberg & Bennett, 2011). As a basic guide, campaigns will aim to use the same hashtags and populate those hashtags with content. An example pulled from the case studies was the use of #KinderMorgan and #StopKM. These were both used, often simultaneously, in the context of addressing the proposed (and approved) Kinder Morgan pipeline. It should also be noted that the uppercase letters do not alter the search results. That said, the @ symbol changes the message directed towards an individual's Twitter handle. For example, on numerous occasions, the Prime Minister is called to attention using @JustinTrudeau. By using hashtags, climate change communication can be streamlined and gathered. The trending and the most used hashtags of the three case studies will be discussed. The hashtags and @ tags serve a different purpose for each organization.

In addition, Twitter can serve as a transparent means to facilitate internal communication and logistical coordination of a campaign or protest. Gladwell writes that "with Facebook and Twitter and the like, the traditional relationship between political authority and popular will has been upended, making it easier for the powerless to collaborate, coordinate, and give voice to their concerns" (Gladwell, 2010). The voice of individuals can be amplified with a retweet by an organization to build momentum. However, Malcolm Gladwell also points out that a person following a campaign on social media does not have the same involvement or presence as an activist does in person. Social networks are effective means to increase participation and to encourage further engagement in person (Gladwell, 2010).

Climate change communicators should be aware of "clicktivism", as a critique of the shallowness of social media based activism (Clicktivist, n.d). With the rise of social media, non-

profit organizations have increased their presence on these platforms to gain support for their campaigns and to promote their causes (Clicktivist, n.d). Tweets should be considered as a gateway for initial engagement that will ideally lead to further action. Otherwise, organizations may find that they have difficulty generating sustained forms of action through Twitter. For this reason, the discourse analysis below set out to record and interpret the most effective and most used strategies for sustained public engagement through images and text.

4.2 The Selection of the Twitter Case Studies

The purpose of this research was to identify effective communication practices of the three case studies: 350.Org, the David Suzuki Foundation and the Sierra Club. However, the Twitter accounts of these organizations have differing scopes and number of followers. While 350.Org is an international organization founded in the United States, this study analyzed only its Canadian Twitter account. As of April 10th, 2017, the 350.Org Canada (@350Canada) account had 3,550 followers, compared to the 352,000 followers on the original American account (@350). The David Suzuki Foundation Twitter account (@DavidSuzukiFDN) had 147,000 followers. While the Sierra Club is an international organization, the Sierra Club BC Twitter account (@Sierra_BC) is specific to the province of British Columbia and has 7,745 followers. The Sierra Club Canada (@SierraClubCan) Twitter account has double the followers, but only sent out four tweets in the month of January compared to the 206 tweets in the same month sent by the Sierra Club BC. In summary, the three case studies include an international (350.org) and two national organizations (the David Suzuki Foundation and the Sierra Club), yet the twitter accounts reviewed for content are their national (350 Canada and David Suzuki Foundation) and provincial (Sierra Club BC) Twitter feeds.

In collecting content from these three Twitter accounts, the study looked for the number of tweets discussing climate change out of the months of November, December and January, depending on the case study. Of the 950 tweets analyzed from these three sources, 447 tweets related to climate change. These 447 tweets were then analyzed to understand the top strategies used to engage followers using text and images. The most common themes and images are summarized and discussed below.

4.3 Political activity on climate change

According to its website, "350 is building a global grassroots climate movement that can hold our leaders accountable to the realities of science and the principles of justice" (350.Org, n.d.). Its mandate focuses primarily on advocating for action on climate change. As a registered non-profit organization registered in the United States, "Under the Internal Revenue Code, all section 501(c)(3) organizations are absolutely prohibited from directly or indirectly participating in, or intervening in, any political campaign on behalf of (or in opposition to) any candidate for elective public office" (IRS, 2016). While its lobbying activities to support candidates in specific campaigns have been restricted, the organization has generally been vocal about political views in support of climate action (IRS, 2016).

On the other hand, the Sierra Club and the David Suzuki Foundation are both registered charities. The Imagine Canada's Sector Monitor report indicates that most charities are involved in public policy activity and 31% in "political activities" (Lasby & Cordeaux, 2016). Political activity is defined as a 'call to action' to the public with the goal of changing or defending government policy or law. (Lasby & Cordeaux, 2016). These can be tied to political engagement, but they differ from charitable activities as "they can seek to pressure elected representatives or

political officials in some way" (Lasby & Cordeaux, 2016, p.4). For both the Sierra Club and the David Suzuki Foundation, their advocacy efforts were designed to hold politicians accountable for their action on climate change.

There has been a trend observed by studies on the 'advocacy chill' by charitable organizations registered with the Canadian Revenue Agency. In the political context of the Stephen Harper government, charity organizations underwent thorough audits and investigations to ensure they were non-partisan. This produced hesitation to share any form of political content, while they were under examination. Even with a new Trudeau government in office, the CRA's regulations and audits cast a chill over political activity.

Charities may still be 'risk-averse' to policy engagement or political activity, for fear of being screened for 'risky activity' (Cameron, 2016). That said, in a study on Canadians' Opinions on Charities, "94% of all Canadians agree that charities should speak out on issues of public concern like environment, poverty, or healthcare" (Lasby & Barr, 2013). All three organizations reviewed below use a political voice to engage the public in climate change communication during the selected period of analysis. Both the David Suzuki Foundation and the Sierra Club are subject to the rules on political activities by charities. While they have tweeted @ politicians and shared links to political voices, they have not endorsed politicians, done direct calls for political action, or made efforts to engage the public in political activity.

4.4 Case Study I: 350.Org

For 350.Org, the selected months for analysis were November 2016 and January 2017. These months were particularly active for the campaigns that were trending on Twitter. The Twitter handle for the organization is @350Canada and both the posting and the 'retweets' by

the organization were considered. In the month of November, 350 Canada tweeted 284 times and the categorization in the twelve step checklist revealed that 210 of these were related to climate change communication. In the month of January, there were 103 tweets and 88 of them communicated climate change is some form. To provide context, these months were particularly influential due to the national discussion about the proposed Kinder Morgan Pipeline in November 2016 and in January 2017. The hashtag '#ClimateFacts' was trending to communicate climate change. Strategies used to communicate climate change and to encourage climate action were identified using the checklist, as a guide to finding common frames.

The top strategies used by 350.Org were to 1) encourage group action, 2) direct action requests, 3) tailor the message to the audience, 4) use repetition, and 5) urgency. These strategies will be discussed in the context of the effectiveness.

1) Encourage group action

350.Org is an organization that aims to promote climate change as a movement to contribute participation. By mobilizing the public to join protests, a sit-in in an elected official's office or a vigil in honour of a proposed pipeline, 350.Org requires collective effort. Its Twitter feed is followed by a number of individuals who can immediately see public feedback and support. There were 118 tweets using this strategy out of 284 tweets during the months of November and January. Known as 'social proof', this strategy of group mobilization is effective in encouraging individuals to become motivated by collective action (Futerra, 2005, p.5). Out of 298 tweets, 98 tweets communicated group action or showed visuals like Figure 3 below.

Figure. 3. A Tweet to mobilize group participation against the Kinder Morgan pipeline.

In the example above, a tweet encouraged individuals to join a Kinder Morgan rally. The image was effective in using humans to convey a message. Rather than putting the message "Climate Leaders Don't Build Pipelines" in a tweet, the image of a group of people marching with the sign creates a 'pictorial superiority effect' (Banse, 2013). Our brains grasp images more than words, so an image of an inviting group paired with words will be more easily remembered than simply written material about a group action. In a study from the Visual Storytelling Guide, "when information was presented orally, people remembered only about 10 percent of what they heard when tested 72 hours later. That figure jumped to 65 percent when pictures were added" (Banse, 2013, p.4). For this reason, the Tweet on group action is more likely to be remembered.

350.Org not only communicates about climate change, but they organize events and mobilize the movement to address it. Throughout the month of November, rallies happened across Canada with mobilization support from 350.org. Over the course of the two-month

analysis, the Kinder Morgan pipeline was the leading campaign for 350.Org.

2) Make direct action requests

  350.Org sent out 64 tweets requesting direct action in some form. Rather than proving the science of climate change in the 140 characters of a tweet, 350.Org shares the environmental consequences of the Kinder Morgan pipeline and encourages mobilization of the public to oppose it. Through direct action requests, 350Canada tweeted about the sit-ins in elected politicians offices. In November, Twitter documented sit ins at the office of the Minister of Environment and Climate Change, Catherine McKenna, as seen in Figure 4 below. Tweets were directed at @ec_minister @cathmckenna calling for the rejection of the Kinder Morgan pipeline with the hashtags #KinderMorgan and #StopKM. The repeated messaging shows effective imagery with protest posters saying "Climate Leaders Don't Build Pipelines", like in Figure 3 above. The organization does an effective job at appealing to the emotional sense of belonging to a cause by getting people to take action.

  Tweets mobilizing participation in direct action included sit-ins at the offices of Minister of Indigenous and Northern Affairs Carolyn Bennett, Minister of Transport Marc Garneau, Member of Parliament Jim Carr, and Member of Parliament Andy Fillmore in Ottawa, Toronto, Winnipeg, and Halifax. In addition to the sit-ins that were shared on Twitter, the organization mobilized people to attend the Kinder Morgan vigils. As described in a tweet from November 18, "on Monday, November 21st, 40+ communities will stand united against the Kinder Morgan pipeline. Join the day of #KMvigils" (350 Canada, 2016). These mobilizations across Canada encouraged the public to take action by calling politicians and asking for their rejection of the pipeline.

Figure. 4. A Tweet shows the sit-in and call to action from the Ministers' office.

3) Tailor the message to the audience

Tailoring the images and messages to the target audience is one of the 'Seven Rules of the Road by the Visual Storytelling Guide' (Banse, 2013). Out of 350.Org's 284 tweets, 66 tweets were tailored to a specific target audience. In the examples of group action and direct action requests by 350.Org described above, photos were effective in gathering support. In the visual storytelling guide, it is recommended that the image "follow the same formula as your messaging – threats need to be coupled with solutions" (Banse, 2013, p.6). In 350.Org's imagery, the solution offered to fight the threat of climate change is to reject a climate-threatening pipeline and to hold politicians accountable to this decision. The images focus on public support, tailored to an audience of engaged citizens.

The image in Figure 4 was tweeted twice in the same day, once with the caption: "BREAKING: #KMSitin starts @ec_minister's office calling for #KinderMorgan rejection. Will she choose youth over a climate denying company?" (350 Canada, 2016). This quote could

connect with various audiences, including students who stand for their beliefs, and parents and grandparents who want the next generation to be able to live without the detrimental impacts of climate change.

Out of the 3,550 followers of 350 Canada, it can be assumed that many hope to see images that align with deliverables, such as mobilizing a movement and inspiring commitment to climate action. An audience that stumbles on 350.Org tweets or is a loyal follower of the organization on social media is quickly connected to the cause. The next step of engagement could be clicktivism, if they engage with the post through like or retweet. The goal is for the image and message to be so well tailored to the audience that audience members follow through on the action requested. In this political context, the request to call their local member of parliament or to join a sit in with members of the 350.Org organization is tailored to Canadians of voting age with a political voice.

4) Use repetition

As, the most used strategy of the five, 350.Org used repetition for 180 tweets. 350.Org understands the principle that to change habits, it is important to convince someone to take action more than once. Sharing information once is not likely to make a difference to the reader's behaviour. The Futerra report shares that "you need to remind them exactly when they're taking the action you want to change" (Futerra, 2005, p.8).

On November 21, 350.Org sent out 59 tweets about the Kinder Morgan pipeline since this was the national day hosting the vigils. In leading up to the event, there had been many reminders about this event happening with an emphasis on the vigils being an opportunity to show solidarity. This was an effective use of repetition as 53 of the 59 tweets were retweets by

350.Org of messages and photos from individuals or groups using the #StopKM and #KMVigil hashtags.

Repetition of information appeals to the experiential processing system of the brain. With repetition, balance is needed between an effective emotional appeal and emotional numbing. It is also important to consider that the "repeated exposures to emotionally draining situations" can cause 'emotional numbing', where people become jaded to the content communicated (CRED, 2014, p.21). On social media, this balance may be assessed post engagement through a review of likes and retweets. Feedback is an important consideration when posting social media content. The experiential processing system is more receptive to information through association and through the repetition of decisions over time (CRED, 2014). Repeated information shows progression and positive transformation. With the repetition of an event date, the audience is more likely to remember and to attend, if exposed in numerous ways over time.

5) Share urgency

To express the immediate need for action, urgency was expressed in 50 tweets. This was a communication strategy that was felt was best addressed by 350.Org than by the other two other case study organizations. 350.Org emphasizes the need for immediate opportunities to take action on climate change. On Twitter, the best examples have started with "BREAKING", "TODAY", "LIVE" and "JUST NOW" to show the immediate need for attention. These tweets have been about recent governmental decisions, and current actions that are happening. Typically, they share an immediate action that can be taken alongside the event described in the Tweet. The language about the time to act now suggests that climate change is not a distant reality, but rather one that needs immediate attention. The hashtag #TheFutureIsHere was

trending in the month of January as a means to share the reality of climate change. In the month

of January, the science of climate change was shared with the hashtag #ClimateFacts. The quote

"No one under the age of 30 has experienced a month with below average temperatures.

#ClimateFacts" from Figure 5 is a striking message to show the real impact of climate change on

the current generation. The visual implicitly describes global temperature rise, while showing
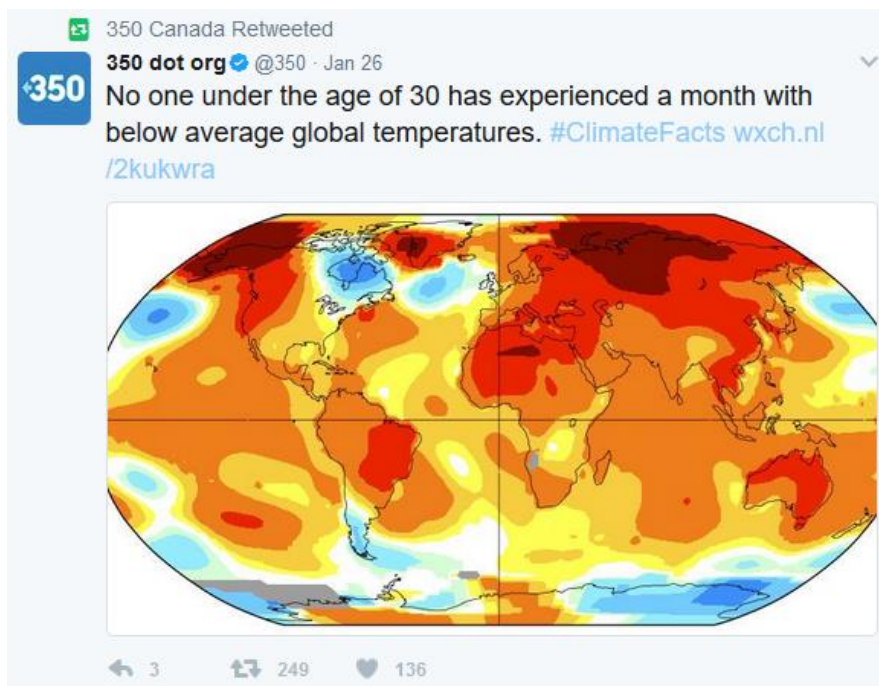
how climate change is affecting our generation.

Figure 5. A Tweet addressing the reality of climate change in our generation.

By sharing repeated updates about events and contributing to trending hashtags, 350.Org

has used Twitter as a mobilization tool for its audience. Their approach to Twitter has been to

focus on campaigns through repeated messaging, through group actions and direct action

requests. The tweets share messages of urgency and are tailored to their audience. Of the 12

communication strategies, these have been the most effective for 350.Org.

4.5 Case Study II: David Suzuki Foundation

For the David Suzuki Foundation, the selected months for analysis were November 2016 and January 2017. These months were particularly active on the climate change related topics of Canadian impacts, the COP22 United Nations Climate Change conference, political personalities and renewable energy. Tweets during these two months also covered energy usage, fellowship opportunities, transportation, pipelines and pollinators. These environmental topics are related to climate change, but out of the cumulative 171 tweets, 55 focused on climate change communication. In November, 37 tweets out of 122 were on climate change. In January, 18 tweets out of 49 focused on climate change. In the months of November and January, the trending hashtags related to climate change were #ClimateFacts, #KinderMorgan, #renewable, #COP22, #ScienceMatters and #climate. Strategies used to communicate climate change and to encourage climate action were identified using the checklist, as a guide to finding common frames. The top strategies used were to 1) bring the issue close to home, 2) inspire commitment, 3) use careful language, 4) powerful imagery and story, and 5) bust uncertainty with fact.

1) Bring the issue close to home

Of the three case studies, the David Suzuki Foundation is the only Canadian organization that focused on climate change in the Canadian context. Out of 53 total tweets about climate change, over half of them (29 tweets) used the strategy to bring the issue close to home. The tweets appeared to overcome the psychological barrier of distance people feel towards climate change by localizing the issue.

For example, in November, Toronto was dealing with massive flooding that foreshadowed the potential impacts of climate change in the future. The David Suzuki

Foundation used this opportunity to discuss the impacts of climate change on the biggest city in Canada. The campaign 'Flood the Room' as seen in Figure 6 below aimed to gather citizens at Toronto City Hall so they could call for climate action and solutions to reduce carbon emissions. According to the Facebook event posting afterwards,150 attendees showed support for climate action.

The Centre for Research and Environmental Decisions report states that weather events are "vivid, dramatic, and easily understood, especially to the locals who suffer through them, and they provide effective frames for the potential impacts of future climate change" (CRED, 2009, p.9). According to the report, these events provide "teachable moments" that communicators can convey with a local audience to show the relevance of climate change. The strategy adopted by the David Suzuki Foundation was done effectively and with memorable white on black wording. (See the 'Flood the Room' image below at Figure 6.)

In addition to the Toronto campaign, the David Suzuki Foundation was effective in highlighting other campaigns in a Canadian context. The question "What does #KeystoneXL mean for Canada?" on January 26 encourages Canadians to understand the climate impacts and vulnerable populations living downstream from this pipeline. Similarly, the question "What Canada's coal phase-out means to your health, climate change, electricity bills, etc." posted on November uses a similar, accessible tone to make the issue of climate change an element of the day to day.

Figure 6. A call to action on climate change after the flooding in Toronto.

2) Inspire commitment

The David Suzuki Foundation account sent out 10 tweets that aimed to inspire commitment to take action on climate change. In the month of January, the account focused on connecting the issue of climate change with a renewal of commitment to the environment. The quote "we have to imagine the kind of world we want and then work to create it" by David Suzuki, posted on January 1st, were words of encouragement to seize the opportunity to be involved. The welcoming aspect of starting from a clean slate with new commitments makes New Year's an important time for environmental initiatives. It is strategic of the organization to motivate climate action by aligning with traditions. To counteract 'single action bias', an important approach to further initial inspiration to commitment is to continue with tiered options for commitment (CRED, 2009). Whether in gradually larger time increments or larger responsibilities for followers to take on, this approach has been attempted by the David Suzuki Foundation.

From initially engaging in a campaign to developing long term commitments, the David Suzuki Foundation uses repetition, particularly repetition regarding the opportunity for an academic fellowship focusing on the realities of climate change and environmental work. This offer inspires commitment for longer term involvement with the Foundation on climate change. While the offer of a fellowship does not directly communicate climate change, it does promote education as a means to further awareness and engagement of others on the topic.

3) Use careful language

Thirty two tweets that used this strategy for communication. While the assessment of this criteria is subjective, most tweets were carefully written with linguistics that matched the images well. In November, the Kinder Morgan campaign was a leading issue for the Foundation's climate change communication. On November 1st, after Ontario approved the $1.3 billion western fracked gas pipeline expansion, they linked an article and captioned the post with "Climate leaders don't approve pipelines" (DavidSuzukiFDN, 2016). After the Kinder Morgan pipeline approval, they tweeted "Our government just approved #KinderMorgan, despite opposition from the community. This isn't climate action" as described on November 29. Another example of this is the quote, "Can we run our society with vastly less fossil fuel? As Obama leaves office, he says "Yes, we can." #climate" (DavidSuzukiFDN, 2016). With the classic political quote, this tweet crafts a message of optimism while opposing the climate impactful fossil fuel industry. While the organization carefully develops opposition to pipelines, it also effectively shows a positive solution as an alternative.

Using positive words such as "enable", "excited", "global best practice", "full potential", and "clean energy", the enthusiasm and optimism needed for sustained public engagement is

conveyed. By using words carefully, the tone can influence the message completely. For example, energy can have a positive or negative light by sharing 'clean' or 'dirty' energy. Along the same lines, the naming the "tar sands" and "oil sands" provides a worse or better framing.

Finally, the use of careful language also means using simple messaging. In Figure 7, the tweet reflects a straightforward and positive message about the opportunities for addressing climate change. This tweet was one of the most liked and retweeted post of the month. First, this beautiful imagery correlates perfectly with a positive textual message and a visually pleasing photo with wind turbines. Of the 53 tweets on climate change by the David Suzuki Foundation, 36% of them (19 tweets) were about renewable energy. This reflects the solution oriented approach by the David Suzuki Foundation.

Figure 7. Renewable energy is emphasized by the David Suzuki Foundation.

4) Share powerful imagery and story

As the most effective of the strategies, the David Suzuki Foundation had 35 out of 53

tweets that shared powerful imagery and stories. Following the strategy of careful language, the

Twitter messages also should align with the imagery. The selection of images coordinates with

positive quotes such as "better, cheaper, greener & more democratic energy choices" on January

5 (DavidSuzukiFDN, 2016). These narratives show the direction the David Suzuki strives for in

tweeting out images that are 'feel good' and combine images with storylines that make an

emotional appeal. In Figure 8 below, the quote effectively describes a sense of urgency to act.

The paired picture shows the dependence of the 'extinction crisis' on our collective action to

"change course" (DavidSuzukiFDN, 2016).

Figure 8. The polar bear is an icon of climate change to show urgency to protect.

The polar bear has been used frequently as a reminder that climate change threatens Canada's charismatic megafauna. While polar bears may seem distant, the concept of anthropogenic, human-caused climate change drives the message about the opportunity for change. In the paper 'Beyond Polar Bear? Re-envisioning climate change', the authors share that the polar bear has become an icon of the climate change movement. This "helps explain why polar bears are now 'the second most popular animal to adopt through the World Wildlife Fund, after orangutans'" (Barton, 2008), but such charitable giving only begs further questions, about why images of polar bears prompt that type of response" (Manzo, 2010, p.2). These icons have the capacity to inspire behaviour change through sharing this effective photo and message.

5) Bust uncertainty with fact

Finally, as previously described, the David Suzuki Foundation ensures that the information shared is backed up by science and preferably peer-reviewed. Through Twitter, however, the postings are typically links to new articles rather than academic papers. There were 11 tweets that used the strategy to bust uncertainty with fact. To address mental models that limit public engagement or encourage denial, it is important to communicate through simple, authoritative facts. In January, both hashtags 'Climate Facts' and 'Science Matters' were trending, thanks to tweets related to scientific information on climate change. Example of these included: "7x increase in tankers and underwater noise with #kindermorgan could be devastating for Pacific herring" posted on January 24 as a #ClimateFact. In addition, on January 19, the Foundation shared that "it's no longer fervent environmentalism driving the transition to clean energy – it's economics" followed by #ScienceMatters to show that environmental work and climate change are as much an economic as an ecological consideration (DavidSuzukiFDN,

2016). This strategy is aimed at translating scientific data into concrete experience clearing away doubts with simple, effectively communicated, authoritative facts.

4.6 Case Study III: Sierra Club

The selected months for analysis of Twitter for the Sierra Club were December 2016 and January 2017. As described in the limitations section 3.5 in Chapter 3, the Sierra Clubs tweets for the full month of November were impossible to retrieve. The Twitter handle is @Sierra_BC, since the selected account for analysis was from the province of British Columbia. In the month of December, there were 186 tweets, yet a low 26 tweets were about climate change issues. In January, there were 65 tweets about climate change out of 206 tweets in this month. Topics unrelated to climate change included tweets about photo contests, species at risk and the Great Bear Rainforest. While these are environmental topics, they do not directly engage the public on climate change. Trending hashtags during these two months addressed the BC Climate Plan and the urgent need to address climate change with #TheFutureisHere. Strategies used to communicate climate change and to encourage climate action were identified using the twelve step checklist. The top strategies used were to 1) bring the issue close to home, 2) use repetition, 3) use careful language, 4) show easy behaviour change, and 5) bust uncertainty with facts. These strategies are discussed below.

1) Bring the issue close to home

The Sierra Club had similar outcomes to those of the David Suzuki Foundation. Out of 91 tweets about climate change, 34 brought the issue close to home. Due to the provincial focus of the Sierra Club BC account, the Twitter postings on the account are not surprisingly targeted

towards British Columbians. A narrower audience creates an opportunity for issues to become

more localized. In British Columbia, the Sierra Club has a particularly active Twitter feed

compared to the national Sierra Club account. The advantage of studying a provincial account is

that the solutions are naturally closer to home. The tweets aimed at sharing possible climate

change solutions identified in the BC Climate Plan were effective. The Sierra Club encourages

shifting away from a fossil-fuel dependency to create a post-carbon economy. The tweet that

"we have to move BC to a sustainable post-carbon economy that includes everyone. Are you

with us? @GreenJobs_BC" mobilizes provincial attention to a specific need. The tweet "What is

a "just transition" to a low-carbon economy?" was repeated three times to ensure that people

were engaged in climate change decision making processes.

2) Use repetition

The best example of repetition by the Sierra Club was with the number of times the

#BCClimatePlan was discussed. Out of 26 Tweets in December, nine were about the BC Climate

Plan. In total, 59 tweets used the strategy of repetition. These tweets used similar formats to the

tweet in Figure 9 below. The two columns of "What We Need" versus "What We Get" are

repeated to emphasize the disconnect between what British Columbians want, yet are not offered

by the BC Government. Through repetition, individuals were influenced to take on new ideas

and opinions relating to the BC Climate Plan.

The January 8 tweet about "2050 way too far" was also mentioned on December 24 and in

the January 15 tweet that stated: "we can't wait until 2050. #BCClimatePlan targets are

unacceptable" (Sierra_BC, 2016). The narrative used by the Sierra Club BC does not stand out as

a storyline, though this campaign effectively draws attention to the BC Climate Plan through the

message and visuals. The wording is effective in using direct comparison between what the province's needs and what the province currently receives. The trending hashtags of the #BCClimatePlan and the #BCClimateFraud create a connection between this repeated advocacy.

Figure 9. The repeated comparison of 'what we need' and 'what we get' with the BCClimatePlan.

3) Use careful language

The use of careful language focusses on creative methods to engage the public through concise and impactful wording. There were 24 tweets out of 91 that used careful wording. The Sierra Club BC has numerous campaigns, from the BC Climate Plan, to the Pull Together initiative against the Kinder Morgan pipeline, to opposing the Site C dam over the month of December and January. Since repetition is often used to spread the word, careful language is essential. An example of quality wording combined with an effective visual was the tweet from

January 29: "fracking, threatened orcas, #oldgrowth logging & #climate change. Is this your vision for BC? Stand up on Feb 14!" The tweet included a photo of broken hearts for the campaigns opposing environmentally destructive industries contributing to climate change. Again, similar to the previous case studies, the climate change hashtag was "TheFutureIsHere". In this case, the hashtag represents a sense of urgency to act now.

4) Show easy behaviour change

The Sierra Club BC did the best of the three case studies at encouraging an easy behaviour change for the audience following the twitter account. A total of 16 tweets were dedicated to this communication strategy, encouraging anyone to get involved through cartoon characters and friendly images of families joining a session on climate change. In a tweet with planet Earth in someone's hands, the message was "Family taking action through Fun for the Future" (Sierra_BC, 2016). In a photo with cartoon heroes, the text shared the opportunity six times to "Learn how your family can fit #ClimateChange" over the two months analyzed. Rather than promoting single action bias, these workshops would help families find solutions that work best for them.

5) Bust uncertainty with fact

Finally, this strategy aims to reduce uncertainty with scientific information that is pertinent to the doubts expressed about climate change. There were 17 tweets that used this strategy. An example of this would be to share statistics or facts that relate to a campaign. The Sierra Club's tweet on January 19 read, "We can't meet the Paris climate goals if Canada continues exploiting the #tarsands" and "Canada is less than 0.5% of the Global Populations, but Canadian Oil could

use up 16% of the Global Carbon Budget #keepitintheground" (Sierra_BC, 2016). At the Sierra Club, the tar sands are undeniably a fossil-fuel emitting and polluting industry to the environment. While climate change deniers have the greatest uncertainty about climate change, clear, bold statements provide confirmation that there should be no doubt.

Chapter 5: Conclusion

This study aimed to understand the psychology of effective public engagement on climate change issues, specifically the barriers to public engagement and communication strategies that might help overcome these barriers. The five barriers that block the climate change message considered in this thesis were distance, doom, dissonance, denial, and identity. The twelve communication strategies to overcome these barriers became a twelve step checklist that was used to identify effective climate change communication from the three case studies. Through quantitative and qualitative analysis, Twitter texts and images were analyzed using the checklist. The top five climate change communication strategies were listed for the three organizations studied: 350.Org, the David Suzuki Foundation and the Sierra Club.

1. 350.Org

For 350.Org, the top strategies used were: encourage group action, direct action requests, tailor the message to the audience, use repetition, and urgency. These methods effectively drew attention to their campaigns during the two months under review, with 298 out of 387 tweets communicating about climate change. 350.Org uses Twitter as a mobilization tool, to gather attention and to amplify their political voice during events. Since 350.Org is not a registered charity, this organization could do direct calls for action and advocacy aimed at politicians.

Group action and repetition with a more adversarial tone were directed at the fossil fuel industry and politicians. 350.Org used more collaborative messages to engage Canadians through tailored messages.

350.Org could benefit from using more powerful imagery and stories. While the photos of group action and direct action were effective in mobilizing audiences, it should consider sharing stronger storylines to contextualize the direct action requests on climate change. The organization also prioritized quantity over quality. The repetition of images and text (totaling 180 tweets using repetition over the two months) offered mass communication but, to increase engagement, it would be helpful if 350.Org offered opportunities for easier behaviour change that enable public engagement. The strategy of direct action to call on changes in government direction is also very effective. Finally, the organization did an excellent job of making use of climate change information specifically tailored to the Canadian context.

2. David Suzuki Foundation (DSF)

The David Suzuki Foundation's top strategies were: bring the issue close to home, inspire commitment, use careful language, powerful imagery and story, and bust uncertainty with facts. This organization addresses a diversity of environmental issues, including climate change. While under half of the tweets communicated about climate change (55 out of 171), the content was effectively communicated through thoughtful text and captivating imagery. The David Suzuki Foundation frames its communications as solutions oriented by finding campaigns that localize the issue and encourage commitments relevant to a current issue (such as a natural disaster or international event). The messaging is communicated in a hopeful and positive frame to motivate public engagement. The David Suzuki Foundation's lack of political voice, possibly due to

concerns related to the Canadian Revenue Agency, could be a reason for its limited direct action requests. These would help to show that the organization is active and demands urgent action. In addition, the David Suzuki Foundation focuses on individual commitments and news sharing rather than mobilizing groups. The sense of urgency of climate change was not as present in the organization's text. In local campaigns like 'Flood the Room' in Toronto, there is great opportunity for the strategy of urgency to be communicated.

3. Sierra Club

The Sierra Club communicated climate change using these strategies: bring the issue close to come, use repetition, use careful language, show easy behaviour change, and bust uncertainty with facts. These strategies are similar to those of the David Suzuki Foundation, with its careful wording and effective imagery. Out of 578 Sierra Club tweets, there were only 91 on climate change. This environmental organization tweeted about a range of other topics, yet climate change was one of many priorities. The particularly effective communication method was to encourage easy behaviour change. Through accessible, family-friendly cartoon imagery, the organization invited families to join learning sessions about climate change. While education is an important component of engagement, the Sierra Club should consider follow-ups that offer pathways to further involvement. The Sierra Club could benefit from using the communication strategies that inspire people to commitment and to engage in group or direct actions. This way, the organization can further connect with their audience long term.

In summary, the three case studies have shown examples of effective climate change communication using the strategies listed above and they have also shown room for

improvement. While this study was limited to Twitter's narrowed audience, it would be useful to broaden the analytical approach to other methods of communication over a larger sample size of months and more organizations engaged in climate change communication. More research is needed on the effect of climate change communication on public engagement to deepen this study. The psychology of public engagement should be considered by non-profit organizations, as well as all climate change communicators.

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