PERCEPTIONS OF GLOBAL ENVIRONMENTAL CHANGE AND HEALTH

KNOWLEDGE, ATTITUDES AND PRACTICES OF GLOBAL ENVIRONMENTAL CHANGE AND HEALTH: TOWARD SUSTAINABLE BEHAVIOUR CHANGE?

By

FRANCESCA CARDWELL, B. Arts Sc (Hons)

A Thesis

Submitted to the School of Graduate Studies

In Partial Fulfillment of the Requirements

For the Degree

Master of Arts

McMaster University

MASTER OF ARTS (2011) McMaster University
(Geography) Hamilton, Ontario

TITLE: Knowledge, Attitudes and Practices of Global Environmental Change and Health: Toward Sustainable Behaviour Change?

AUTHOR: Francesca Cardwell, B. Arts Sc (Hons) (McMaster University)

SUPERVISOR: Dr. Susan J. Elliott

NUMBER OF PAGES: viii, 131

ABSTRACT

Environmental sustainability is increasingly threatened by large-scale changes to the natural environment that could significantly affect human and ecosystem health. In addition, changes to the social, political, economic and physical environment will impact populations globally. Sustainable behaviour change is needed to reduce greenhouse gas emissions, mitigate related impacts, and develop the capacity to adapt to future climate and environmental changes. Towards these ends, it is necessary to understand how members of the public perceive and behave in relation to global environmental change. This research begins to explore the knowledge, attitudes and practices of Canadians related to global environmental change and health. In particular, this thesis focuses on results from qualitative, semi-structured in-depth interviews (n=22) with adults (18+) in the Golden Horseshoe region of Southern Ontario. Participants were asked about individual and community health, knowledge and attitudes of global environmental change, actions taken to mitigate environmental change, and potential behaviour change mechanisms. Results indicate that although participants are environmentally aware and concerned about local environmental issues (eg. air pollution), detailed knowledge of specific causes, impacts and risks of climate change and global warming is limited. While the majority of respondents expressed concern about global environmental change, there was also skepticism around the causes and impacts in the Golden Horseshoe Region. Participants demonstrated a willingness to act in environmentally friendly ways, and

respondents described possible environmentally-friendly activities such as recycling and reducing energy consumption. Decreasing cost, and increasing time, convenience, and enjoyment were described as incentives to undertake behaviour change. The main contribution of this thesis is the advancement of knowledge related to the public perception of climate change, global warming, and global environmental change as important emerging environmental health risks. Results are discussed relative to policy implications and directions for future research.

ACKNOWLEDGEMENTS

This thesis would not have been possible without the ongoing support and encouragement of a number of people. Most importantly, I would like to thank my supervisor, Dr. Susan J. Elliott, for all of her continued encouragement and guidance during the last two years. Susan, I greatly appreciate all of your input, invaluable knowledge, and support.

In addition, I would like to thank all of the participants that agreed to take part in the study. I would also like to acknowledge the financial support of the Social Sciences and Humanities Research Council of Canada, which allowed me to further my academic and professional development.

I would like to thank all of my friends for the encouragement and cooperation throughout the last two years. In particular, I have been extremely lucky to not only have supportive and knowledgeable colleagues in BSB-339, but great friends as well. I wish you all so much success and hope our paths continue to cross in the future. Bonnie, I look forward to our coming adventure together! Finally, thank you to my parents, Marilyn and Harry, and Tom for the endless support, generosity, insights, and love.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Research Problem

Environmental sustainability is increasingly threatened by large-scale changes to the natural environment. Human behaviour is disrupting natural ecological processes and depleting natural resources worldwide, causing potentially irreversible global environmental changes that could significantly affect human and ecosystem health (Myers & Patz, 2009; McMichael, Nyong & Corvalan, 2008).

Climate change is one of the most threatening global environmental changes of the century (Costello, et al., 2009). The Intergovernmental Panel on Climate Change (IPCC) defines climate change as:

> "a change in the state of the climate that can be identified … by changes in the mean and/or variability of its properties, and that persists for an extended period, typically decades or longer" (IPCC, 2007, 30).

Although the Earth's climate varies naturally, the IPCC states that there is evidence for human activities being responsible for global warming (Costello, et al, 2009; IPCC, 2007) as anthropogenic greenhouse gas emissions increased by 70% between 1970 and 2004 (IPCC, 2007). This increase in greenhouse gas concentration has already significantly influenced climate (Costello, et al., 2009). Future climate change projections include changing surface temperatures, precipitation changes, sea-level rise, and changes in the frequency and magnitude of extreme weather events (such as heat waves) (Solomon, et al., 2007).

The IPCC believes that the health of millions of people worldwide could be affected by the impacts of climate change (IPCC, 2007). Adverse health effects will include changes in the geographic range and transmission rates of vector and rodent-borne disease, malnutrition and food insecurity, air pollution and temperature stress, reduced potable water for drinking and sanitation, inadequate shelter, and psychosocial impacts like anxiety and depression following extreme weather events or natural disasters (Myers & Patz, 2009). Additionally, current social, economic and health inequalities will be exacerbated as those least responsible for climate change and with the lowest adaptive capacities will be amongst the most severely affected (Costello, et al., 2009).

1.2 Research Context

Research supports the notion that much global environmental change has anthropogenic causes (IPCC, 2007). Policy makers play a significant role in addressing environmental change. Public policy must be developed to reduce greenhouse gas emissions and adapt to the potential risks of environmental changes. Behaviour change strategies that are consistent with the public's awareness and understanding of global environmental change are therefore necessary in order for sustainable policy to be developed (Plotnikoff, et al., 2004).

In addition, although government interventions play a significant role in greenhouse gas reduction, voluntary behaviour change is also important (Semenza, et al., 2008). Voluntary reduction of energy consumption depends on awareness and acceptance of the existence of global environmental changes like climate change and global

warming. Without understanding and acceptance, public willingness to act and engage in voluntary behaviour change will be reduced (Semenza, et al., 2008).

In the Canadian context, understanding knowledge, attitudes and practices is important for two reasons. The first is the influence of public opinion on political, social and economic action. The public's support or opposition could affect the success of Canadian governmental or industrial policy to mitigate greenhouse gas emissions (Leiserowitz, 2005). Governments must convince citizens that the problem requires behaviour change, otherwise policy will be constrained by a lack of understanding, awareness and concern. If population and expert opinions correspond, policy change will likely be sustainable, while government policy may be ineffective if populations are skeptical or not accepting of the problem (Pietsch & McAllister, 2010).

Secondly, Canada has the second highest carbon dioxide (CO_2) emissions per capita in the world, with one third of Canadian greenhouse gas emissions from daily activities like consumer choices, transportation and choices in the home (Plotnikoff, Wright & Karunami, 2004). Understanding how the Canadian population perceives and values these behaviours is therefore essential, as the public's role in decreasing Canadian energy consumption will be critical on a global scale.

1.3 Research Objectives

In order to achieve sustainable behaviour change in Canada, it is necessary to understand how the Canadian public currently perceive and behave in relation to global environmental change. First, qualitative exploration of a smaller region will take place in

order to determine possible perceptions of the Canadian public. This research aims to answer the question "what are the knowledge, attitudes and practices of adults (18+) in the Golden Horseshoe region of Southern Ontario with respect to global environmental change and health?" This research will address three specific objectives:

1. to understand knowledge and attitudes of Canadians regarding global environmental change;
2. to document actions taken by Canadians to mitigate global environmental change; and
3. to investigate potential behaviour change mechanisms.

1.4 Research Contributions

Contributions of this study are substantive, theoretical and methodological in nature. Substantively, there is currently limited research that concentrates on understanding perceptions of global environmental change in Canada. Academic studies that have been conducted (Plotnikoff, Wright & Karunam, 2004; Stedman, 2004) have focused on perceptions in Alberta. The lack of research on perceptions of global environmental change in Ontario or at a national level highlights the significant literature gap this research aims to fill.

Theoretically, the social constructionist framework used often within health geography informs this research. A social constructionist approach concentrates on understanding the meaning of a social construct and the societal influences involved in developing meanings to an individual or population (Gatrell & Elliott, 2009). This research will apply a social constructionist framework to examine perceptions of global

environmental change in Canada, contributing to the existing health geography literature using this approach.

The final contribution of this research is methodological in nature. The majority of research on public perceptions of climate change has been quantitative, while only a limited number of studies have used mixed-methods *(*Bulkeley, 2000; Harrington, 2001; Henderson-Sellers, 1990; Lorenzoni & Hulme, 2009; Whitmarsh, 2008 a & b). As the results of this study will be used as a base for further quantitative exploration, this research will add to the health geography literature that uses qualitative and mixed-methods approaches.

1.5 Chapter Outline

This thesis is organized into five chapters. Chapter two reviews the relevant theoretical, methodological and substantive literature that guides the research. The third chapter outlines the research locale, design and methodology used. This includes a profile of the communities included in the research, and the methods involved in the recruitment, in-depth interviews and analysis. Chapter four presents the results of the qualitative data collection. The results are organized to address the three research objectives. The final chapter includes a summary of the main findings in the context of previous literature. In addition, methodological, theoretical, and substantive contributions are discussed. The thesis will conclude with a discussion of the limitations, and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The effects of human activities are evident in observable changes to the functioning of ecosystems, earth's oceans, atmosphere, freshwater systems, and land surfaces. These environmental changes include freshwater shortages, climate change, biodiversity loss, exhaustion of fisheries (McMichael, Nyong & Corvalan, 2008), land-use change, and altered ecosystem services (Myers & Patz, 2009). More specifically, human activity is responsible for global environmental change including the use of approximately half of the earth's accessible surface freshwater, the conversion of 40% of the planet's land surface to cropland, a net loss of 7-11 million km^2 of forest due to deforestation, the overfishing of three-quarters of our monitored fisheries, and the unsustainable construction of over 45,000 large dams that have changed the natural flows of 60% of the earth's rivers. These and other changes have resulted in species extinction rates increasing by 1000 times the natural rate (Myers & Patz, 2009).

Climate change is one of the most dangerous global environmental changes, and the Intergovernmental Panel on Climate Change (IPCC) believes that it could affect the health of millions of people worldwide (IPCC, 2007). Adverse health effects will range from changes in the geographic range and transmission rates of rodent and vector-borne

disease, food insecurity and malnutrition, reduced potable water for drinking and sanitation, insufficient shelter, psychosocial impacts following extreme weather or natural disasters, and air pollution and temperature stress, (Myers & Patz, 2009).

In Canada, changes in temperature, precipitation and extreme weather events are projected, although there will be a significantly uneven distribution of the effects of these changes due to adaptive capacity and geographic variability (Field, et al., 2007). Most notably, freshwater will be impacted as climate change will affect water quality, species may become at risk from temperature and precipitation changes, agricultural yields could vary regionally, forestry could become more sensitive to disturbances like diseases, invasive species, and wildfires, while heatwaves, air pollution and an increasing geographic range of Lyme disease are anticipated to cause adverse health effects (Field, et al., 2007). These changes demonstrate that the possible adverse impacts of climate change are not only limited to other regions worldwide, but will be experienced locally as well.

The following chapter begins with a description of the transition from medical to health geography, followed by an examination of the theoretical concepts in the geography of health. Next, research that uses a knowledge, attitudes and practices (KAP) approach will be examined. This is followed by a discussion of previous research that has used a KAP approach, with particular interest in perceptions of environmental change and health. Methodological approaches that have been used in this past research will also be outlined.

2.2 The Geography of Health

Medical geography, as a subdiscipline of human geography, has seen significant change throughout the past decades (Kearns & Moon, 2002; Kearns, 1995). In Canada, this subdiscipline dates back to the early 1970s (Luginaah, 2009), when medical geographers focused on two individual streams of research (Luginaah, 2009; Kearns, 1995). These two traditions in medical geography consisted of disease ecology (the spatial distribution of disease) and health care provision, planning, accessibility and utilization (Kearns, 1995; Luginaah, 2009). As medical geography moved into the 1990s, the differences between the individual streams of research became less exaggerated, and there was a growing overlap between them (Kearns & Moon, 2002). This shrinking dichotomy was influenced by the increasing presence of postmodernism and social theory and thought in the field began to recognize the concept of difference. Traditional medical geography was already concerned with difference in health outcomes and service opportunities, but the influence of postmodernism led to an increased recognition of difference in class, race, sexuality, gender, and health-related beliefs (Kearns, 1995).

With increased concern of the broader social models of health, the traditional twin streams of medical geography were complemented with contemporary concerns (Kearns & Moon, 2002). This transition was evident in key publications (Kearns, 1993) and observations from major conferences, providing the foundation for the creation of the journal *Health and Place* in 1995 (Kearns & Moon, 2002). *Health and Place* incorporated another theme in the changing field of medical geography; place. The lack of recognition of the importance of place was a criticism of earlier medical geography

(Luginaah, 2009), so issues of place in health and health care began to gain recognition (Kearns & Moon, 2002).

The shifting of medical geography to a more holistic view of health led to the renaming of the field to the geography of health and health care in 1993 (Kearns & Moon, 2002). The main themes of the new health geography included the construction of place, sociocultural theory, and a critical geography of health (Kearns & Moon, 2002). Health geography not only included the multiple determinants of health, but the roles of environmental, political, economic, social, biological, and individual factors that interact to shape health (Elliott, 1999a). For this research, the combination of interacting factors that influence health is particularly important. Understanding what people perceive to be the social, environmental, and individual aspects of health will be necessary in recognizing how the public in the Golden Horseshoe region of Ontario understand and behave in relation to environmental change and health.

In Canada, health geography now covers themes including population health, disability studies, health inequalities, health and social conditions, social construction, mental health, women's health, psychosocial health, environmental exposure, chronic diseases, environmental justice, emerging epidemics, housing and health, and ageing and health (Luginaah, 2009). Although health geography uses theoretical perspectives including positivism, structuralism, structurationism, and post-structuralism (Gatrell & Elliott, 2009), social constructionism in health geography is of particular importance for this research as it will be used as a theoretical lens through which to explore public perceptions of environmental change and health.

2.3 Theoretical Context

2.3.1 Social Constructionism

Social constructionism (or social interactionism) in health geography is concerned with the interactions, conversations, and encounters in which people engage in their daily lives (Gatrell & Elliott, 2009). This theory explores the public's engagement in the construction of knowledge, society, and the everyday world through processes of social interaction (Bickerstaff & Walker, 2003). Ordinary knowledge, behaviours, and perceptions are held with as much value as the opinions of health professionals and policy makers. The role of the researcher, therefore, is to see things from the participant's point of view, explore the subjective experiences of health, and to understand and interpret the meanings that make certain behaviours and opinions acceptable (Gatrell & Elliott, 2009).

Studies that use social constructionism in health geography cover a range of contemporary issues. For example, Balfe, et al. (2010) explore the perceptions of young Irish women and their behaviours and attitudes related to Chlamydia-screening services. Ritchie et al. (2010) investigate the social and cultural contexts of smoking behaviour following changes to smoking legislation in Scotland. Other research that uses social constructionism as a theoretical context includes Berman, et al.'s examination of experiences of war-related violence of refugee women in Canada (2006), and Richmond & Ross' exploration of the determinants of health and cultural identity in First Nation and Inuit populations in Canada (2009).

2.3.2 Social Construction of the Environment

Health is not the only concept that can be constructed socially (Litva & Eyles, 1995). For this research, reviewing how the environment is socially constructed is valuable. Social constructionism posits that the environment and nature are constructed through social interaction and social processes that occur in everyday life (Bickerstaff & Walker, 2003). For example, Bickerstaff and Walker (2003) explore public understandings of air pollution. Ontologically, they accept that air pollution objectively exists, but they believe that how it is publically understood is socially influenced. For example, the term 'pollution' is not defined in a single way across different societies and cultures, and can have context-dependent meanings related to how it is experienced. Bickerstaff and Walker find that how people understand air pollution is influenced by their everyday experiences and how they sense it spatially, temporally and socially (Bickerstaff & Walker, 2003). Environmental issues, therefore, could have varying meanings reflecting different cultures, values, and beliefs (Greider & Garkovich, 1994). For policy making, this is particularly important as the management of environmental risks is determined by how individual experiences influence perceptions of the environment and how those perceptions are linkedto individual and community value systems (Litva & Eyles, 1995).

Study of environmental issues using social constructionism has been criticized for denying the existence of environmental problems, and failing to assess their causes, consequences, and management. Critics say that social constructionists do not acknowledge the reality of the environment or environmental issues that objectively exist

independent of their social construction, and consequently do not care about environmental concerns. In opposition, proponents state that this view is only held in an extreme form of radical constructionism, which is used far less frequently. In addition, social constructionists recognize that nature *and* societal interests, values and conflicts intersect to shape reality (Burningham & Cooper 1999).

The media's role in the social construction of environmental issues has been recognized in previous research (Dispensa & Brulle, 2003; Kalof, 1997/1998). Although scientists recognized global warming as a potential problem in 1896, it was not until the mid-1990s that it became a well-recognized issue in the United States (Dispensa & Brulle, 2003). Although the media plays a crucial part in communicating the issue with the public (Kalof, 1997/1998), its role in effective communication of accurate information is questioned (Dispensa & Brulle, 2003). For example, although some believe that the media fosters public opinion and political action, it is also considered a source of apathy and skepticism (Kalof, 1997/1998). In an American context, it has been demonstrated the US media provides citizens with sensationalized information, whereas other national media (specifically New Zealand and Finland) portray similar information to that found in scientific journals (Dispensa & Brulle, 2003). In addition, different media sources can communicate information that can influence public opinion in varying ways. Kalof (1997/1998) found that newspapers encourage environmental awareness and concern, whereas television viewing discouraged environmentally responsible behaviour.

2.4 Knowledge, Attitudes and Practices

To effectively achieve sustainable behaviour change it is necessary to understand how the Canadian public values, perceives, and behaves in relation to environmental change. It is for this reason that a KAP (knowledge, attitudes, and practices) approach is particularly useful for this research.

KAP research approaches are used to understand what people know, believe and do related to a specific topic (WHO, 2008). In health research, this is particularly valuable as understanding the knowledge, attitudes, and practices of a community can provide data on how to improve quality and accessibility of services, current health and cultural practices (like seeking medical attention), and opinions of a particular health outcome (WHO, 2008). Understanding these issues is particularly important when making policy decisions that will be sustainable, appropriate, and accessible to the community. For example, Jaffer et al.'s (2006) research on the knowledge, attitudes and practices of students' perceptions of reproductive health in Oman demonstrated that understanding what is culturally appropriate in a community is necessary in order to understand behaviour and identify vulnerable individuals. In this particular case, 80% of both males and females surveyed approved of female genital cutting. This knowledge will help the researchers target marginalized groups and attempt to implement strategies through appropriate education, communication programs, and stakeholder participation (Jaffer et al., 2006).

KAP studies have been useful in health research in the past. They have spanned a number of health issues, such as public perceptions of HIV/AIDS (Al-Owaish et al.,

1995; Tehrani & Malek-Afzali, 2008), complementary and alternative medicine (Al Shaar, et al., 2010), reproductive health (Jaffer et al., 2006; Roudsari et al. 2006), infectious diseases (Minung'hi et al., 2010; Yap et al. 2010), allergies (Gupta et al., 2010), cigarette smoking (Chisolm, et al., 2010), and the environment (Esa, 2010; Stedman, 2004; Carlsen, Getz & Ali-Knight, 2001). Research using this approach has helped gain a deeper understanding of key health issues in both the developed and developing world. KAP studies can also target various populations, including the lay population (Al-Owaish, et al., 1995; Minungi'hi et al., 2010), health care professionals (Al Shaar et al., 2010; Chisolm et al., 2010) marginalized groups (Tehrani & Marlek-Afzali, 2008; Roudsari et al., 2006), adolescents (Tehrani & Marlek-Afzali, 2008; Jaffer et al., 2006), children (Ajiboye & Silo, 2008), teachers (Esa, 2010), parents (Gupta et al., 2010), healthcare patients (Chisolm, et al., 2010), and members of the military (Yap et al., 2010).

2.4.1 KAP and Environmental Change

KAP research related to environmental change is valuable in both developing (Yap et al., 2010; Roudsari, et al., 2006; Jaffer et al., 2006) and developed countries (Dishman et al., 2010; Gupta et al., 2010; Chisolm, et al., 2010). For example, Esa (2010) examines the environmental perceptions of aspiring teachers in Malaysia. Sustainable development is being integrated into the Malaysian education system, and teachers' behaviours and attitudes will impact the success of new teaching initiatives. Esa found that overall the teachers had sufficient knowledge about the environment and the

depletion of natural resources as well as positive attitudes toward the environment. They also demonstrated average behaviours (such as reducing energy consumption) related to the environment (2010). In addition, Carlsen, et al. (2001) used a KAP approach to determine the environmental goals and sustainable management and conservation practices of 198 family tourism and hospitality businesses in Western Australia.

For this research, KAP studies in developed countries are of particular value. In developed countries, there is a gap in the literature related to knowledge, attitudes and practices and the environment. Although there are studies that discuss public perceptions of environmental change (Harrington, 2001; Leiserowitz, 2005; O'Connor, Bord & Fisher, 1999; O'Connor, Bord, Yarnal & Wiefek, 2002; Palutikof, Wright & Karunam, 2004; Slimak & Dietz, 2006; Whitmarsh, 2008), they are not designed as KAP research.

Stedman's (2004) work, however, quantitatively assessed the knowledge, attitudes and practices of 356 key informants in the agriculture, forestry and water policy industries in the Prairie Provinces of Canada. Stedman found that 57.8% of participants believed climate change was a problem, but when ranked against other environmental issues was not a top priority (2004). Although this work was conducted with key informants in Canada, to date there have been no environmental KAP studies that target the lay public in a national or provincial context.

2.4.2 Methodological Approaches in KAP Research

KAP research can be approached using both qualitative and quantitative methods (WHO, 2008). Although quantitative methods are often used in KAP research because of

their generalizability, this study is particularly interested in KAP research that uses a qualitative approach. Qualitative research is explorative in nature, and although not generalizable, gains in-depth knowledge of the perceptions, stories, opinions and beliefs of the participants. Qualitative methods allow for richer accounts of the issue so researchers gain a comprehensive understanding that may not be explicit in quantitative data (Winchester & Rofe, 2010).

KAP research that uses quantitative methods uses surveys for data collection (Yap, et al., 2010; Chisolm et al., 2010, Esa, 2010; Minung'hi et al., 2010; Tehrani & Malek-Afzali, 2008; Jaffer, et al., 2006), administered by mail (Al Shaar, et al., 2010), online (Gupta, et al., 2010; Steman, 2004), or in person by the researcher (Roudsari et al., 2006; Dishman, et al., 2010). KAP studies that employ qualitative methods most often use focus groups (Kruger & Gericke, 2003) and interviews (Lock et al., 2002). Mubyazi et al.'s (2005) research on the knowledge, attitudes and practices of health managers, service providers and pregnant women in Tanzania examines their perceptions of preventive treatment of malaria services during pregnancy. This study uses multiple qualitative methods (in-depth interviews and focus groups) to gain a broader understanding of the participants' perceptions individually, and in a more comfortable setting.

2.5 Past Research on Public Perceptions of Environmental Change

Although the majority of previous research on perceptions of environmental change and health are not specifically KAP studies, the scope of the literature overlaps

with certain areas of knowledge, attitudes and practices research. The following will explore the substantive results of the past research on the knowledge, attitudes and practices of people in developed countries related to global environmental change and health.

Past research that assesses public perceptions of environmental change and health ranges in date throughout the last 20 years, although the majority of the research has been conducted in the latter half of this 20-year period. The majority of this research has been conducted in the United States (Plotnikoff, Wright & Karunam, 2004; Kellstedt, Zahran & Vedlitz, 2008; Leiserowitz 2005 & 2006; O'Connor, Bord & Fisher, 1999; Slimak & Dietz, 2006), while studies in Europe have also been pursued (specifically the UK, Sweden and Norway [Palutikof, Wright & Karunam, 2004; Whitmarsh, 2008 a & b; Norgaard, 2006; Jaeger, et al., 1993]). There is a significant gap in the literature in Canada, with only two studies conducted specifically in this country. Both of these were located in the Prairie Provinces (Plotnikoff, Wright & Karunam, 2004; Stedman, 2004), while two other studies have included Canadian data in research on a global scale (Dunlap, 1998; Sandvik, 2008). This literature gap is not exclusive to Canada, indicating a need for more risk perception research on global environmental change, particularly as the effects of environmental changes like climate change become more pronounced worldwide.

2.5.1 Key Themes

A significant number of recurring themes were identified throughout the literature. These have been divided into three categories: knowledge, attitudes, and practices.

2.5.1.1 Knowledge

Awareness of climate change was high and ranged between 88-92%. Stamm, Clark & Eblacas (2000) observed an 88% level of awareness in Seattle, while Jaeger, et al. (1993), Semenza et al. (2008), and Leiserowitz (2005; 2006) recorded awareness rates of 91%, 92% and 92%, respectively, in both Europe and the USA. In England, only 2.9% of participants had never heard of climate change (Whitmarsh, 2008; 2009).

Despite this high level of awareness, understanding of the causes and impacts of climate change was significantly lower. In Dunlap's (1998) comparison of six nations' perceptions of climate change, few people responded that they understood the issue 'very well', while Plotnikoff, Wright & Karunam (2004) recognize that although Albertans show high levels of concern related to the environment (particularly related to health and air pollution), they are only moderately informed about such issues.

This lack of understanding of the basic concepts of climate change is evident in participant knowledge. For example, Jaeger, et al. (1993) observed that when asked to identify the main contributing greenhouse gas, only 28% of participants could identify carbon dioxide (CO2), while the other 72% stated they did not know or identified another gas.

A lack of knowledge is further demonstrated in a series of common misconceptions. A frequently stated misconception is the relationship between global warming and ozone depletion, with the understanding that the ozone layer ensures heat stays outside of the Earth's atmosphere (Henry, 2000). There are various interpretations of this concept throughout the literature (Dunlap, 1998; Henderson-Sellers, 1990; Henry, 2000; Slimak & Dietz, 2006; Stamm, Clark & Eblacas, 2000; Whitmarsh, 2008; 2009).

This misconception was also related to understanding both the causes and possible solutions to climate change. For example, Stamm, Clark & Eblacas (2000) observed that 43.8% of their participants in Seattle, Washington viewed chlorofluorocarbons (CFCs) as important in causing global warming. Additionally, 44.6% of participants considered reducing the use of aerosol spray cans as a 'very helpful' mitigative behaviour, despite the prohibition of CFCs in aerosol sprays in 1978 (Stamm, Clark & Eblacas, 2000). Although there are other greenhouse gases in spray cans, they are much less potent compared with carbon dioxide and methane, so this mitigative action would be much less effective than other behaviours like reducing home energy use.

2.5.1.2 Attitudes

Overall, participants expressed some concern at the prospect of climate change; ninety percent and 82% of survey respondents in both Portland and Houston, respectively, demonstrated concern (Semenza, et al., 2008 a & b), while Leiserowitz (2005; 2006) observed that Americans perceived climate change to be a moderate risk. This concern is not limited to the USA, as in the UK Palutikof, Agnew, & Hoar (2004)

observed that most of their participants from Southern England and Scotland were worried about global warming. Participants in Australia were also concerned about a possible decrease in quality of life due to environmental change (Henderson-Sellers, 1990). Concern about climate change was only limited in Harrington's (2001) examination of key informant perceptions in Kansas, USA.

Despite the fact that climate change is seen as a concern, when compared with other environmental risks like water pollution, it is not a priority (Dunlap, 1998). When ranked against 23 other environmental issues in a national survey in the USA, the public ranked global warming as tenth on their list of priorities, whereas risk assessors and managers ranked it as third and first, respectively. Global warming was ranked against other risks including invasive species, commercial fishing, oil extraction, acid rain, ozone depletion, human population growth, hazardous wastes, radiation, pesticides and sewage (Slimak & Dietz, 2006).

Another attitude commonly expressed is that climate change is not perceived as a direct risk within the context of participants' daily lives (Norgaard, 2006; Whitmarsh 2008; 2009; Leiserowitz, 2005; 2006; Harrington, 2001; Stamm, Clark & Eblacas, 2000; Henderson-Sellers, 1990; Dunlap, 1998; Lorenzoni & Hulme, 2009; Slimak & Dietz, 2006). Although participants recognize climate change as a threat, it is an abstract concept (Norgaard, 2006) that is seen as distant and to be acted upon when they perceive it to be directly relevant to their lives (Lorenzoni & Hulme, 2009).

When asked about possible impacts, participants tended to identify generic issues that could affect all life (like plant and animal extinction), rather than impacts to their

specific community (Dunlap, 1998; Stamm, Clark & Eblacas, 2000; Whitmarsh, 2008; 2009). This is consistent with the belief that impacts will be temporally and spatially distant, as expressed by participants in America (Leiserowitz, 2005; 2006), and by Australian participants who perceived the likelihood of deaths due to the impacts of the greenhouse effect as smaller at home than overseas (Henderson-Sellers, 1990).

2.5.1.3 Terminology

In the public domain, it is often assumed that the terms global warming and climate change refer to the same phenomenon (Whitmarsh, 2009; Schuldt, et al., 2011). Despite differences in their meanings, the media and public often use the terms interchangeably (Schuldt, et al., 2011). The term climate change refers to all impacts of what is commonly called the greenhouse gas effect, while global warming concentrates solely on the heating of the atmosphere (Whitmarsh, 2009). Inconsistency in how the terms are used has the potential to act as a significant barrier to environmentally friendly behaviour change. If varying vocabulary holds differing connotations with the public, terminology choice could affect levels of skepticism and concern within the population. As effective climate change mitigation relies on acceptance of global warming, climate change or global environmental change, reducing public concern because of terminology choice has significant implications for policy makers (Whitmarsh, 2009).

Research findings from the UK indicate the public often associates the term global warming with heat-related impacts, human causes, ozone depletion, and the greenhouse effect, while climate change is more often recognized as a range of impacts with natural causes. Participants stated that they heard more about global warming than

climate change, and global warming evoked concern in more participants than climate change (Whitmarsh, 2009). Akerlof & Maibach (2011) explain how political consultant to the American Republican party, Frank Luntz, suggested they use the term climate change instead of global warming because of its ability to invoke less fear and emotion in the public. Schuldt, et al. (2011), however, found that global warming is more often used within conservative groups, while liberals use climate change more often. In addition, Schuldt et al. found using a survey with two different wording conditions that belief in global warming was significantly lower than belief in climate change as global warming is more easily discredited by a cold spell. These results indicate that global warming is more favourable for those reluctant to implement climate change policy (Schuldt et al., 2011). Overall, the term climate change has been discussed in the literature as superior for promoting public engagement, as it is seen as less politically polarizing (Akerlof & Maibach, 2011).

2.5.1.4 Practices

Findings from North America, Europe and Australia demonstrate that people already act in environmentally beneficial ways (Palutikof, Agnew & Hoar, 2004; Lorenzoni & Hulme, 2009; Plotnikoff, Wright & Karunam, 2004; Semenza et al., 2008; Bulkeley, 2000). Current behaviours include recycling, walking and cycling (Palutikof, Agnew & Hoar, 2004; Lorenzoni & Hulme, 2009). Another common environmental-enhancing behaviour is reducing home energy use, seen in 63% and 47% of participants aware of climate change in Portland and Houston, respectively (Semenza et al, 2008).

This was also observed in Newcastle, Australia where 21% of participants reported having reduced their home-energy use over the last five years (Bulkeley, 2000).

Participants also expressed a general willingness to act in environmentally beneficial ways in the future. Ninety percent of a sample of Americans that had heard of global warming believed that the US government should do something to address greenhouse gas emissions (Leiserowitz, 2005; 2006), while 79.5% of Australian participants believed something should be done to address climate change (Bulkeley, 2000). Personal behaviour change is less supported, however, only 51% of Australian participants felt they could act to address climate change, while 21% were unable to think of anything they could do (Bulkeley, 2000).

Behaviour change that is most supported provides financial benefits (O'Connor, Bord, Yarnal & Wiefek, 2002; Harrington, 2001), like using energy-efficient appliances to reduce the electricity bill. Forty to 60% of participants in Pennsylvania were willing to consider voluntary action based on this condition (O'Connor, Bord, Yarnal & Wiefek, 2002). Support for behaviour change reduces when it becomes more difficult or costly (O'Connor, Bord, Yarnal & Wiefek, 2002). Actions that threaten lifestyle or take up personal time (like carpooling or using public transport) or that could have economic costs are not widely supported (Fortner, et al., 2000; O'Connor, Bord, Yarnal & Wiefek, 2002).

2.5.2 Methods in Past Research

Past research on public perceptions of environmental change and health has used a mix of qualitative (Henry, 2000; Norgaard, 2006), quantitative (Harrington, 2001;

Leiserowitz, 2005; O'Connor, Bord & Fisher, 1999; O'Connor, Bord, Yarnal & Wiefek, 2002; Palutikof, Wright & Karunam, 2004; Slimak & Dietz, 2006; Whitmarsh, 2008), and mixed-methods (Bulkeley, 2000; Harrington, 2001; Henderson-Sellers, 1990; Lorenzoni & Hulme, 2009; Whitmarsh, 2008 a & b).

Quantitative methods have been used in the majority of previous research, relying on self-administered online surveys (Sandvik, 2008; Stedman, 2004; Viscusi & Zeckhamuser, 2006), self-administered mail questionnaires (Harrington, 2001; Leiserowitz, 2005; O'Connor, Bord & Fisher, 1999; O'Connor, Bord, Yarnal & Wiefek, 2002; Palutikof, Wright & Karunam, 2004; Slimak & Dietz, 2006; Whitmarsh, 2008), telephone questionnaires (Fortner et al., 2000; Hamilton & Keim, 2009; Kellstedt, Zahran & Vedlitz, 2008; Plotnikoff, Wright & Karunam, 2004; Semenza, et al., 2008; Stamm, Clark, Eblacas, 2000), and interviewer-administered questionnaires (Dunlap, 1998). While quantitative studies are useful for gaining a general knowledge of public perceptions on a large scale, they are constrained when assessing in-depth understanding of a specific community or region. For example, Bord, et al. (1998) collected a comprehensive database of the American public's perceptions about global warming and climate change. Mail questionnaires from a random sample of 1,225 adults from the 48 contiguous states were completed. When responding, participants believed the survey was on public priorities for issues affecting their communities (including crime, chemical waste, AIDS, air pollution, cancer, global warming, heart disease, water pollution, and automobile accidents), responding to questions about goals and threat perceptions, climate change, social and political values, and demographics (1998).

The qualitative research (including the qualitative sections of the mixed-methods research) was conducted using focus groups (Bulkeley, 2000; Lorenzoni & Hulme, 2009), face-to-face interviews (Harrington, 2001; Henderson-Sellers, 1990; Norgaard, 2006; Whitmarsh, 2008 a & b), participant observation (Norgaard, 2006) and observations of comments, questions and narrative (Henry, 2000). Observations of comments and narrative refers to the researcher working at an exhibition on global warming at the Smithsonian Institute in Washington, DC and recording daily notes on the comments and questions made by visitors, and the narrative in which he engaged during their visits (Henry, 2000). Qualitative research is particularly useful when the researcher is interested in a deep, contextual understanding of public awareness, attitudes, and behaviours. Norgaard (2006) conducted effective qualitative research in a rural community in western Norway using in-depth interviews. Norgaard's objective was to gain an understanding of the relationship between their thinking in daily life in relation to their opinions on climate change. Interestingly, Norgaard also noted issues that were not discussed in the interviews, as these topics could be equally important. Participants were chosen based on various sociodemographic variables including sex, occupation, age, life experience, political background, and their knowledge of local environmental politics, culture and history (2006).

Little previous research of public perceptions of global environmental change has been conducted using mixed-methods (Bulkeley, 2000; Harrington, 2001). While both qualitative and quantitative research are useful, they can elicit different findings about public knowledge of environmental change (Whitmarsh, 2009). Using a combination can

gain a more accurate reflection of public understanding. For example, Lorenzoni & Hulme (2009) explore perceptions of future climate change using mixed-methods in Norwich (UK) and Rome (Italy). They used a quantitative survey to assess environmental attitudes, personal opinions and options for managing climate change in both cities with adults and high-school students. In addition, they held discussion groups in Norwich and Rome to complement and gain further insight into their survey results (2009).

2.6 Chapter Summary

The preceding chapter began with a discussion of the themes that fall under the subdiscipline of medical geography. Its transformation to the geography of health was explained, while exploring the broad themes of research in this field. Social constructionism was then discussed as a theoretical lens through which to view this research.

A substantive and methodological discussion of knowledge, attitudes and practices research approaches was also included, leading to a discussion of current KAP research that investigates perceptions of global environmental change and health.

Finally, a methodological and substantive review of past research that examines public perceptions of global environmental change was included. This review highlighted the literature gap in this field, as well as a number of key themes relating to public perceptions of environmental change and health.

CHAPTER THREE

STUDY DESIGN AND METHODS

3.1 Introduction

This chapter describes the study design and methods used to address the three research objectives:

1. to understand knowledge and attitudes of Canadians regarding global environmental change;
2. to document actions taken by Canadians to mitigate global environmental change; and
3. to investigate potential behaviour change mechanisms.

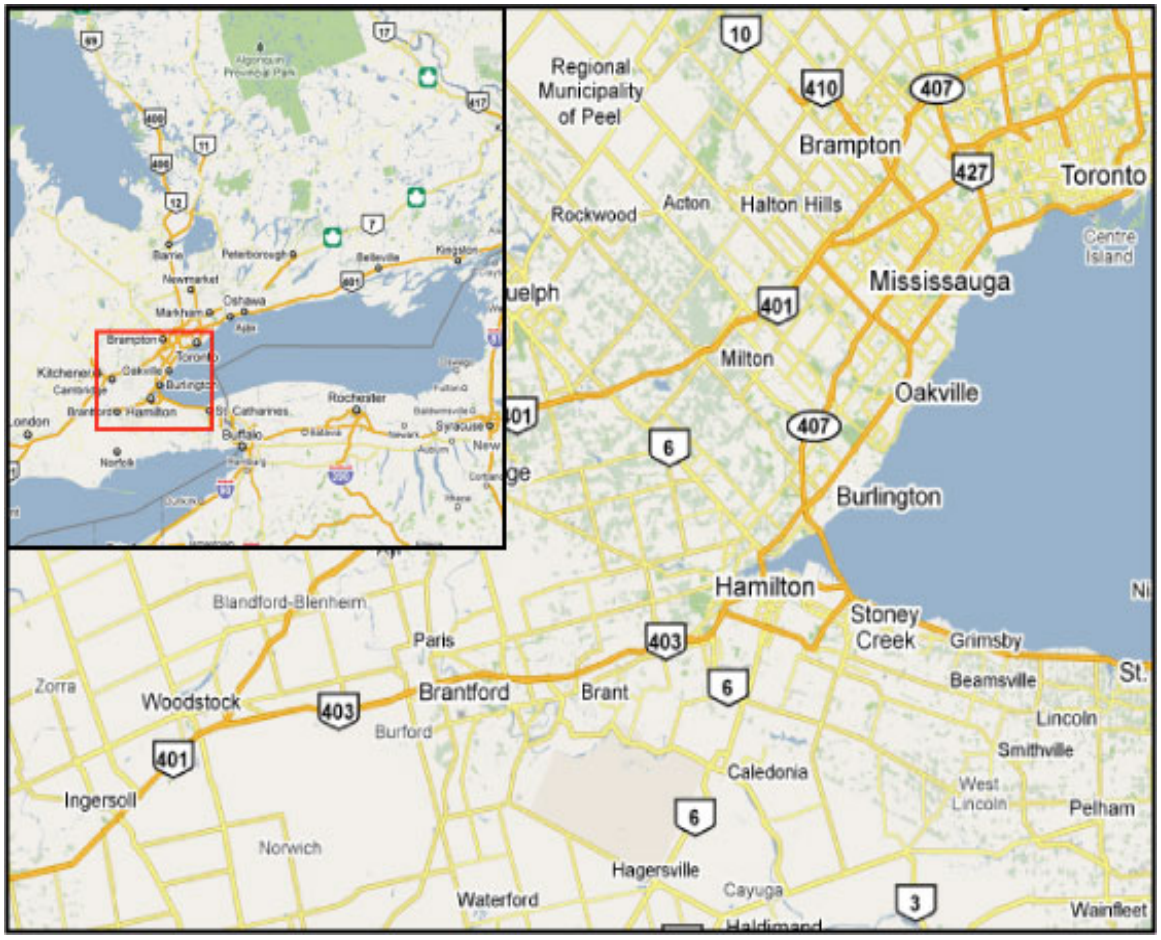
The chapter is divided into two parts; the first examines the study area chosen in order to contextualize the research, while the second outlines the methodological design, recruitment, data collection and analysis of this research.

3.2 Research Setting

This research took place in The Golden Horseshoe region of Southern Ontario. This area is located on the western edge of Lake Ontario, and stretches from Oshawa, east of Toronto, to Niagara Falls (see Figure 3.1). It spans a 250km strip along the lake, which covers Toronto, Mississauga, Oakville, Burlington, Hamilton, St. Catherines, and Welland (Chambers, 1994). One quarter of the Canadian population resides in this region of approximately 8.1 million people (Statistics Canada, 2006). It is both the most populous (Chambers, 1994) and most heavily urbanized region in Canada (Statistics

Canada, 2006). Central in the Golden Horseshoe is Hamilton, one of the first major towns developed in Canada (Wilson et al., 2010). Located approximately 75 kilometers southwest of Toronto at the western edge of Lake Ontario (Wakefield, 2007; Williams, et al., 2010), Hamilton has a population of about 505, 000 (Williams, et al., 2010) and consists of various residential communities including Ancaster, Dundas, Flamborough, Glanbrook, Hamilton and Stoney Creek (City of Hamilton, 2010).

Figure 3.1 – Study Location (source: Adapted from Google Maps)



Historically, Hamilton is known on a local and national scale for its steel manufacturing industry (Williams, et al., 2010; Wilson, et al, 2010). Its blue-collar

industrial roots have given it a number of nicknames, including Steel Town (Williams, et al., 2010; Cruikshank & Bouchier, 2004). Industrial development was facilitated by its strategic location at the western end of Lake Ontario. This offered a central position in Ontario's transportation network, with shipping routes that could easily access the Niagara peninsula, the Northeastern United States through Buffalo, eastern Canada through Toronto, and the Midwestern United States through Detroit (Cruickshank & Bouchier, 2004). While Hamilton's industrial waterfront neighbourhoods traditionally attracted working-class immigrants (Bruickshank & Bouchier, 2004) more recently, Hamilton has also been recognized for its educational and health care sectors. In addition, McMaster University now employs the same number of workers as the steel industry in the area (Williams et al., 2010). Residents of this urban area also commute to work in neighbouring cities like Burlington and Toronto (Williams, et al., 2010). Due to recent downsizing in the local steel industry, many jobs have been eliminated leaving employees looking for work elsewhere. Additionally, a number of areas of the city (particularly in the central and eastern core) have suffered from poverty and lowered standards of living (Williams, et al., 2010).

For this research, participants were recruited in the greater Hamilton area of the Golden Horseshoe region. This includes neighbouring cities Burlington and Brantford, and the town of Oakville. Participants in Hamilton were recruited from various regions including Dundas, Hamilton, and Stoney Creek (see Table 3.1 for participant breakdown). Although 16 of the 22 participants were from Hamilton, two participants from each Burlington, Oakville, and Brantford were also included.

Table 3.1 – Participant Demographic Breakdown

Participant Number	Year of Birth	Gender	Marital Status	Children	How many?	Country of Birth	Municipality	Employment Status	Education	Political Views	Community Involvement	Recruitment
1	1983	F	Single	N	0	Canada	Hamilton	Unemployed	Masters	Liberal	Middle	Kijiji
2	1968	F	Divorced	N	0	Canada	Dundas	Part-time	College	Middle	Middle	Kijiji
3	1968	M	Single	N	0	Canada	Dundas	Full-time	High School	N/A	Not Involved	Kijiji/Friend
4	1989	F	Single	N	0	Canada	Hamilton	Student	Some college/ university	Liberal	Not Involved	Kijiji
5	1968	F	Married	N	0	Northern Ireland	Hamilton	Full-time/part-time	Masters	Middle	Not Involved	Kijiji
6	1980	F	Married	Y	1	Canada	Hamilton	Maternity Leave	University	Conservative	Middle	Kijiji
7	1958	F	Married	Y	6	Egypt	Stoney Creek	Full-time	Masters	Liberal	Very Involved	Kijiji
8	1955	F	Married	Y	2	Canada	Hamilton	Full-time	University	Middle	Not Involved	Kijiji
9	1977	F	Single	N	0	Canada	Brantford	Full-time	University	Middle	Not Involved	Kijiji
10	1988	M	Single	N	0	Canada	Brantford	Student/Part-time	University	Middle to Liberal	Middle	Aunt
11	1972	F	Single	N	0	Canada	Hamilton	Full-time	University	Liberal	Very Involved	Online (unspecified)
12	1988	M	Single	N	0	Canada	Hamilton	Full-time	University	Middle	Very Involved	Kijiji
13	1942	F	Single	Y	3	Canada	Burlington	Retired	2 yrs college	Middle	Not Involved	Poster
14	1960s	F	Married	Y	6	Canada	Oakville	Part-time	Post-grad	Conservative	Not Involved	Kijiji
15	1979	F	Single	N	0	Canada	Stoney Creek	Unemployed	Degree (unspecified)	Conservative	Very Involved	Kijiji
16	1943	F	Married	Y	3	Canada	Hamilton	Retired	College	Conservative	Middle	Unsure
17	1961	F	Married	Y	2	Canada	Hamilton	Full-time	University	Middle to Liberal	Middle to not involved	Co-worker
18	1956	M	Married	Y	2	Germany	Hamilton	Full-time	Some University	Middle	Not Involved	Wife
19	1988	M	Single	N	0	Canada	Hamilton	Unemployed	High School	Middle	Very Involved	Friend
20	1949	F	Married	Y	2	Germany	Oakville	Full-time	Second year University	Conservative	Middle	Craigslist
21	1959	F	Separated	Y	1	Canada	Hamilton	Retired	High School	Liberal	Middle	Snowball (unspecified)
22	1950	M	Married	N	0	Canada	Burlington	Retired	Some College	Middle	Middle	Kijiji

By population and land area, Hamilton is the largest city in the study area (see Table 3.1). Brantford is of similar size spatially (1,072.9 km^2) to Hamilton (1,117.21 km^2) but has the smallest population of the four regions. Brantford also has significantly fewer immigrants and a smaller visible minority population than other areas of the study region. Along with Hamilton, Brantford has a significantly higher number of uneducated individuals (without a high school certificate), while Burlington and Oakville lie above the average provincial education level. The median yearly income in Hamilton and Brantford are slightly below the provincial median income (at around $27,258), while Burlington and Oakville sit at $34,379 and $35,650, respectively. Burlington, Oakville, and Brantford all sit below the provincial unemployment rate of 6.4%, while Hamilton is slightly higher at 6.5% (Statistics Canada, 2006).

Table 3.2 – Study Area Demographics (Statistics Canada, 2006)

	BURLINGTON	HAMILTON	BRANTFORD	OAKVILLE	ONTARIO
Population (2006)	164,415	504,560	124,610	165,615	12,160,285
Males	78985 (48.0%)	245690 (48.7%)	60470 (48.5%)	80305 (48.5%)	5930700 (48.8%)
Females	85425 (52.0%)	258870 (51.3%)	64135 (51.5%)	85305 (51.5%)	6229580 (51.2%)
Land Area (km^2)	185.74	1117.21	1072.90	138.56	907573.82
Median Age	40.30	39.60	39.60	38.40	39.00
Immigrants	36280 (22.3%)	126485 (25.4%)	15935 (13.0%)	50250 (30.5%)	3398725 (28.3%)
Canadian Citizens	154270 (94.9%)	467330 (94.0%)	119595 (97.4%)	152210 (92.5%)	11131465 (92.5%)
No certificate, diploma or degree	20930 (15.8%)	102180 (25.1%)	28365 (28.5%)	18515 (14.2%)	2183625 (22.2%)
Unemployment rate (%)	4.6	6.5	6.0	5.3	6.4
Total visible minority population	15690 (9.7%)	67845 (13.6%)	6715 (5.5%)	30315 (18.4%)	2745200 (22.8%)
Median income (15 years and over [$])	34,379	26,353	26,703	35,650	27,258
Mother Tongue English	133,020 (81.9%)	363,115 (73%)	107,725 (87.7%)	119,460 (73%)	8,230,705 (68.4%)

The region's industrial roots have given the western end of the Golden Horseshoe a reputation of pollution and poor air and water quality, both locally and nationally (Wakefield, 2007; Elliott, 1999b). In addition to pollutants from its manufacturing industry, it receives cross-border air pollutants from industrial centers in the United States (Elliott, 1999b). Consequently, environmental community concern in the region has been present since wartime industrial growth (Cruikshank & Bouchier, 2004). Recently, local concern and action has increased Hamilton's air and water quality to similar levels of other southern Ontario cities, although its poor environmental reputation remains (Wakefield, 2007).

The Golden Horseshoe region of Southern Ontario was chosen as the research setting for a number of reasons. First, it is close in proximity to McMaster University, where the research was undertaken. Communities in this region are also sufficiently diverse to employ a successful maximum variation sampling method, as Oakville, Burlington and Hamilton differ in their socio-demographic variables (Table 3.2) (Statistics Canada, 2006). The city of Hamilton, Ontario also has a regional reputation for poor environmental quality due to its historic role in steel and related industrial activity, while community concern and action has been centered around these issues (particularly air and water quality) in the recent past (Wakefield, et al., 2007; Cruickshank & Bouchier, 2004).

3.3 Research Design and Methodology

This research uses a social constructionist approach (see Chapter 2) to examine subjective meanings, experiences, and behaviours of participants related to global environmental change and health. These perceptions can be assessed using qualitative research methods in order to explore in detail individual and community experiences of health and the environment in the study area (Patton, 2002).

Qualitative research is used often in human geography (Winchester & Rofe, 2010) to tell a specific story by capturing and communicating participant's views and perspectives (Patton, 2002). Qualitative methods are increasingly important in the geography of health (Curtis, 2000) as geographers "concerned with the understanding and analysis of meanings in specific contexts" (Baxter & Eyles, 1996, 506; Eyles, 1988, 2) can use various approaches to understand individual experiences of events, structures,

and places that might not be considered using quantitative methods (Winchester & Rofe, 2010). It is for these reasons that qualitative methods have been chosen for this research.

Although there is a range of qualitative methods that can be used in human geography (including go-along interviews, discontinuous writing, and photo-elicitation), the three main types of qualitative research are oral (interviews), observational, and textual (such as the analysis of documents) (Winchester & Rofe, 2010; Patton, 2002). Oral qualitative methods are the most popular and widely used in human geography (Winchester & Rofe, 2010). For the purpose of this research semi-structured in-depth interviews were chosen in order to "yield in-depth responses about people's experiences, perceptions, opinions, feelings, and knowledge" (Patton, 2002) related to environmental change and health of community members in the Golden Horseshoe region.

Face-to-face semi-structured in-depth interviews were used to gain an increased understanding of the knowledge, attitudes and practices of community members in the region. Semi-structured interviews were chosen in order to retain a predetermined series of topics to discuss, while maintaining flexibility for the participants to describe any other stories or opinions they felt important (Dunn, 2010). Semi-structured interviewing allows participants to elaborate on their answers and disclose complex behaviours, thoughts, motivations, individual meanings, opinions and experiences that might not be possible using alternative methods (Dunn, 2010). Additionally, to avoid embarrassment or participants withholding opinions when discussing sensitive issues, interviews were best suited as some questions may have been difficult to answer in a group setting such as a focus group. Following the social constructionist theoretical framework, interviews with

the lay public were chosen as an appropriate data collection tool as each individual opinion is valued equally (Gatrell & Elliott, 2009), and each participant is treated as an information-rich case (Dunn, 2010).

In preparation, an interview schedule was created (see Appendix A). Dunn (2010) explains the importance of formulating the intended scope of the interview in the form of an interview guide, or schedule, in order to remember the general issues or questions to cover while maintaining flexibility. This flexibility ensures "the interviewer remains free to build a conversation within a particular subject area, to word questions spontaneously, and to establish a conversational style but with the focus on a particular subject that has been predetermined" (Patton, 2002, 343). The questions and themes in the interview schedule were chosen based on a systematic critical appraisal of the current academic literature related to perceptions of global environmental change and health in North America, Europe, and Australia. Special attention was given to phrasing each question carefully in order to avoid ambiguity, jargon, technical language, and leading questions (Dunn, 2010). The interview started with general introductory questions on health in order to build rapport with the participant, before discussing more challenging questions related to environment, health and climate change. The interview guide included primary questions and probes (Dunn, 2010).

Twenty-two participants were selected based on the purposeful sampling principle of maximum variation, meaning information-rich cases were selected to represent the widest demographic range possible. This included varying gender, education level, income level, marital status, age, parental status and residential area (Table 3.1). The

principle of maximum variation avoids one-sidedness in responses (Patton, 2002) and ensures a broad range of perspectives and views are captured. This technique allows identification of common patterns that emerge across a range of demographic variables (Bradshaw & Stratford, 2010).

To achieve maximum variation, a one-page demographic information questionnaire was distributed to all participants following the interview (see Appendix B). Participants had the option of disclosing characteristics including year of birth (participants under 18 years of age were excluded from the study), gender, marital status, parental status and number of children, place of birth, residential area, employment status, education, political views, and self-stated community involvement. Considering these characteristics was important in order to achieve saturation in both themes and participant demographics, and to ensure the views of those from all geographical areas and sociodemographic groups were included.

Participants were recruited using an advertisement posted on community notification boards in coffee shops, libraries, senior's centers, and grocery stores in different neighbourhoods in Hamilton, Oakville, and Burlington (see Appendix D). The advertisement was also posted on local advertising websites like craigslist.com and kijiji.ca. Advertising on such websites is free and can strategically access potential participants in the Greater Toronto and Greater Hamilton areas. The advertisement specified participation criteria, basic research details, and compensation information. Being a Canadian citizen, resident of the Golden Horseshoe Region, and 18 or over were criteria for participation. If interested, potential participants contacted the researcher

either by email or phone for further information or to set up a meeting time. Snowball sampling was also used; following the interviews participants were asked if they could identify friends or family that might be interested in participating. Advertising in multiple locations and using numerous recruitment methods helped ensure maximum variation among participants. Fifteen participants (68%) were recruited using online advertising (13 specified they found the advertisement on kijiji.ca, only one stated they found it on craigslist.ca, and one did not specify where they found the poster online), five participants (23%) were recruited using snowball sampling, while only one stated they saw the poster in their community. One participant was unsure of how they heard of the research. All participants were compensated for their time with a $10 gift card for a local grocery store.

Data collection occurred between August 2010, and January 2011 with a total of 22 participants. The interviews were conducted at a local library of the participant's choice (in either Brantford, Burlington, Hamilton, or Oakville), and lasted between 30-70 minutes. Topics included global environmental change, climate change, global warming, air and water pollution, community health and environmental concerns, personal health, environmental behaviours and possible barriers to change (see Appendix A). All participants signed a consent form prior to the interview (see Appendix C), and with their permission all interviews were digitally recorded. Interviews were transcribed and proofed to ensure accuracy prior to thematic analysis.

Following interviews, the researcher recorded thoughts, observations and/or comments in a personal research diary. This encouraged reflexivity as the researcher

identified their perspective and self-reviewed their role in the research (Patton, 2002). The use of a research diary also allowed the interview schedule or rapport between the researcher and participant to be changed accordingly throughout the research (Dowling, 2010).

Following the interviews participants were given the opportunity to ask any questions related to the research or related to environment and health issues in the Golden Horseshoe region. A list of environmental resources in the region (see Appendix E) was distributed to ensure respondents could access information related to the topics and concerns discussed in the interview. Participants also listed their email addresses on the consent form if they were interested in receiving a summary of results. The summary will be distributed in summer, 2011.

A codebook including macro and micro descriptive and analytic codes (see Appendix F) was created to facilitate data organization and theme identification (Cope, 2010). Codes were created inductively and deductively in order to satisfy the research objectives. Another member of the research team reviewed the codebook prior to use to ensure validity.

Computer-assisted qualitative data analysis software (CAQDAS), specifically NVivo9, was used for data analysis. NVivo9 helped organize and clearly calculate the frequencies of different emergent themes (Dunn, 2010). CAQDAS like NVivo9 provide a simple way of accurate data organization to gain an advanced general illustration of the data to facilitate analysis (Welsh, 2002). Following coding of the data, inter-rater reliability was assessed to ensure rigour. The researcher reviewed their own coding of an

early transcript, and a second coder was used to determine agreement of codes in the data. The two coders achieved a 95% agreement between the codes. Results of the data analysis are presented in Chapter 4.

The four criteria for evaluating qualitative research were used to ensure rigour in the study (Baxter & Eyles, 1997; Lincoln & Guba, 1985). Credibility can be defined as "the degree to which a description of human experience is such that those having the experience would recognize it immediately and those outside the experience can understand it" (Baxter & Eyles, 1997, 512). It aims to provide an accurate representation of the experiences, behaviours, and opinions of the participants in the Golden Horseshoe region. To ensure credibility in this research, member checking was used when the researcher briefly summarized the participants' ideas prior to finishing their interview. This was to ensure the plausibility of the way the participants' perspectives were interpreted. In addition, sampling from multiple regions (Burlington, Oakville, Hamilton and Brantford), allows for triangulation if themes cut across multiple geographical boundaries. The researcher also identified their potential biases, and socio-demographic characteristics (relative to the respondents') in the research diary in order to ensure subjectivity (Baxter & Eyles, 1997). Crosschecking also occured through testing for inter-rater reliability, and through peer evaluation of the codebook for accuracy (Baxter & Eyles, 1997).

Transferability refers to the ability of the research to fit within contexts outside the study area (Baxter & Eyles, 1997). This research aimed to satisfy transferability through the use of purposeful sampling to identify all possible perceptions of health and

environmental change that cut across different socio-demographic variables and geographic borders.

Dependability examines the reliability of the research over space and time (Baxter & Eyles, 1997). Strategies used to maintain dependability include audio recording the interviews, verbatim transcription, and proofing to ensure no errors in interpretation. The transcripts and audio recordings can be peer examined if concern related to data interpretation arises. Additionally, a research diary was used to keep accounts of behaviours or comments made before, after, and during the interview. Peer examination was also utilized to ensure dependability, as a second researcher checked the interview schedule and coding manual. Testing for inter-rater reliability ensured dependability in the results.

Finally, confirmability aims to ensure both the researcher and data interpretation are objective by reviewing how biases, interests, and motivations of the researcher influence the results (Baxter & Eyles, 1997). A research diary was used to ensure critical reflexivity and to identify existing biases and positionality in the research. As someone that grew up living in the study region (I was raised in Burlington, Ontario and have also attended McMaster University for the past six years), I can relate to many of the concerns and was often familiar with issues and perspectives the participants described. Coming to the research as an educated female interested in environmental issues meant I had to remove myself from this bias in order to understand and communicate other perceptions, stories and behaviours with consideration and interest. Also, because the interviews were conducted in quiet areas or private rooms in public libraries, participants had the

opportunity to develop individual rapport with me allowing them to share stories that they may not have done in a group setting or public area. Finally, being a researcher comes with the position of being an educated representative of an academic institution, which could cause some participants to feel intimated or uncomfortable. I tried to begin the meeting with general conversation (although the topic of the weather was avoided to reduce bias in response if the interview was conducted during a time of unusual weather) to establish a comfortable dynamic with the participant. Important questions related directly to the research objectives were asked later in the interviews once comfort and an honest rapport were best achieved.

3.4 Chapter Summary

This chapter identified and described the study area used for this research. Additionally, the research design and methodology used in the study were outlined. The chapter concludes with a discussion of the methods used to ensure rigour throughout the research.

CHAPTER FOUR

RESULTS OF ANALYSIS

4.1 Introduction

This chapter presents the results of the analysis of twenty-two semi-structured in-depth interviews. Results are organized around the three research objectives:

1. to understand knowledge and attitudes of Canadians regarding global environmental change;
2. to document actions taken by Canadians to mitigate global environmental change; and
3. to investigate potential behaviour change mechanisms.

The first part of the chapter reports individual and community health concerns in the Golden Horseshoe region of Southern Ontario. Next, the knowledge and attitudes toward global environmental change, climate change, and global warming are presented. An exploration of possible behaviours to mitigate environmental change follows. Next, possible barriers and incentive strategies to behaviour change are presented.

4.2 Individual Health

Interviews began with participants explaining the factors they think make a person 'healthy' in order to determine whether participants considered the environment as a risk factor to health (Table 4.1). Health was most often defined as some combination of physical and mental states: *Well I figure there are several things. Diet, exercise, and your mental health. (Interview 18, Male)*

Table 4.1 – Perceptions of What Makes a Person Healthy

Definition of Health	Number of participants (% of the total)	Mentions (% of the total)
Exercise	14 (64)	19 (18)
Mental Health	13 (59)	23 (21)
Food and Diet	12 (54)	21 (19)
Social factors (friends, education, safety, employment, resources)	6 (27)	8 (7)
Disease/Illness/Sickness	6 (27)	6 (6)
Environment	5 (23)	10 (9)
Stress	5 (23)	7 (6)
Genetics	2 (9)	3 (3)
Spirituality/Religion	2 (9)	2 (2)
Other	7 (32)	9 (8)
Total	* 22	108 (100)

** This is not equal to the sum of the numbers in the column due to multiple responses*

Aspects of physical health were identified by all respondents as determinants of a 'healthy' person. The factors most frequently identified to affect physical health were food and diet, and exercise:

> You have to have somewhat of a diet and some exercise to keep within reasonable levels. I guess a lot of Canadians are not eating enough fruits and vegetables though and I guess now they have changed it from five or ten to twenty servings a day. (Interview 22, Male)

Mental health was identified by 59% (n=13) of participants as important to maintaining good health. Often, depression, stress, and mental illness were described when explaining mental health:

> As well as I would say like mental health, being able to have the flexibility or freedom in mind, and I guess not be bound by like a mental illness or something like that. (Interview 1, Female)

In addition to physical and mental health, social aspects like family, community, education, safety and employment were described in six interviews, while spirituality and religion, and genetics were each identified by two participants.

When discussing perceptions of health, 23% (n=5) of participants identified the 'environment'. When the environment was identified as an influence on individual health, it was most often with respect to general pollution, air and water quality:

> Their environment would be [the] number two [individual health risk], what they are exposed to day to day, whether it be pollution or the water that they drink, the water quality. (Interview 3, Male)

4.3 Community Health

When asked what makes a *community* healthy, 32% (n=7) of participants identified environmental influences without any probing. Pollution, specifically air quality, was most frequently identified as an environmental determinant of community health:

> Like if you look around you can pretty well tell what is going on, and like I say air quality is important in a community to be healthy, and there are some areas in Hamilton that have lousy air quality. (Interview 16, Female)

In addition to air quality, the availability of perceived green space was also recognized as an important factor impacting community health:

> Certainly if everyone is in a community where they have available walking paths, and cycling paths, and the whole thing is set up, that you can get to work or to get to your work place in an environmentally considerate way, then you are definitely going to be in a better position to be healthy from day to day. (Interview 3, Male)

If a participant did not identify the environment when describing community health, they were asked whether they perceived health and the environment to be linked in any way. Again, the majority of these respondents identified links between health and the environment related to air quality:

> So for example, in the area of Hamilton, in which I live, there is a higher rate of asthma and that kind of thing because of pollution and smog, and that kind

> of thing, whereas where I grew up in Ancaster, there was nothing like that. (Interview 6, Female)

Air pollution from both industrial and transportation sources were identified:

> Yes, health and the environment are linked in a way to a degree. For example, Hamilton and Burlington are the two dirtiest cities in Canada, and it is important not to be in some areas of those cities. For example, right on Burlington Street, downwind of the larger factories like on the Beach Boulevard, not Beach Road. These are areas that could be very detrimental to your health, and again in Burlington, it is a little more environmentally bad for you at the south end, than it is at the north end, because of the winds coming from the west off the steel mills. (Interview 22, Male)

Another source of air pollution identified was car idling and traffic on major highways in the area:

> My only issue is idling. Just because my building is really close to a little corner store, and so delivery trucks, and then I am also close to a bank. So people going through the drive through. And I never really thought about those things. You think school zones and things like that, of course it comes to your mind with children, but my goodness, I keep my windows open at night, you know to get some air, circulation in my condo, and it is deadly. I have to close my windows, because it gets that bad. (Interview 11, Female)

Participants from Hamilton, Oakville, and Burlington described air pollution in their neighbourhoods. Health impacts associated with negative air quality mainly include respiratory problems, like asthma:

> Because if there are pollutants in the air, I just feel that you are eventually going to get sick from something, even if it is asthma, and I have asthma, so yeah, it really affects me. (Interview 16, Female)

Participants used the term ‘dirty’ to explain a visual presence of garbage or pollution in their community:

> Well if you live in a dirty place, if you live in a pollution filled area, like Hamilton or any industrial area, you are going to be bombarded with pollution. It is going to affect your health and you are always going to be trying to play catch up with the effects that are going on against you, as

> opposed to starting at the beginning where you are living in a healthy, clean environment. (Interview 3, Male)

Alternatively, health was identified as positively related to environment when the environment was described as 'clean': *Good environment. Just generally clean I guess. (Interview 10, Male)*

Next, participants were asked about specific health concerns in their respective communities. Environmental issues were most frequently mentioned (Table 4.2).

Table 4.2 – Community Health Concerns

Health Concern	**Number of Participants (% of total)**	**Mentions (% of the total)**
Environment - Total	16 (73)	39 (20)
Air Pollution	12 (54)	26 (13)
Garbage	5 (23)	7 (4)
Drinking Water	4 (18)	6 (3)
Accessibility to Services (ie. medical, education, housing)	11 (50)	24 (12)
Transportation	9 (41)	31 (16)
Obesity/Nutrition/Physical Activity	9 (41)	25 (13)
Poverty	6 (27)	15 (8)
Mental Illness	5 (23)	5 (3)
Accessibility to Information	4 (18)	9 (5)
Crime/Safety	4 (18)	5 (3)
Cancer/Diseases	3 (14)	3 (2)
Drugs	2 (9)	3 (2)
Immigrant Segregation	1 (4)	3 (2)
Aging population	1 (4)	3 (2)
Other	14 (64)	34 (17)
Total	* 22	199 (100)

** This is not equal to the sum of the numbers in the column due to multiple responses*

Environmental issues were identified by 73% of participants (n=16) as community health concerns in Burlington, Hamilton, and Oakville. These environmental concerns were limited to what is visually present or what is perceived to have a direct effect on their lives (e.g. water and air pollution, garbage):

> R: Okay, and do you have concerns over the cleanliness of your water?
> W: When I lived in Hamilton proper I did, but Stoney Creek water seems to be very clear and colder. I don't know why. It seems to be a better quality water than what you get even in the city. I don't know why. (Interview 16, Female)

Air quality, pollution, and smog were also mentioned as environmental health worries by 54% (n=12) of participants: *Pollution is huge. Air pollution, like is mostly huge. (Interview 12, Male)*

Although most participants described air pollution as a concern, there was also uncertainty around the extent of the problem. In a discussion around community health concerns and air pollution in Hamilton, one participant expressed their desire for clarification:

> R: And then if it [air pollution] is a problem, then that is something that you would address?
> W: Yea, maybe clarity on whether this is actually a problem. (Interview 1, Female)

Few specific health concerns due to air quality were described by participants, however asthma and breathing problems were mentioned as increasing due to air pollution:

> In my community, well I am not that familiar with this community. I would say industrial pollution is probably another big issue too because I think from having grandchildren, I notice that a lot of younger kids now, I would say a high percentage either have asthma or they are on puffers. (Interview 13, Female)

23% (n=5) of participants also spoke of mental illness, in both the homeless and general population, as an important community health concern:

> I think that mental illness, undiagnosed mental illness, especially around like specifically the east end of Hamilton. There is a lot of that, and it is just, people don't know about it, or don't care, or it is just, people don't talk about it, so yea I would say those three, especially this area of Hamilton. (Interview 12, Male)

Other community health concerns discussed include a lack of physical activity, poverty, a lack of social interaction, nutrition and obesity, access to medical, education, transportation and housing services, and dissatisfaction with the health care system (Table 4.2).

Results related to individual and community health illustrate that both are socially constructed based on interactive experiences. In addition, although mental, environmental, social and spiritual aspects of health are identified, physical health dominates participants' individual views of health. When considering community health determinants, the environment, specifically when considered a community health concern, is described as important.

4.4 Global Environmental Change

4.4.1. Knowledge

In order to gain an understanding of what people know, understand and believe related to environmental issues and health, participants were asked to discuss what the term global environmental change meant to them. The terms climate change and global warming were also introduced if the participant did not mention them in their description of global environmental change. When asked what the term global environmental change

meant to them, respondents spoke of a variety of causes and impacts of climate change, global warming, and other environmental issues (Table 4.3).

Table 4.3 – Knowledge of Global Environmental Change

Theme	Number of participants (% of the total)	Mentions (% of the total)
Health effects	17 (77)	49 (21)
Weather/Temperature Change	15 (68)	22 (9)
Glaciers/Ice Caps	14 (64)	22 (9)
Pollution (general)	13 (59)	31(13)
Natural Disasters	12 (54)	23 (10)
Ozone Hole	11 (50)	16 (7)
Greenhouse Gas Emissions	8 (36)	16 (7)
Wildlife	8 (36)	14 (6)
Natural Cycles	7 (32)	18 (8)
Deforestation	5 (23)	12 (5)
Sea-level rise	4 (18)	4 (2)
Rainforests	2 (9)	4 (2)
Storms	2 (9)	3 (1)
Water	2 (9)	3 (1)

Total	* 22	237 (100)

** This is not equal to the sum of the numbers in the column due to overlap in responses*

If participants did not address health effects in their description of global environmental change, they were asked how they considered environmental change and health to be related. The impacts of global environmental change on health were widely discussed by 77% (n=17) (Table 4.3). When described in detail, respondents identified health risks related to heat, air pollution and air quality, natural disasters, and sunburn and cancer (Table 4.4).

Table 4.4 – Perceived Health Impacts

Health Impact	**Number of participants (% of the total)**	**Mentions (% of the total)**
Air Pollution	8 (36)	11 (20)
Sunburn/Cancer/UV Exposure	5 (23)	7 (13)
Heat	5 (23)	6 (11)
Natural Disasters	5 (23)	5 (9)
Food Security/Safety	2 (9)	2 (3)
Spread of Infectious Diseases	1 (5)	1 (2)
Other	10 (45)	22 (41)
Total	* 17 (78)	54 (100)

** This is not equal to the sum of the numbers in the column due to overlap in responses*

Increased UV exposure because of the growing ozone hole was identified as a significant risk for sunburn and skin cancer:

> But I guess, for me, what I immediately see is just like cancer right. You have global warming, the heating of the atmosphere, skin cancer, with UV rays.

> Well that is a direct impact on human health with skin cancer. (Interview 9, Female)

Heat was also identified as a risk factor, particularly to the elderly, children, and those that suffer from respiratory illnesses:

> I think with the hotter summers and everything, more people are being affected, like infants could get heat stroke, and elderly could be affected. As an average person, I don't think it really has hurt us that much. (Interview 10, Male)

Natural disasters, like tornadoes, flooding, tsunamis, and hurricanes, were also described as health threats:

> All these tornadoes and hurricanes, and a cloud comes over Oakville, and it rains for ten minutes in the middle of the summer, or you get hail and this is all being caused by this global upheaval in the environment … because what is the point of having so many millions of people if they are all dying of all kinds of problems and are unhealthy… We are not a healthy globe. The earth is not healthy, and you can see it in the weather today, all over the world. (Interview 20, Female)

In addition to health, when discussing global environmental change 15 (68%) participants identified changes to weather patterns both locally (in the Golden Horseshoe region) and globally (places such as Florida and Australia were described). More specifically, temperature increases were identified by thirteen participants, while five described decreasing temperatures as a component of environmental change:

> And I am not feeling it. I think our winters are the same as they were, in fact sometimes even colder, and if it was global warming, wouldn't they be warmer? Our summers have been cool lately. So I see the real thing that is happening, and I don't know where this global warming is happening, but I don't feel it. (Interview 20, Female)

The use of terms such as ice, ice caps, icebergs, glaciers, North Pole, the Arctic and polar caps was frequent when discussing the effects of global environmental change,

global warming and climate change. Sixty four percent (n=14) of participants identified the receding, shifting, or melting of glaciers when asked what global environmental change means to them: *Up north like the North Pole, it is melting. (Interview 21, Female)*

59% (n=13) of respondents identified pollution as a significant issue. Three types of pollution were described; air pollution, general garbage, and water pollution: *Well the water pollution is pretty bad too, you know. (Interview 13, Female)*

Air pollution was also described when respondents were asked about environmental change:

> There is so much pollution in the air … but how much more can you do now? It is already done. (Interview 21, Female)

Participants also described a general physical presence of garbage or pollution in their communities that they identified with global environmental change:

> Look at my neighbourhood. Look at the town. Now, why do you feel you have the right to crap it up? You know, you can't crap in my area. Pardon my language, but you can't do that. So clean it up or you are not welcome here. And things are happening, they are falling apart, you know. Now they are having this big stink about where do we put the new stadium? Well we can't put it there. Why? Because some land they want to stick in on in the first place is so blasted polluted, they can't afford it. They don't know what is underneath it. It has been sitting there for so many years. They haven't got a clue, you know. (Interview 18, Male)

Natural disasters, such as tsunamis, earthquakes, floods and storms, and volcanoes were described as becoming more frequent with environmental change in 12 interviews (54%):

> So if you are going to allow countries to put pollution into the air, cut down trees in the rain forest, you are going to suffer by the kind of suffering we are going through these days with all these tornadoes and hurricanes. (Interview 20, Female)

Some respondents described environmental change as possibly responsible for the floods occurring at the time of interviews (late 2010, early 2011) in Pakistan, Australia, Brazil and the Phillipines:

> When you think of three floods in one week the size of what is happening for example, the Brazil one, they thought three hundred died, well it is up to five hundred now, so the flooding is becoming larger. (Interview 22, Male)

Although flooding and the melting of ice were widely identified as an impact of global environmental change, sea-level rise was only described by 18% (n=4) of participants as an important impact: *Water levels rising. I probably should move up to the escarpment. (Interview 4, Female)*

Fifty percent (n=11) of participants identified the ozone layer as related to global environmental change. Although the ozone hole is indeed part of global environmental change, over half of these participants spoke of it in the context of climate change or global warming:

> I think, I mean you heard about the ozone layer, right, and just the heating of the atmosphere, and how it is making the holes bigger. (Interview 9, Female)

The ozone layer was described by some respondents alongside topics accurately related to climate change and global warming, such as melting of the glaciers:

> Maybe because the polar ice, down there, the level of the ozone is much thinner. (Interview 14, Female)

The perceived relationship between climate change and global warming and the ozone hole was also evident when discussing health issues related to environmental change:

> You have global warming, the heating of the atmosphere, skin cancer, with UV rays. (Interview 9, Female)

Greenhouse gas emissions were identified when asked about global environmental change, global warming and climate change by 36% (n=8) of the participants. Very little detail was discussed related to emissions, with participants mainly implying they are negative and using basic terminology like *gases* and *emissions*:

> What I have heard is the greenhouse gases, and everything is changing in the atmosphere, so it is breaking down. (Interview 10, Male)

Only this participant used the term 'greenhouse gases'. Specific greenhouse gases were not often identified, however when they were it was carbon dioxide, also described by respondents as carbon or carbonates. When emissions were mentioned participants generally had difficultly identifying what kind of emissions they were discussing:

> Like they are trying to stop it as much as like the carbonates or whatever that goes into the air. (Interview 21, Female)

36% (n=8) of participants also described the effects of environmental change on wildlife. Species becoming extinct or moving to other geographical locations was explained:

> Yea, I don't know, even I guess species moving farther north, and species losing like amount of species on the earth and stuff like. (Interview 12, Male)

One participant described his skepticism with the dangers of environmental change on wildlife, as he spoke of new species being discovered as well as extinction:

> We have lost certain things, certain things are extinct. We have got new species. We are losing some, but not at the rate that they are claiming. (Interview 18, Male)

Seven (32%) respondents also described historical natural environmental change and the belief that the environment will naturally repair itself to prevent dangerous climate change or global warming. It was explained that because historical climate

change has occurred cyclically, what is currently observed is natural. Thirty six percent (n=8) of participants mentioned some level of natural variation in the climate:

> We have gone through a couple of ice ages, right, so we have to be way, way colder than we have ever been, and I will just kind of view it as a natural fluctuation of the earth, and that wasn't due to the people, because there weren't people at the time. So now I see this increase in temperature, and I am like, oh, yes it could be on one hand due to the carbon dioxide or whatever it is we are emitting that is causing this problem, but like I think it is hard to discern, like how much of that is due from people, and how much can it just be a natural fluctuation. I think we just don't know. (Interview 1, Female)

Other issues that were identified by participants include the rainforest, storms and extreme weather events, water pollution and wastage, and deforestation in Canada and abroad.

4.4.1.1 Confusion

When participants were asked about the terms global warming, environmental change, and climate change separately, they often began using the **t**erms and ideas interchangeably. There was confusion about which topic was being discussed, as causes and impacts specific to one term were used throughout. Some participants were confused between the meaning of climate change and global warming:

> Like I think global warming is everything being affected, where climate change is more or less just your temperatures. (Interview 10, Male)

Another respondent when asked about global warming immediately responded with the term climate change, demonstrating a perceived interchangeability between the terms:

> R: Okay. So you mentioned global warming there for a second? Can you elaborate more on that, or what that means to you?
> W: Climate change. (Interview 4, Female)

Confusion around the issues was self-identified when participants stated they did not fully understand:

> I mean I don't know about it in depth. I don't study it. I don't like, you know, I just, I have my own common sense kind of radar that is built in, that tells me, you know, like I do read a lot, and I make my own decisions. (Interview 13, Female)

4.4.1.2 Personal Term Preference

Participants were asked whether they perceived a difference between the terms climate change, global warming and environmental change. 41% of participants (n=9) stated that they considered these terms to be interchangeable:

> R: So we talked about global warming. What about the term climate change? Does that mean something different to you?
> W: No, I think that is part of it, isn't it?
> R: Okay, yes. So you would use the same term?
> W: Yea. (Interview 8, Female)

32% (n=7) of respondents identified a difference between the terms. Despite the knowledge of a difference between the terms, some participants could not articulate it:

> R: You used the term "global warming" before. Do you see a difference between those terms?
> W: Global warming, climate change. Well I know there is one. (Interview 1, Female)

Some participants described their lack of knowledge and knew they could not differentiate between the two:

> R: What about the term global warming. Do you see that as something different to climate change?

> W: To be honest with you, because I am not a scientist, I don't know for sure. I can only know what I hear and then I have to make my own conclusion, based on my ability to reason what I hear, and my reasoning says, okay me, you are not expert enough to make a conclusion, because you are not a scientist. You haven't really gone into it for whatever reason, but I am busy working and what have you to really get into that. So there is possibility that there is that happening but I really am not sure.
> R: Okay.
> W: Because it is not my expertise. (Interview 20, Female)

Only two participants specified that they preferred the term climate change, and one participant described how they used the term global warming instead of climate change. The reason identified for choosing one specific term was skepticism towards the other:

> I would think climate change instead of that, simply because I am not a huge subscriber to the global warming theory. (Interview 6, Female)

This is particularly interesting as although participants identify that they prefer specific terminology, results indicate a significant lack of knowledge and confusion between terms.

4.4.1.3 Information Sources

Participants were asked to identify the source of their knowledge of environmental issues. This information helps understand how the public learns about environmental issues and what sources most influence their knowledge and behavioural decisions (Table 4.5).

Table 4.5 – Information Sources

Source	Number of Participants (% of total)	Mentions (% of the total)
Media	22 (100)	38 (26)
Newspaper	10 (45)	12 (8)
TV	10 (45)	11 (8)

Internet	7 (32)	10 (7)
Radio	5 (23)	5 (3)
Family/Friends	16 (73)	32 (22)
High School	12 (54)	35 (24)
Children at school	7 (32)	10 (7)
University/College	5 (23)	10 (7)
Other	10 (45)	18 (13)
Total	* 22	143 (100)

** This is not equal to the sum of the numbers in the column due to multiple responses*

The media was identified as a major source of environmental information. 100% (n=22) of respondents described media sources including the Internet, radio, television, newspapers, movies and magazines. The television (for example, advertisements) and newspapers were each identified by 45% (n=10) of participants, while the Internet and radio were described as a source of environmental information by 34% (n=7), and 23% (n=5) of participants, respectively.

> Or you know you have the TV or the radio and you hear about climate change, and okay what is this climate change? So I will go into the Internet, or I will maybe get a book out, if it recommends a book to read. (Interview 20, Female)

Other media sources of information include movies like *The Day After Tomorrow* (n=2), and magazines (n=2). 27% of participants (n=6) described the news in general as their source of environmental information:

> W: News. Movies. Just television, because you know, like *The Day After Tomorrow* is that the one? That is one of my favourite movies, so that kind of thing. So it does get the message across to some people, right. So, and then the kids too.
> R: So the media?
> W: Ya. (Interview 8, Female)

The significant role of the media in disseminating information to the public related to environmental change enforces the social construction of climate change and global warming, and reinforces the importance of the education system in public awareness.

Some form of schooling was also described by 82% (n=18) of participants, with the majority of education coming in grade and high school (n=14). Four participants described learning about environmental issues in college or university, while five participants identified what their children learn in school as a possible source of environmental information. Participants often explained that they were not taught specifically about climate change and global warming in school (or that they could not remember).

In addition, 73% (n=16) of participants described discussions with family, friends, colleagues, and significant others as a source of information:

> R: Okay, so do you talk about things like climate change or environmental change with your friends?
> W: Yes. Many times.
> R: Alright.
> W: And with our children too. We try to encourage them to get involved in politics, or something that will make a difference if they can. (Interview 20, Female)

4.4.1.4 Environmental Resources

Participants were asked if they could identify any environmental resources, organizations, or programs in their community, and whether they participated. 41% (n=9) of participants could identify at least one program or resource. The programs were often not described in much detail, or were only identified by name:

> There is [one organization] … and they do demonstrations of community gardening, and they sell rain barrels. They do the composting toilet, and you

> know the on sight, little water heater things, so that is one thing. (Interview 5, Female)

Of the participants that identified resources, three said that they participate, while the others either described specifically that they did not participate (n=4), or did not state either way.

36% of participants (n=8) said they knew of resources but could not identify their names or exactly what they do:

> Not by names, sorry. I know that there is a group that meets the third Thursday or Tuesday of every month down at Williams and it was more younger people, young professionals to talk about things. I don't know what action comes out of that, but they sounded actually very interesting. I forgot to meet with them. (Interview 11, Female)

Five participants stated that they did not know of any environmental programs in their community:

> R: So could you tell me about any environmental organizations or resources or programs that you know of in your community?
> W: I don't know of any. (Interview 14, Female)

In short, knowledge of global environmental change differed among participants. Some respondents stated they did not understand or were confused about environmental change, while others discussed their knowledge of climate change and global warming in detail. Aspects of weather changes, the ozone layer, melting ice, greenhouse gas emissions, pollution, natural disasters and health effects were identified by respondents in their description of global environmental change, climate change, and global warming. Health concerns were paramount, particularly with respect to air pollution, heat, natural disasters, and sun and UV exposure. In addition, knowledge of climate change was often linked to the environment-related health concerns participants discussed. Finally,

participants identified the media, school, and family and friend interactions as sources of environmental knowledge, while awareness and participation in environmental organizations was limited.

4.4.2. Attitudes

Throughout discussions of environmental change, climate change, and global warming, a number of dominant attitudes emerged (Table 4.6).

Table 4.6 – Attitudes Toward Global Environmental Change

Attitude	Number of participants (% of the total)	Mentions (% of the total)
Concern/Worry	18 (82)	55 (22)
Cynical/Skeptical	15 (68)	37 (15)
Humans Responsible	14 (64)	23 (9)
Spatially Distant	13 (59)	22 (9)
Too Much Hype/Buzz Word	8 (36)	16 (7)
Future Time Frame Identified	8 (36)	10 (4)
Political Agenda	6 (27)	25 (10)
Not My Responsibility	6 (27)	16 (7)
Helplessness	5 (23)	10 (4)
There Are Benefits	4 (18)	7 (3)
Inaccurate Representation in Media	4 (18)	7 (3)
Just Don't Know	4 (18)	5 (2)
Don't Want to Think About It	2 (9)	4 (2)
Sad	2 (9)	3 (1)
Curious About the Truth	2 (9)	2 (.9)
Optimistic Things Will Get Better	2 (9)	2 (.9)
Pessimistic About the Future	2 (9)	2 (.9)

Total	* 22	246 (100)

Eighty two percent (n=18) of participants reported concern as a possible attitude toward global environmental change, climate change and global warming: *And global warming is something that is really worrying. (Interview 7, Female)*

This participant described concern, while the following respondent stated that she is not worried about climate change or global warming:

> R: Okay, and [do you worry] about climate change or global warming?
> W: No I don't, because I think in a few years, like I say, I think it will right itself. I am not sure if we keep polluting the air if it might take longer, but I am hoping that it can right itself. (Interview 16, Female)

Of the participants that expressed concern, it was sometimes only minor worry and not considered immediately concerning:

> Well I don't know. I don't like to get worried about gigantic things that like this because I think it only harms things. It doesn't really help. I think that like a little bit of concern is good, but if you get worried about things like this, then it is just added stress to your life and that is going to negatively impact your health, which doesn't make too much sense. So I mean I think it is good to be concerned, to be educated about it, but to be worried about it, it just doesn't make sense. (Interview 12, Male)

68% (n=15) of participants expressed a skeptical attitude, not only when describing climate change or global warming but other environmental issues as well. This attitude was not only their own, as they described family and friends' skepticism as well:

> Global environmental change. Well I am not sure. You hear global warming, which I don't believe in. I think it is a load of horse manure actually. (Interview 18, Male)

Although skeptical of global warming or climate change, many participants expressed concern for other environmental issues, even when they overlapped with

climate change (such as air pollution in Hamilton). For example, one participant mentioned that they were not very concerned about climate change because of the climate's cyclical nature:

> And I sometimes think it is fear mongering, because if you look back over the years, the climate has always changed up and down. It usually swings back, swings one way, and then it will swing back, so I don't know if I am really concerned about that. (Interview 16, Female)

When discussing other environmental issues, however, this same participant expressed concern related to air pollution and health:

> R: Are you concerned about your health and the health of your family related to these environmental issues or…
> W: Yes.
> R: What about climate change or…?
> W: To the fact that the air is polluted.
> R: Yea?
> W: Yea. Yea, I worry about that a lot. (Interview 16, Female)

Despite these feelings, the majority of participants (64% [n=14]) described humans as responsible by identifying anthropogenic sources responsible for environmental change:

> I also think it has to do with population growth and just like what people are doing generally all over the world. (Interview 1, Female)

Industry was most often described as a cause of anthropogenic environmental change, although humans generally were also identified:

> But with human beings, you know, ruining everything they touch. It is not easy. (Interview 7, Female)

Most people discussed the impacts of humans as a negative thing for the environment, however it was also identified that there could be some benefits to human behaviour:

> You know the things like that people like we were put here on this earth to take care of the animals, to take care of the planet, and we have destroyed it. Like really we have destroyed it by putting… but and then on the other hand, you have to look at, well if we didn't do it, we wouldn't be on the moon. We wouldn't be doing this and we wouldn't be doing that, so there is a good and there is a bad always. So you got to find the middle. (Interview 21, Female)

Although Canadian environmental and health issues are identified, 13 participants (59%) believed that the most significant environmental changes will not occur locally:

> All of the cutting of the trees in the rain forest are changing how our weather is worldwide. (Interview 20, Female)

Here, the participant identified the cause of climate change as something spatially distant, and the impacts on an international scale. The impacts in Canada are also recognized:

> So we sort of dodged a bullet so far here in Canada, because we don't have as high a population perhaps, and we do have a forested area to kind of buffer some of this, and maybe absorb some of the carbon dioxide. (Interview 22, Male)

This participant believed Canada is not as threatened by environmental change because of our forested area and low population density. This belief is not only described for future environmental change projections, but current environmental conditions as well:

> In our area, I don't think it has affected us much. Like I enjoy hotter summers. I don't really care about winters. (Interview 10, Male)

Thirty six percent (n=8) of participants also believed that the effects of climate change would be temporally distant and less likely to impact their own lives. Participants refer to their children, grandchildren or the future being affected:

> So my expectations as to how the world is going to be two degrees warmer, 400 years from now, I can't get involved. It is out of my interest level. (Interview 3, Male)

Another commonly described attitude was the belief that there is a political agenda behind decisions related to environmental change in Ontario and Canada. This belief was expressed by six participants, and evident in three main themes; financial gain, bad science and trust. Participants voiced concern that decisions are influenced by financial gain or cost:

> Because to me there is too much political disingenuousness. There are too many people who stand to benefit economically, and I don't think we are being told what is actually going on. (Interview 5, Female)

Respondents also spoke of concern related to the quality of science in research of environmental issues. This follows a number of high profile events in the media undermining climate science:

> M: They won't tell you, oh no, you have got what's his name, that Vice-President, or whatever.
> R: Al Gore.
> M: Al Gore, yea well and they won't tell you that his is based on false science, and when the real scientists start challenging, you know, even David Suzuki, okay, David Suzuki was a geneticist before he started on the big kick, but which is fine, even changed majors or whatever, they don't state full facts of you know, if you go back over the years, yea there is some change, yes it warms up. It cools. Now overall, now if we go, what we are doing to the planet, okay there is where we have a problem. (Interview 18, Male)

Along with questioning the science behind climate change, global warming and environmental change, participants spoke of their lack of trust toward governments related to environmental policy:

> R: So it is a trust issue?
> W: Yea, it is a huge trust issue. (Interview 5, Female)

Participants also mentioned feeling like the effects of environmental change were not their fault or responsibility. 27% (n=6) of respondents identified other people or organizations responsible for environmental degradation other than themselves:

> W: Like my son always says, your generation ruined the environment. No it wasn't my generation.
> R: Yea.
> W: I said, big businesses, corporations ruined the environment, and then people were just not aware. (Interview 13, Female)

This participant places the blame of environmental degradation on industry and business rather than herself or others her age.

Participants also spoke of how they felt helpless and that their actions would be ineffective in creating or mitigating environmental change and that it would happen regardless. Twenty three percent (n=5) of participants described feeling that individual action is useless, and increased participation is needed to effectively change:

> I feel kind of helpless I suppose. I just feel overloaded. I don't know what the truth is. I don't think I can make a difference. (Interview 5, Female)

The role of the media in exaggerating the issues was described by 36% (n=8) of participants. Respondents spoke of terms like climate change and global warming becoming buzzwords and hyped up for fear mongering purposes: *Well sometimes it is overblown into a bit of a panic. (Interview 4, Female)*

Concern around sensationalism in the media, and the need for critical assessment of media sources was also described:

> I think sometimes when something new comes along, that like a new term, that we tend to go so much to that side that you have to rationalize it and come back and say okay, let's go back. Let's see what happened through history, and how much is this. That is my personal opinion. (Interview 13, Female)

Only 18% (n=4) of participants spoke of their belief that environmental change would bring benefits to their community, or that they look forward to the perceived benefits of climate change. This was reported when increased temperatures were being discussed:

> In our area, I don't think it has affected us much. Like I enjoy hotter summers. I don't really care about winters. (Interview 10, Male)

This illustrates the confusion around the use of the terms climate change, global warming and global environmental change, as increasing temperatures were one of the most commonly identified possible impacts of environmental change.

Respondents also explained feeling curious about the outcomes of climate change, feeling like environmental change has now become a joke amongst their friends and in society, feeling like they do not know what could happen in the future, and that they just do not want to think about it or hear the bad news associated with it.

4.4.3 Practices

Participants were asked what people could do to act in environmentally friendly ways, in order to gain an understanding of how the participants interact with the environment and their attitudes toward possible environmental behaviours. A variety of both individual and community level behaviours were identified (Table 4.7).

Behaviour	**Number of participants (% of the total)**	**Mentions (% of the total)**
Recycle, Reduce, Reuse	22 (100)	228 (45)
Energy consumption	17 (77)	57 (11)

Water bottles/mugs/containers	10 (45)	20 (4)
Water	8 (36)	14 (3)
Cloth bags	5 (23)	15 (3)
Transportation-related	21 (95)	125 (24)
Green Bin/Compost	18 (82)	59 (12)
Food-related	9 (41)	28 (5)
Public initiatives	8 (36)	11 (2)
Other	14 (64)	61 (12)
Total	* 22	512 (100)

** This is not equal to the sum of the numbers in the column due to multiple responses*

Table 4.7 – Environmental Behaviours

All participants (n=22) discussed recycling, reducing and reusing as ways to act in environmentally friendly ways:

> But I do my part, right. I do the recycling. I recycle everything. People get mad at me, if they come to my house, because I will go through the garbage. (Interview 21, Female)

Only one participant described their uncertainty related to the effectiveness of recycling:

> And a lot of the things that affect the environment have been in place for years. Right. And I mean I sometimes wonder when I am rinsing out my jars, etc. how much that is really helping when we have so much industrial pollution. Like if you are going to say in terms of health, what, in terms of the environment would affect health more, not me recycling my jar, it is what is spewing out of, and into the air, you know, and you can breathe it constantly, because I grew up in a small town in Northern Ontario, the mining industry, which is pretty good now. (Interview 13, Female)

Although participants described recycling as useful, they also described reasons why it was sometimes inconvenient:

> I recycle all the time, but I don't recycle all the time sometimes, because you just, you know, you forget, or get a little bit lazy, just like everything else, but you try, you know. (Interview 17, Female)

Participants also discussed other forms of recycling, reducing and reusing. Limiting pollution, picking up garbage, and not throwing garbage on the ground were discussed as ways to reduce personal waste:

> Well, one big thing is pick up your garbage. Like you know like I said this city is very, in the last little while, downtown they are trying to clean it, and I mean literally, they are scrubbing the streets. (Interview 18, Male)

Conserving energy was mentioned by 77% (n=17) of participants as a way to reduce. The majority (n=12) identified switching off or unplugging appliances, and installing energy-saving light bulbs to save energy:

> I guess I was reducing energy and consumption by installing fluorescent bulbs, and not leaving computers and TVs on stand by, especially the computers, TVs, video games in terms of electronics, because those tend to suck up energy like "wow". (Interview 4, Female)

Reducing the use of heating or air conditioning was also identified:

> Not using air conditioning hardly ever, unless I really need it. Having windows open obviously. (Interview 20, Female)

Using reusable water bottles or mugs and not purchasing plastic water bottles were identified by 45% of participants (n=10). Reducing consumption of store-bought plastic water bottles was most commonly discussed. Respondents explained they act this way because tap water is good quality and free:

> I mean we still use plastic water bottles too, but we all have those. Do I think it makes a difference? I think it makes a difference not using all the plastic for sure. They are probably pouring the water into those bottles from the same tap as I am pulling my water from, except then they are charging me a buck for it. So I do agree with that kind of stuff. (Interview 8, Female)

Some participants discussed environmental reasons behind this behaviour:

> I refuse to buy bottled water. I say, no that is bad. Because it is very easy, like it is really easy for the kids, because it is like what, a whole package for

> $1? So it is very accessible for them to buy the package. If it is easy, because you toss it out. The effect on the environment from that. (Interview 7, Female)

Although some participants described the practice of reusing water bottles, they explained how they did not personally participate for a number of reasons:

> You know, I will be the first one to say, I use bottled water too you know. It is convenient. Sometimes you know you see water on sale; it is just easy to grab it and whatever, right. (Interview 15, Female)

Other environmentally friendly behaviours discussed by participants as ways to reduce, reuse or recycle include reducing water use. Eight participants (36%) described turning taps off and limiting shower time, reusing water from one activity for another, such as watering the plants with the same water used to cook food, and using lower-flow taps, showers and toilets:

> R: Again water, water, water. I reuse my, the water I use to boil eggs. Stuff like that. I reuse it. Water I use to boil pasta. You can reuse it. I know of a woman who reuses the water for her laundry. That is effort intensive.
> R: Yea, that is.
> W: That is out of my league. (Interview 11, Female)

Although this woman identified the activity as beneficial, she explained that she would not participate due to the effort involved.

Using reusable bags for shopping instead of plastic bags from the grocery store was identified as a possible behaviour by 23% (n=5) of participants. This was described as beneficial, but some participants questioned its effectiveness:

> You know, there are plastic bags, not using plastic bags is that going to make a big difference? I don't know. It will make a little difference though. If everyone is doing it, yea, it will make a little difference. Enough of a difference, I don't know. And if we are really committed, plastic bags shouldn't be five cents. They should be twenty-five cents. I mean they should be, if they are environmentally damaging, maybe we shouldn't have

> them any more. But they are very convenient. Who is going to give them up? (Interview 5, Female)

Environmentally friendly behaviours related to transportation were identified by 95% (n=21) of participants when asked what people could do to help the environment. Three themes emerged; car use, walking and biking, and public transit. When discussing car use, participants described behaviours in four categories; reducing use, idling, environmentally friendly cars, and carpooling.

Reducing car use was the most frequently described transportation-related behaviour as participants spoke of driving less and substituting car use with alternative methods of transportation:

> For example, if you are driving three cars, reduce down to one car. Take the eight cylinders off the road. They should be even banned. There is no need for an eight cylinder now. We have six cylinders that go fast enough, and six cylinders are fine. So reducing the number of vehicles. Getting a smaller engine, and the car companies, I believe could get more gas mileage than they are from the vehicles that they are producing. I think there must be some cooperation between them and the oil companies, because there are cars that have been shown to get better gas mileage, and they haven't put them out, so there is a lot in that area. (Interview 22, Male)

The following participant described a commonly identified behaviour of planning car trips to ensure the most efficient route to reduce time spent in the car and distance travelled:

> R: Do you drive a car?
> W: Yes.
> R: Yes, and do you do that fairly often, or do you think that is important?
> W: No we try to because we are retired, so if we have appointments we try to do like our shopping if we have an appointment, we plan, or if we are going to go to two or three places, we try to plan our routes so that we don't use the car any more than we have to. (Interview 16, Female)

Using, researching, and investing in environmentally friendly cars was also identified. Participants described hybrid or electric cars and their potential use as an environmentally friendly alternative to their current vehicles:

> M: If everybody could afford a hybrid car, I would suggest to buy one, but I still think they are not quite ready.
> R: Why is that?
> M: They are just, when you are going from zero to thirty that is when you are using electric power. When do you ever drive zero to thirty. Like first five seconds of your trip. So I think once you can fully use an electric car all the way on the highway not using any gas, is when you should start. (Interview 10, Male)

Participants also described driving in more environmentally friendly patterns, and keeping car maintenance current. The specific actions taken in these behaviours were not identified: *Maintain your car so that it doesn't let off as many pollutants. (Interview 21, Female)*

Carpooling was also mentioned as a possible transportation-related behaviour. Although these participants identified carpooling as potentially beneficial, some respondents spoke of not taking part in this behaviour themselves:

> I know cars are not going to happen. I am guilty. I don't car pool. There are four cars in our house. We can be all going in the same direction, and everybody goes in their car. (Interview 7, Female)

Reducing idling was identified as an important transportation practice by 18% (n=4) of participants:

> Like it drives me crazy, pet peeve, to see people running their cars, just because they want to, I don't know why they do, maybe to keep warm. And that drives me crazy because I am thinking, we have enough pollution, and I think of global warming, and so on and so forth. (Interview 14, Female)

Another transportation theme described by participants was walking and biking as alternatives to car use, either for environmental reasons or to increase physical activity to maintain health:

> Bicycle riding versus driving the car for a short distance, except when you are late. These kinds of things. You try to attach more time so that you can get there earlier by bicycling or walking or using a bus kind of thing. (Interview 2, Female)

In addition to biking or walking as alternatives to car use, participants also spoke of using public transportation, such as buses or trains. Specific to the Golden Horseshoe region, 10 respondents discussed the Hamilton Street Railway (HSR) bus system and four participants identified GO Transit:

> And of course public transport. I know the big downside with public transport is that it generally costs you a lot more per month, [compared with] driving, which of course is the big deterrent. That is why I am so happy I am back at Mohawk now. Free bus pass. (Interview 4, Female)

As described by this participant, cost and time are often identified as reasons why public transportation is not always a viable option. For example, not all participants choose to use transportation, as is identified by this participant in a discussion about the Hamilton Street Railway:

> No, I don't use it. I don't use it. It is actually not that cost effective, and it is not that convenient for where - if I needed to go along the bus route, I think it would be more, I don't know about the environment wise, but yes that goes back to your last question actually, regarding the cost involved, and I think there is a price for convenience, and I would need to, and I couldn't dedicate an entire day to taking the bus to a place and back. I just couldn't. (Interview 3, Male)

Reasons participants described for not using the HSR include time, physical disability, convenience and cost:

> R: And do you take the HSR ever?
> W: No.
> R: No. Is there a reason why not?
> W: The disability, not accessible, waiting times. Just from my house to get to the station, there is no way. (Interview 7, Female)

The Government of Ontario offers a GO Train and Bus service in the Golden Horseshoe region and Greater Toronto Area, which provides frequent services between Hamilton, Burlington, Oakville and Toronto. Eighteen percent (n=4) of participants also spoke of GO transit as a transportation option:

> R: Do you use public transit?
> W: In Brantford no, I have my own car, but I mean the minute I leave Brantford and I start heading east towards Hamilton, any time I have to go to Burlington, Oakville or Toronto, then I will just hop on the GO Train. (Interview 9, Female)

Using the green bin for food and other biodegradable waste was discussed by 68% (n=15) of participants, most of which described it as useful:

> Otherwise being super anal about like use Kleenex, throw them in the green box, and that kind of stuff, and hair, and I have got lots of it to put in there, and nail clippings. People think I am gross, but you know, so it says that I can put them in there, so why shouldn't I put them in there? (Interview 2, Female)

Although it was identified as a possible environmentally beneficial behaviour, many participants said they did not actually use a green bin:

> To be honest, we don't use the green bin. I don't really even know what it is for. It is terrible. It is for like, I think it is for like organic stuff? That just gets so disgusting, and like I can't handle maggots. Neither can my mom. So we just can't do it. (Interview 1, Female)

This participant described some confusion around the purpose of a green bin, and how her and her family find it uncomfortable to use. Other participants also expressed a lack of understanding of the green bin:

> W: Like I don't see any green bins. Is that for garbage right? That is just the regular garbage you are talking about?
> R: No, like food waste kind of thing.
> W: Oh, that just goes into our regular garbage. So we have a regular garbage, and then there is three or four bins, newspaper and cardboard, then there is glass and plastic. That is it, and then the garbage goes into a separate spot. (Interview 13, Female)

Although this participant actively separates and recycles some of her waste, she has no knowledge of the green bin system.

In addition to the green bin, composting was described as a possible behaviour. It was identified as something to do either on an individual or community level:

> We did compost, campus wide compost, so we had like a compost. Every Sunday you know whatever people went to church or they had their meals or whatever, we would do a compost collection. So we would take turns you know, you did it this week. You do it this week. We just go around campus, knocking door to door, and collecting compost, and we gave compost buckets to every single dorm on campus. So we had like a pretty good compost program by the end. It was like pretty good. We had like a whole compost area on campus that we did with leaves and everything, so it was really good. (Interview 12, Male)

Although many participants spoke of composting as a behaviour they could pursue themselves, some identified reasons why they choose not to:

> I don't think I would compost myself, just because of the fact that I do take care of the little ones, and I wouldn't want them going into it. I don't know how the set up is, but it would take years for me to fill it up, because there is only me and my boyfriend and my son. I think it would take years to fill that up, right because of the bones, and it turns into worms or something like that. I don't know. (Interview 21, Female)

Recycling, using the green bin and composting were identified frequently, possibly because they are not only activities the participants do themselves, but can visually identify others in their community doing:

> But as far as everything else, recycling, and you know composting, and things like that, I think everybody does it. The people that I associate with and in my community. Like all the green boxes are out, you know. All that kind of stuff. (Interview 15, Female)

Food-related purchasing behaviours were also identified by 41% (n=9) of participants as practices to benefit the environment. Four sub themes emerged; personal gardens, buying organic, buying local, and vegetarianism/veganism. Participants stated that if they had the resources available, they preferred buying organic foods for both health and environmental reasons:

> W: Try to buy your foods in organic stores, those that sell organic, and then that will wake up the regular stores to change. Like for instance already, Dominion which is Metro now, and the one that is owned by Loblaws, Super Centre.
> R: Okay.
> W: You can get all kinds of organic stuff in there now, and I can get all the kinds of foods that I never used to be able to get in there, because they know they lost a customer to Whole Foods, and to the Organic Garage, and to the farmers, so they are now starting to bring stuff in to bring me back, and sometimes I do shop there if I can find what I am looking for. If it is not there, I am out of there. So they are starting to build more of a healthier chain of food in the store, so they offer that at least.
> R: Okay, now when you …
> W: I would tell them, I am leaving and I am not coming back because you don't have this. I want healthy food, if you are not going to sell me, I read every label of everything that I buy. Every label. If it contains sugar, or some kind of dextrose or some kind of bologna in it that I don't want to eat, I put it down.
> R: Definitely. Now is that for health reasons or are you considering the environment when you are looking or buying organic or local foods.
> W: You want to know that is health, but I think that that does affect the environment too.
> R: Yes definitely. (Interview 20, Female)

Buying local produce was also described:

> And actually if I could do another thing, if I had more money, I would probably buy more products that are environmentally sustainable, so for example like when I buy my steak, like I would buy it from a local, like a

> local farmer. If I had the money. Or even if I had like a car or something to go there, but just it is too hard for me so I don't. It doesn't make sense. (Interview 12, Male)

Participants also spoke of vegetarianism, or limiting meat consumption, as an effective environmental behaviour:

> Yea, well I think the biggest impact that you can have I think is to become a vegetarian, but not the kind of vegetarian that then just goes out to the grocery store, and buys processed tofu, and considers that they are doing a really good thing for themselves, because I think there is just as much industrial energy that goes into producing flavoured yummy tofu, mock, fake bacon, fake chicken, whatever, if you want to be a vegetarian, and I don't want to be, because I don't have any kids, so when I die, if you want to be a vegetarian, be a real vegetarian, not this fake, industrial vegetarian that people are, because yes, I think becoming a vegetarian could have a huge impact on the environment. (Interview 5, Female)

The use of personal gardens to grow fruits and vegetables was also discussed: *We grow our own vegetables. (Interview 5, Female)*

Increasing education and awareness around environmental issues and associated behaviours was described by 45% (n=10) of participants as a beneficial environmental practice:

> Educating others. Reading. Just keeping on top of little things that you can do here and there and more so this year. Just holding people accountable or just kind of encouraging or reminding them to recycle. (Interview 9, Female)

Participants described information coming from government, academia, and media sources, as well as their personal role in educating others in their community:

> How would you educate people? I guess you would have to start running billboards and things in newspapers, TV to catch these people, and not trying to explain every detail, but just to give them two or three lines in large letters about issues and maybe if it was flashed enough in the media across, they might start to pick it up, but there are too few that are concerned. (Interview 22, Male)

There were negative opinions among the participants related to public environmental initiatives such as 'Earth Day' and environmental campaigns. Nine percent of participants (n=2) described the ineffectiveness of such campaigns. Despite the awareness generated, they feel that this should be a long-term change rather than a single day event:

> Oh my goodness, I am so proud of myself. I turned my air conditioning off for the day. Whatever they are doing again? It just strikes me as just more show, than substance. (Interview 5, Female)

Although a variety of practices were described as environmentally friendly, the most commonly identified behaviours were limited to reducing, reusing and recycling personal waste.

4.4.3.1 Reasons to Pursue Behaviours

Following a discussion around the environmental behaviours participants choose to pursue, respondents were asked why they believe people choose to act in ways that are helpful to the environment (Table 4.8).

Table 4.8 – Reasons to Pursue Environmental Behaviours

Reasons to Pursue Behaviour	Number of participants (% of the total)	Mentions (% of the total)
Morality (believe it's the right thing to do)	18 (81)	39 (23)
Believe it's the right thing to do	12 (54)	19 (11)
Altruism	7 (32)	10 (6)
Guilt	4 (18)	8 (5)
Believe that every little bit counts	2 (9)	2 (1)
Education	13 (59)	23 (13)
Out of concern for environmental issues	10 (45)	13 (8)

Lazy	8 (36)	11 (6)
Habit	7 (32)	19 (11)
Feels good	7 (32)	14 (8)
Media messaging	6 (27)	14 (8)
Hear that they should (from peers)	6 (27)	7 (4)
Socially acceptable behaviour	4 (18)	6 (3)
Have to (by-laws, etc.)	4 (18)	5 (3)
Other	12 (54)	21 (12)
Total	* 22	172 (100)

** This is not equal to the sum of the numbers in the column due to multiple responses*

81% (n=12) of participants explained some sort of moral or social obligation in their environmental actions. This most frequently came in the form of feelings of altruism, guilt, the belief that every little bit counts, and to act in what is considered the 'right way':

> W: So in the long run, what [my husband] and I do is it going to make a big enough difference when, like we are one out of a hundred maybe, so I don't know.
> R: So, if you are kind of questioning that, why do you still do it?
> W: I think it is the right thing to do (Interview 8, Female)

Altruistic feelings were also described. 32% of participants (n=7) spoke of feeling that it was important to act in positive ways in order to maintain their childrens', families' and overall societal health. When asked about why people act in environmentally friendly ways, this participant described the impacts on future generations:

> Because they are scared of the impact of what will happen, because they have, you know, I think they have social responsibility of what is going to happen for the next generations? (Interview 7, Female)

59% (n=13) of participants mentioned that education is a reason they act in environmentally friendly ways:

> Education. I think we have been told not to pollute. Now we are told to recycle. We are told it is a good idea (Interview 14, Female)

Participants also identified that increased education on what behaviours are most useful would encourage behaviour change. In addition to education, 22% (n=6) of participants described the messages coming from the media as influencial. Respondents described the strong influence of the media on people's behaviour:

> Yea, exactly like they are convinced by the media that they must do it. They don't really know why they are to do it. (Interview 12, Male)

In addition to morality and education, ten participants (45%) explained that their environmentally friendly behaviour is inspired by concern for the environment, climate change or global warming: *We are destroying the earth. That is a concern to me. (Interview 7, Female)*

Respondents also described their behaviours as habitual. 32% (n=7) of participants spoke of their own or their families' habits that they often do not consider environmental behaviours because they are engrained in everyday life:

> M: Well, okay, they, I don't know if they have a different mind set, or they have thought about it, and I think it is more, maybe it is the way they were raised. I was raised that way, you know. I try to raise my kids that way, like garbage police. You know what I mean?
> R: And that will get them into the habit.
> M: Trying to get them into the habit, you know what I mean? (Interview 18, Male)

Although this participant described how acting in environmentally friendly ways is habitual for him, other participants spoke of how people do not act in these ways due to pre-existing habits:

> We, my age group, we have just seen it for so long that it is, we are just so numb to it. Just throw it in the garbage. Throw it in the garbage. Throw it

> away. Away from me. It doesn't matter if it is in the garbage or where it is. (Interview 3, Male)

32% of participants (n=7) also described acting in environmentally friendly ways because it makes them feel good, and gives them the sense that they are doing something positive:

> I think because like if it is easy to do, and it is convenient to do, and it is making people feel good, I think they will do it. (Interview 1, Female)

Other reasons identified for acting in environmentally friendly ways include government enforcement, laziness, social acceptability, and being told to by media and peers.

4.4.3.2 Behavioural Incentives

Incentives that could encourage environmentally friendly behaviour were also discussed (Table 4.9). Four major incentives were described by participants; a cheaper cost, increased convenience, behaviours that take less time or increase spare time, and activities that are enjoyable. 86% (n=19) of participants discussed the use of financial incentives as a useful way to encourage environmental behaviour. Saving money while behaving in environmentally friendly ways was described by participants in a number of examples, including using public transit when it is inexpensive or free (for example, using a student card to ride the Hamilton Street Railway), turning the lights off to save money on electricity bills, bringing reusable bags to the grocery store, saving gas by reducing idling, and returning beer and wine bottles for money:

> I think cost too. I think everybody likes to save money, and I think you know it is important to turn off your computer, or turn off your lights, turn off any power sources, that you may have, that are just wasting energy for no reason, and I do that quite diligently in my house. (Interview 15, Female)

Convenience was described as an incentive by 45% (n=10) of participants:

> I don't think people will do it otherwise until it becomes you know convenient and cheap. (Interview 1, Female)

Six participants (27%) described saving time, while enjoying the behaviour was identified as an incentive by three (14%).

Table 4.9 – Incentives

Incentive	**Number of participants (% of the total)**	**Mentions (% of the total)**
Cost	19 (86)	56 (68)
Convenience	10 (45)	15 (18)
Time	6 (27)	7 (08)
Enjoyment	3 (14)	4 (05)
Total	* 22	82 (100)

** This is not equal to the sum of the numbers in the column due to overlap in responses*

4.4.3.3 Behaviour Satisfaction and Barriers to Behaviour Change

Participants were asked whether they were satisfied with their environmental behaviours. 64% (n=14) of the respondents expressed satisfaction, although some mentioned that although they are happy with what they currently do, they know there is more than can be done:

> M: I am satisfied. It doesn't mean that I don't think I can do more.
> R: Okay.
> M: But I am satisfied with the work that I have done. I know there is more I can do. (Interview 19, Male)

Six participants explained that they are not satisfied with what they do to help the environment, and that more should be done:

> No, just because I think everyone can do more. I do a lot, but I still think no, there is always more you can do. Definitely (Interview 11, Female)

Participants were also asked if there were any barriers to behaving in more environmentally friendly ways, or reasons why they were not prepared to do so (Table 4.10).

Table 4.10 – Barriers to Behaviour Change

Barrier	Number of participants (% of the total)	Mentions (% of the total)
Convenience	13 (59)	40 (27)
Personal Cost	12 (54)	22 (15)
Don't Know What To Do	11 (50)	24 (16)
Lack of Time	9 (41)	18 (12)
Economic Harm	8 (36)	13 (9)
Discomfort	7 (32)	8 (5)
Physical Barrier	5 (23)	6 (4)
Already Doing Everything I Can	4 (18)	5 (3)
I Won't Make a Difference	4 (18)	5 (3)
Habit, Culture	4 (18)	4 (3)
Availability of Options	3 (14)	5 (3)
Total	* 22	150 (100)

** This is not equal to the sum of the numbers in the column due to overlap in responses*

Convenience was most often described as a barrier to behaviour change. If an activity were perceived to be inconvenient, 13 participants would be less inclined to participate:

> I also work at a Tim Horton's and when people come in with like their mugs, like people still fill the coffee cup up with a cup, and then pour it into the mug, so they are still wasting that cup. So for everybody to have the mug, you know, like if it is through a drive thru, we are still pouring it into a cup. We are not supposed to, but just for speed and service we do. (Interview 10, Male)

Similarly, when something is not perceived to be an easy activity to pursue, participants did not express willingness to act:

> If I could find more of the easy things to change I would. But not like drastic, turn my life upside down type of thing. (Interview 6, Female)

In addition to convenience, respondents identified an increased personal cost as a disincentive. Twelve participants mentioned cost as a barrier:

> If I had more money than sense, I could see buying more fair trade, because I know when I was in Toronto, I walked through this one fair trade, 'The Fairies' Pajamas". That is so cute but it is so expensive. (Interview 4, Female)

Another barrier that was discussed was a lack of accurate knowledge of what more to do to act in environmentally friendly ways. 50% (n=11) of participants described feeling overwhelmed with information and not knowing what to do:

> So for the environment, you know, somebody might tell you that it is better to do this, but then somebody will come up with something that says no it is not. Just nobody really knows, so just like information I think is a barrier. (Interview 10, Male)

41% of participants (n=9) identified a lack of time as a significant barrier. They described time consuming activities as less appealing because their lives are already busy:

> I don't compost because I don't have a lot of time, but I think with the green boxes, and everything, it is basically composting. Yea, I have a forest in the back yard. My house, I am very lucky that way. I will take all the leaves, and put them all back there, so that they just continue to compost. (Interview 17, Female)

Eight participants described economic harm as a barrier to individual and societal change:

> Because I grew up in a small town in Northern Ontario, the mining industry, which is pretty good now. They have reduced a lot of the emissions, and nobody is ever going to do anything about that, because again it comes down to a money factor, where nobody is going to start shutting down plants, and mines, you know because again it is about money and jobs and economy. (Interview 13, Female)

Participants (n=7) described discomfort as a barrier to pursuing environmental activities. Respondents often did not want to sacrifice comfortable activities if they were not environmentally friendly, even with the knowledge of their environmental impacts:

> Well I do take a cruise every year, and I think about that. It is a big gas guzzler, the ships, and but I think in the winter when it is cold, I want to get away, and there is nothing else to do, and the plane, it is a big gas guzzler, and it pollutes the air, and I know that, but you do want to get away from the cold, and so you bite the bullet and you go and I feel bad about it. What else is there to do? (Interview 20, Female)

Physical health was identified as a barrier by five participants. This was described as important for elderly people or those with poor health, young children, or disabilities:

> R: And why not would you be interested [in becoming involved with an environmental organization] or no?
> W: I can't do it.
> R: Yea?
> W: Because of my condition.
> R: Right.
> W: Okay, like just right now it is bothering me just sitting here.
> R: Yea.
> W: Because I will have to get up, even though it hurts, I have to get up and move a bit. (Interview 21, Female)

Finally, four participants felt that they were already doing all that they could realistically do:

> R: Why are you satisfied?
> W: Well I don't really see unless I go out every morning and start taking my little net with me, and cleaning the water. No I mean I recycle, you know, I do what I do, and like I said in terms of, I don't use a lot of plastic. I am pretty old fashioned about a lot of things, so I don't know if it is being environmentally friendly or it is just having good habits, you know. But in terms of that, that is all I do. (Interview 13, Female)

Although only mentioned briefly, other barriers preventing behaviour change include pre-existing habits, insufficient options, the attitude that a single person will not make a difference, insufficient social support, not knowing the right people to initiate change, not enough incentive, not knowing the results of actions and choices, and not caring about the outcome.

4.5 Summary

This chapter summarized the results of the qualitative data analysis. First, on both an individual and community level, the environment is not often perceived as an important determinant of health. However, when asked about specific community health concerns, participants frequently described environmental issues in their community. Air and water quality were perceived as particularly concerning.

While there is general awareness of global environmental change, detailed knowledge of specific causes, impacts and risks is limited. This is demonstrated in confusion between terms, misconceptions, and a superficial understanding of key issues evident throughout the interviews. In addition, participants identified the media and

friends, colleagues, and family as significant sources of environmental information, illustrating how climate change and global warming are constructed through social interaction in daily life.

While the majority of respondents expressed concern about global environmental change, there was also skepticism around the causes and impacts in the Golden Horseshoe region. Overall, participants do not perceive climate change as a direct risk within the context of their daily lives, and respondents described impacts as temporally and spatially distant.

Finally, although participants expressed concern and a willingness to act in environmentally friendly ways, these attitudes did not necessarily translate into action. Respondents described activities like recycling and reducing energy consumption, however a number of barriers to participating in environmentally friendly activities were also identified. Decreasing cost, and increasing time, convenience, and enjoyment were described as incentives to undertake behaviour change.

The following chapter will discuss these findings in the context of previous literature, as well as limitations, contributions, and directions for future research.

CHAPTER FIVE

DISCUSSION AND CONCLUSIONS

5.1 Introduction

The following chapter links the main findings of this research with the literature, discusses substantive, theoretical, and methodological contributions as well as possible limitations, and identifies directions for future research.

5.2 Key Findings

5.2.1 Perceptions of Health and the Environment

This research uncovered a range of perspectives related to global environmental change and health. Results indicate that when asked specifically about individual health, few participants recognize the influence of the environment. Surprisingly, however, other physical determinants of health often perceived as important in determining individual health, such as genetics (Haalbloom, 2002), were mentioned less frequently.

When asked what makes a community healthy, few participants described the relationship between the environment and health. When identified, links were most often described related to air quality and respiratory illness. Interestingly, when questioned about health concerns specific to their community, environmental issues were mentioned *most* frequently compared with other health risks. This difference in how the environment is perceived indicates that although participants are aware of environmental issues, they

are not constructed as determinants of health unless they are considered immediately concerning (such as air pollution). Health risks from climate change were not identified in this discussion, indicating that environmental change is not yet considered an important immediate health risk by the public (Akerlof, K., et al., 2010).

5.2.2 Knowledge of Global Environmental Change

When asked about global environmental change (or climate change/global warming), there was a high level of awareness amongst participants. This level of awareness is consistent with other literature related to risk perception of environmental change (Stamm, Clark & Eblacas, 2000; Jaeger, et al., 2003; Semenza, et al., 2008; Leiserowitz, 2005; 2006; Whitmarsh; 2008; 2009). General awareness of environmental issues, specifically air quality in the Golden Horseshoe region, could be related to the historical role of steel manufacturing in the Hamilton region, and the continuing reputation of poor air quality in the surrounding area (Wakefield, et al., 2007).

Consistent with the literature (Norton & Leaman, 2004), understanding of the causes and impacts of global environmental change was lower than the level of general awareness. Participants used very simple terms and descriptions to explain their knowledge and feelings.

The inability of the majority of respondents to explain the causes and impacts of global environmental change in extended detail illustrates the lack of basic knowledge related to climate change and global warming in the lay population. In addition, participants had trouble identifying environmental resources and programs in their communities, demonstrating further the lack of knowledge in the population. Previous

research has found that the public likely retains only simple details of climate change and global warming (Whitmarsh, 2009). In addition, these details are often integrated with knowledge of other environmental issues (like air and water pollution) and not considered distinctly different concerns (Bulkeley, 2000; Lorenzoni, et al., 2007).

Residents of the Golden Horseshoe also exhibited confusion between climate change and other environmental issues. General environmental concerns were often discussed when asked specifically about global environmental change, climate change or global warming. Although no participants stated that they could not describe global environmental change whatsoever (an observation that has been described in previous research [Dunlap, 1998; Plotnikoff, Wright & Karunami, 2004]), some participants did state that their understanding of the issues was limited.

Misconceptions were also evident throughout the interviews, further indicating a general lack of knowledge. Although the depleting ozone hole is an impact of global environmental change, most of the participants that described the ozone layer did so in the context of global warming or climate change. This is a frequently stated misconception in the perceptions of climate change/global warming literature (Henry, 2000; Dunlap, 1998; Henderson-Sellers, 1990; Henry, 2000; Slimak & Dietz, 2006; Stamm, Clark & Eblacas, 2000; Whitmarsh, 2008; 2009).

Participants often also used the terms global warming, climate change, and global environmental change interchangeably. For example, when asked about global warming, participants would unknowingly discuss the causes and impacts of climate change. When asked about specific term preference, some participants stated that they considered the

terms interchangeable, while others knew there was a difference, but could not articulate it. These findings are consistent with other literature (Whitmarsh, 2009; Akerlof & Maibach, 2011), revealing a deeper misunderstanding of the meanings of the terms they choose to use. Further, this confusion between terms reveals how the meanings and language of global environmental change are socially constructed through individual experiences and interactions within the lay population.

In the literature, the term global warming is frequently used in association with heating of the atmosphere, whereas climate change considers impacts associated with more than just increasing temperatures (Whitmarsh, 2009; Schuldt, et al., 2011). Definitions from media, policy makers, and scientists, widely vary and are often ambiguous or in disagreement (Akerlof, & Maibach, 2011). Most notably, even the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC) differ in their definitions. While the UNFCCC identifies climate change as anthropogenic, the IPCC defines global warming as anthropogenic, and climate change as a combination of human and natural sources (IPCC, 2007; UNFCCC, 1992; Akerlof & Maibach, 2011). The difference in even credible scientific documentation is particularly problematic, as variation in terminology potentially signifies a barrier to effective communication with the public (Akerlof & Maibach, 2011).

Consistent with the literature (Whitmarsh, 2009), this research also found that when participants favoured one term over the other, it was because of skepticism toward the alternative. This is perhaps due to the prominence, dramatization and politicization of

global warming in current media, while climate change is perceived as a more neutral term (Whitmarsh, 2009). Consistently, past research identifies climate change as less politically polarizing (Akerlof & Maibach, 2011), however the term global warming has the potential to generate more concern because of its prominence in mass media (Whitmarsh, 2009).

When asked to identify the source of their knowledge around environmental issues, participants described their education, family and friends, and the media. Like other studies (Whitmarsh, 2009), mass media sources like television, newspapers, radio, movies and Internet were most frequently identified as significant sources of information. Although participants described other sources of environmental information in addition to the media, an overreliance on mass media for environmental information can be problematic because thematic connections made in media coverage can be confused for causal connections in science. This can result in misconceptions and misinformed opinions of environmental change (Hargreaves, et al., 2008).

Despite the media being most often identified, some respondents expressed concern around the media's role in sensationalizing environmental issues and fear mongering. Distrust in the media is particularly relevant as it is a significant source of information for the lay population. This represents a barrier to public engagement in environmental issues if inaccurate, biased, untrustworthy information is frequently transmitted to the public domain. Concern around media credibility could result from the media's portrayal of scientific and political disagreement (Lorenzoni, et al., 2007). In addition, it has been shown that although fearful messages of climate change in the media

can capture the public's attention, they can also result in feelings of helplessness and denial. The presence of sensationalistic messages in mass media could, therefore, have a negative impact on voluntary behaviour change (O'Neill & Nicholson-Cole, 2009). Reinforcing important environmental messages in multiple, trustworthy sources (like scientists, universities, and social networks [Lorenzoni, et al., 2007]) is increasingly important in order to foster sustainable and effective public engagement with climate change (Akerlof, et al., 2010). (This is in agreement with the results of this study discussed above.)

The lack of knowledge related to global environmental change demonstrated in this research has significant policy implications. First, variation in perceptions based on terminology represents a possible barrier to public engagement with environmental change (Akerlof & Maibach, 2011). For both future qualitative and quantitative research, question wording will play a significant role in the understanding of results. Meaning of a specific term should be established prior to engaging in research, so that understanding is consistent before assessing beliefs and behaviours. If this is not defined prior to research, researchers should be aware of the connotations associated with different terminology (Akerlof & Maibach, 2011; Whitmarsh, 2009; Schuldt, et al., 2011). Next, while the public is aware of basic terms related to environmental change, detailed understanding is much lower. This indicates a need for basic education related to the contributing factors and risks associated with climate change and global warming. Context-specific information customized for a specific audience is likely to more significantly influence public engagement (Whitmarsh, 2009). Additionally, skepticism of the issue due to

terminology choice leads to ineffective mitigation, as sustainable policy relies on public acceptance of the causes (including the role of individual behaviour), risks, and existence of climate change and global warming (Whitmarsh, 2009).

5.2.3 Attitudes Toward Global Environmental Change

Consistent with the literature (Norgaard, 2006; Whitmarsh 2008; 2009; Leiserowitz, 2005; 2006; Harrington, 2001; Stamm, Clark & Eblacas, 2000; Henderson-Sellers, 1990; Dunlap, 1998; Lorenzoni & Hulme, 2009; Slimak & Dietz, 2006), this research found that participants did not perceive climate change as a direct risk within the context of their daily lives, and felt that impacts will be temporally and spatially distant. Concern for environmental issues was higher when they were perceived as local threats. This was particularly true when they could be contextualized in their own surroundings (Lorenzoni, et al., 2007) (like air pollution from industrial activity in Hamilton). Interestingly, it has been shown that although environmental issues like climate change or global warming are often not considered current problems (especially when compared with the economy or unemployment), when asked about serious future global issues, global warming and climate change are considered much more worrying (Yeager, et al, 2010). This demonstrates that although the public is not currently concerned about global environmental change, their anxiety could be affected with a temporally accurate understanding of environmental issues.

Another common perception amongst participants was that natural climate variations and/or industrial activity are most responsible for current global environmental change. Although variation in the Earth's climate is natural and industrial activity is an

anthropogenic cause of global environmental change (IPCC, 2007), participants distanced themselves from personal responsibility. Other studies have found the same removal of individual accountability (Leaman, 2004). This is particularly concerning as in Canada, one third of greenhouse gas emissions come from daily activities such as consumer choices, transportation, and choices in the home (Plotnikoff, Wright & Karunami, 2004). A lack of acceptance of the role of personal behaviour could pose a challenge in encouraging voluntary action in climate change mitigation (Ockwell, et al., 2009).

For future policy-making, it is particularly important to frame the risks of environmental change as spatially and temporally relevant and context-specific, as it has been shown that when climate change is viewed as a current risk people are more likely to engage in personal behaviour change and encourage environmental policy (Krosnick, et al., 2006). In addition, education related to the role of individual behaviour in environmental change is imperative to bridge the knowledge-behaviour gap and foster sustainable voluntary mitigation. Voluntary environmental behaviours can include walking, cycling, using public transport, car sharing, turning off lights, using energy-efficient light bulbs, turning the heating down and dressing accordingly, recycling, composting, and flying less (Ockwell, et al., 2009).

5.2.4 Practices

Participants described a variety of environmentally friendly behaviours that can be pursued at an individual or community level. Frequently identified behaviours include recycling (which was described by every participant), composting or using the green bin, switching off lights, reducing car use and idling, taking public transit, and walking and

biking. Although identified, not all participants engage in these behaviours. Reasons included inconvenience, cost, time and discomfort. These potential barriers were especially prominent related to transportation activities, as participants seemed reluctant to change their current car use patterns for more environmentally friendly behaviours like carpooling or using public transit. This pattern has been observed in previous research (Fortner, et al., 2000; Lorenzoni, et al., 2007; O'Connor, Bord, Yarnal & Wiefek, 2002), as support for environmental behaviours reduces when they become difficult, costly, or affect lifestyle.

Although some of these behaviours are not perceived as attractive alternatives, many actions to reduce greenhouse gas emissions provide direct societal benefits. These include health benefits from walking, cycling, and consuming fewer animal products (for example, eating less red meat), as well as using cleaner fuels and increasing energy efficiency (which could result in financial savings) (Akerlof, et al, 2010). This is particularly important when discussing behaviour change incentives, as participants described decreasing cost, and increasing convenience, time, and enjoyment as potential behaviour change mechanisms. Health and other societal co-benefits (like financial savings) of environmentally friendly practices should therefore be communicated clearly by policy makers so that the public understands the societal and environmental benefits of behaviours that might otherwise seem unattractive (Akerlof, et al., 2010; Huang, et al., 2011; Lorenzoni, et al., 2007; Maibach, et al., 2008).

Discussion of barriers with participants uncovered numerous reasons why they are not prepared to change. This is congruent with previous research (Lorenzoni, et al.,

2007), where individual and social level barriers to engaging with climate change have been identified. Individual barriers include a lack of knowledge, skepticism, distrust in information sources, externalizing responsibility and blame, perceiving climate change as a distant threat, not considering the environment as a priority, reluctance to change lifestyles, and individual helplessness (Lorenzoni, et al., 2007). Although many of these themes emerged throughout the interviews in other discussions around knowledge and attitudes of global environmental change, additional details surfaced when asked specifically about barriers. For individuals, personal cost is the main barrier to engaging in environmental behaviours, while inconvenience, personal discomfort, time and physical disability were also described. These barriers represent infrastructural constraints (Ockwell, et al., 2009), as the availability of cheap and comfortable options are perceived to be few (for example, accessible public transportation).

Notably, half of respondents discussed not knowing what to do in the face of global environmental change and not having sufficient choice of options to act in more effective ways. While this indicates a willingness to act consistent with previous research (Leiserowitz, 2005; 2006; Bulkeley, 2000), a lack of knowledge on how to do so effectively represents a significant obstacle.

In addition, social barriers like a lack of political, business and industrial action, and social norms and expectations have been described in the literature (Lorenzoni et al., 2007). Residents of the Golden Horseshoe region described government and industry's fear of economic harm accountable for their lack of action. In addition, participants spoke of the habitual nature, and cultural acceptability of current behaviour. This is not

surprising, as people tend to be reluctant to change daily habits and routines (Lorenzoni, et al., 2007). Cultural acceptance barriers are particularly relevant, as society has co-evolved with contemporary technology (such as road systems and the internal combustion engine), which fosters a high-carbon lifestyle with consumption and technological development representative of social standing and success (Ockwell, et al., 2009). This demonstrates how high-carbon behaviours have been socially constructed as culturally appropriate. Alternatively, certain mitigative behaviours (such as carpooling or eating less red meat) have not been constructed as the norm in this region.

When using the results of this research to foster public engagement, policy makers should ensure people know and care about environmental change, and are motivated and physically and socially able to act in environmentally friendly ways (Lorenzoni, et al., 2007). To cater to different lifestyles and opinions across Canada and within the Golden Horseshoe region, there is a need for a range of policy solutions involving multiple stakeholders (government, industry, interest groups, and members of the public) that consider how these issues are socially constructed and valued by the public. The finding that participants do not know how to act in more environmentally friendly ways assumes basic information provision is needed to overcome this lack of knowledge (Lorenzoni, et al., 2007). A combination of repeated communication techniques (Ockwell, et al., 2009) from a variety of trustworthy sources (to accommodate context-specific perceptions) like universities, scientists, and social networks must be used to create widespread understanding and acceptance of the issue (Lorenzoni, et al., 2007). In addition, the provision of simple, customized information and energy reduction goals could also be

effective tools to encourage public interest (Maibach, et al., 2008). Messages must be consistent with scientific opinion, in order to enhance credibility (Lorenzoni, et al., 2007). Public involvement in policy making should also be encouraged, as openness from government in addressing climate change could be an effective method to reduce distrust (Lorenzoni, et al., 2007).

In order to encourage individual action, results also point to the need for infrastructure that is affordable, clean, efficient, and accepted by the public (Lorenzoni, et al., 2007). For example, public transport might be used more consistently if accessible and affordable. Although costly (Ockwell, et al., 2009), results show that time, money, and convenience were all identified as potential mechanisms of behaviour change, indicating that addressing these problems could increase engagement.

Some participants described participating in environmental activities because they had no choice (because of local by-laws). Although strong legislation may not be an effective or sustainable solution for all environmental change mitigation, areas like transportation could be successful as has been seen with the congestion charge in central London, UK (Ockwell, et al., 2009). Although effective, government action is often limited, because of the fear of public backlash or loss of political support, while forced behaviour change may also not be sustainable if legislation is removed (Ockwell, et al., 2009).

In addition, knowledge of environmental or health community-based activities, resources, organizations and programs was limited. This lack of knowledge, combined with the attitude that personal behaviours do not make a difference indicates a lack of

social capital and community connectedness amongst the residents of the Golden Horseshoe region. This is consistent with other literature from the same area, specifically conducted in Hamilton, Ontario. Wakefield, et al. (2007) discussed that although high levels of concern around environmental issues (in this case, air quality) are not linked to increased individual or group-level behavioural change, increasing social capital (involvement in community networks) can influence behaviour change and overcome the sense of powerlessness associated with addressing environmental concerns. Without social capital and community connectedness, adaptation to and mitigation of environmental issues will have limited success.

5.3 Contributions

This research contributed to existing literature in multiple ways. While the contributions are theoretical, substantive and methodological in nature, the main advancement of knowledge lies in enhanced understanding of the public's perceptions of climate change, global warming, and global environmental change as environmental and health risks. Understanding how the public understand and behave related to environmental change can inform culturally appropriate, sustainable policy for effective behaviour change. In addition, this research helps fill the gap in environmental risk perception literature in a Canadian context.

Methodologically, the qualitative methods used in this research will contribute to the larger research project that will use these results as a guide to develop a large-scale quantitative survey to assess national perceptions of global environmental change in Canada. This will contribute to risk perception literature using mixed-methods. In

addition, qualitative methods allowed in-depth understanding of the public's knowledge, attitudes and practices, and how global environmental change is socially constructed in the Golden Horseshoe region of Southern Ontario.

Theoretically, this research was informed by social constructionism, which explores the public's construction of knowledge, society and the everyday world through social interaction (Bickerstaff & Walker, 2003). Environmental issues have been examined using a social constructionist approach in previous literature (Burningham & Cooper, 1999; Greider & Garkovich, 1994; Bickerstaff & Walker, 2003) in order to understand how environmental issues are perceived in regions with different cultures, values, and beliefs (Greider & Garkovish, 1994). While very little global environmental change research has been conducted in a Canadian context, this study used a social constructionist theoretical approach to gain a deeper understanding of public perceptions in the Golden Horseshoe region of Southern Ontario as influenced by family, friends, media, education and other activities of daily life.

5.4 Limitations and Directions for Future Research

The purpose of this research was to explore the knowledge, attitudes and practices of members of the Golden Horseshoe region of Southern Ontario using qualitative methods. Twenty-two participants were included. The results are therefore not generalizable on a wider scale and are case-specific to this geographical region. Many of the themes that emerged in this research, however, reinforce results from previous literature (presented in Chapter 2).

Although a maximum variation sampling method was used, participants with unrepresented views from different cultural backgrounds may have been excluded. Specifically, ethnic minority and diverse cultural groups are often under-represented in social research. Consequently, some perceptions may not apply to these segments of the population, and their opinions may not be represented in the results (Napoles-Springer & Stewart, 2006). This problem was addressed through multiple recruitment methods, as the advertisement was posted on multiple community boards across the study region. Snowball sampling was also employed in an attempt to access demographic groups that did not become visible using the initial sampling method.

In order to ensure sustainable environmental adaptation and mitigation policy in both Canada and worldwide, public perceptions of global environmental change on a local, national, and international level must be understood. Additionally, throughout the research process other areas were identified for further research.

First, the next stage in this research project builds upon the qualitative results described in this thesis. The results will be used to develop a quantitative survey that will be randomly distributed across Canada. This survey will establish a deeper understanding of perceptions on a national-level that can be generalized on a larger scale. In addition, results will be compared across varying demographic variables and geographic boundaries. Using multiple methods to assess Canadian perceptions of global environmental change will allow increased rigour through triangulation of the data.

Secondly, further qualitative exploration using focus groups or in-depth interviews in communities outside of the Greater Toronto and Hamilton Areas would be

useful to address the research objectives in varying contexts. Specifically addressing under represented or minority populations could be particularly useful in order to gain a deeper and fuller understanding of public perceptions of environmental change. In addition, being a Canadian citizen was a prerequisite to participate, so targeting recent landed immigrants could be particularly interesting for future research. Including greater representation in a wider study area could increase understanding of other culturally significant barriers to behaviour change in Canada.

In conclusion, this research has contributed to a better understanding of how the public in the Golden Horseshoe region of Southern Ontario understand and behave in relation to global environmental change. It is evident that only implementing general education on a broad range of environmental issues will not successfully change public behaviour. It is increasingly important for policy makers to frame environmental issues with context and audience-specific information, and to address existing public-identified barriers to behaviour change. To face the adaptation and mitigation challenges of global environmental change on a Canadian and global scale, it will be increasingly important for policy makers to recognize and react to public opinion of global environmental change and health.

BIBLIOGRAPHY

Ajiboye, J., & Silo, N. Enhancing Botswana Children's Environmental Knowledge, Attitudes and Practices through the School Civic Clubs. *International Journal of Environmental & Science Education.* 3(3): 105-114

Akerlof, K., & Maibach, E., 2011. A rose by any other name…?: What members of the general public prefer to call "climate change". *Climatic Change Letters.* Forthcoming.

Akerlof, K., et al., 2010. Public Perceptions of Climate Change as a Human Health Risk: Surveys of the United States, Canada and Malta. *International Journal of Environmental Research and Public Health.* 7: 2559-2606

Al-Owaish, R., et al. 1995. Knowledge, attitudes, beliefs and practices of the population in Kuwait about AIDS – a pilot study. *Eastern Mediterranean Health Journal. 1(2): 235-240*

Al-Shaar, I., et al., 2010. Knowledge, attitudes and practices of general practicioners towards complementary and alternative medicine in Doha, Qatar. *Eastern Mediterranean Health Journal.* 16(5): 522-527

Balfe, M., et al., 2010. Young women's decisions to accept Chlamydia screening: influences of stigma and doctor-patient interactions. *BMC Public Health*, 10: 425-436

Baxter, J. & Eyles, J. 1997. Evaluating qualitative research in social geography: establishing 'rigour' in interview analysis. *Transactions of the Institute of British Geographers.* 22(4): 505-525

Berman, H., et al., 2006. A Narrative Study of Refugee Women Who Have Experienced Violence in the Context of War. *Canadian Journal of Nursing Research*. 38(4): 32-53

Bickerstaff, K., Walker, G. 2003. The place(s) of matter: matter out of place – public understandings of air pollution. *Progress in Human Geography*, 27(1): 45-67

Bord, R., Fisher, A., O'Connor, R., 1998. Public perceptions of global warming: United States and international perspectives. *Climate Research.* 11: 75-84

Bradshaw, M. & Stratford, E., 2010. Qualitative Research Design and Rigour. In Haye, I. (Ed), *Qualitative Research Methods in Human Geography:* 69-80. Don Mills: Oxford University Press.

Bulkeley, H. 2000. Common Knowledge? Public understanding of climate change in Newcastle, Australia. *Public Understanding of Science.* 9: 313-333

Burningham, K., & Cooper, G. 1999. Being Constructive: Social Constructionism and the Environment. *Sociology*. 33(2): 297-316

Campbell-Lendrum, D.2005. How much does the health community care about global environmental change? *Global Environmental Change*. 15: 296-298

Carlsen, J., Getz, D., & Ali-Knight, J. 2001. The Environmental Attitudes and Practices of Family Businesses in the Rural Tourism and Hospitality Sectors. *Journal of Sustainable Tourism*. 9(4): 281-297

Chambers, J. 1998. Social Embedding of Changes in Progress. *Journal of English Linguistics*. 26(1): 5-36

Chisolm, M., et al., 2010. Cigarette smoking knowledge, attitudes, and practices of patients and staff at a perinatal substance abuse treatment center. *Journal of Substance Abuse Treatment.* 39(3): 298-305

City of Hamilton, 2010. Urban Residential Subdivision & Condominium Developments and Condominum Conversions. Retrieved 8 May, 2011 from City of Hamilton Website: http://www.hamilton.ca/CityDepartments/PlanningEcDev/Divisions/StrategicServicesSpecialProjects/GISPlanningAnalysis/subdivision-and-condomaps.htm

Cope, M. 2010. Coding Qualitative Data. In Haye, I. (Ed), *Qualitative Research Methods in Human Geography:* 279-294. Don Mills: Oxford University Press.

Costello, A., et al. 2009. Managing the health effects of climate change. *The Lancet.* 373: 1693-1733

Cruikshank, K., & Bouchier, N. 2004. Blighted Areas And Obnoxious Industries: Constructing Environmental Inequality On An Industrial Waterfront, Hamilton, Ontario, 1890-1960. *Environmental History.* 9(3): 464-496

Curtis, S., et al., 2000. Approaches to sampling and case selection in qualitative research: examples in the geography of health. *Social Science & Medicine*. 50: 1001-1014

Dishman, et al., 2010. Duck Hunters' Perceptions of Risk for Avian Influenza, Georgia, USA. *Emerging Infectious Diseases.* 16(8): 1279-1281

Dispensa, J.M., & Brulle, R. 2003. Media's Social Construction of Environmental Issues: Focus on Global Warming – A Comparative Study. *The International Journal of Sociology and Social Policy*. 23(10): 74-105

Dunlap, R. 1998. Lay Perceptions of Global Risk: Public views of global warming in cross-national context. *International Sociology.* 13(4): 473-498

Dunn, K. 2010. Interviews. In Haye, I. (Ed), *Qualitative Research Methods in Human Geography:* 99-138. Don Mills: Oxford University Press.

Elliott, S.J. 1999a. And the question shall determine the method: an introduction to a special issue on qualitative approaches in health geography. *Professional Geographer.* 51(2): 240-243.

Elliott, S.J. 1999b. The Power of Perception: Health risk attributed to air pollution in an urban industrial neighbourhood. *Risk Analysis.* 19(4): 621-634

Esa, N., 2010. Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education*. 19(1): 39-50

Eyles, J. 1988. Interpreting the geographical world. In Eyles, J, and Smith, D. eds. *Qualitative methods in human geography.* Polity Press, Cambridge.

Field, C.B., L.D. Mortsch, M. Brklacich, D.L. Forbes, P. Kovacs, J.A. Patz, S.W. Running and M.J. Scott, 2007: North America. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 617-652.

Fortner, R., et al., 2000. Public Understanding of Climate Change: certainty and willingness to act. *Environmental Education Research.* 6(2): 127-141

Gatrell, A.C. and Elliott, S.J. *Geographies of Health.* Second Edition. London: Wiley-Blackwell, 2009.

Greider, T., & Garkovich, L. 1994. Landscapes: The Social Construction of Nature ad the Environment. *Rural Sociology.* 59(1): 1-24

Gupta, RS., et al., 2010. Food allergy knowledge, attitudes, and beliefs of parents with food-allergic children in the United States. *Pediatric Allergy and Immunology*. 21(6): 927-934

Haalbloom, B. 2002. *A qualitative study of the reproductive and psychosocial health concerns of residents living near the tar ponds in Sydney, Nova Scotia*. Unpublished doctoral dissertation, McMaster University, Hamilton, Ontario, Canada.

Hamilton, L., Keim, B. 2009. Regional variation in perceptions about climate change. *International Journal of Climatology.* 29: 2348-2352

Hargreaves, I., Lewis, J., & Speers, T. 2008. Towards a better map: Science, the public and the media. Retrieved from the Economic and Social Research Council Website: http://www.esrc.ac.uk/_images/towards_a_better_map_tcm8-13558.pdf

Harrington, L. 2001. Attitudes toward climate change: major emitters in southwestern Kansas. *Climate Research.* 16: 113-122

Henderson-Sellers, A. 1990. Australian Public Perception of the Greenhouse Issue. *Climatic Change.* 17: 69-96

Henry, A.D. 2000. Public Perceptions of Global Warming. *Human Ecology Review.* 7(1): 25-30

Hinds, K., Carmichael, C., & Snowling, H. 2002. Public Attitudes to the Environment in Scotland, 2002. Retrieved from The Scottish Government Website: http://www.scotland.gov.uk/Publications/2002/11/15864/14272

Huang, C., et al., 2011. Constraints and Barriers to Public Health Adaptation to Climate Change: A Review of the Literature. *American Journal of Preventive Medicine.* 40(2): 183-190

IPCC, 2007: *Climate Change 2007: Synthesis Report. Contributing of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds)]. IPCC, Geneva, Switzerland.

Jaeger, C. et al. 1993. Determinants of Environmental Action with regard to Climatic Change. *Climatic Change.* 23: 193-211

Jaffer, Y.A., et al., 2006. Knowledge, attitudes and practices of secondary-school pupils in Oman: I. Health compromising behaviours. *Eastern Mediterranean Health Journal*. 12(1&2): 35-49

Kalof, L. 1997/1998. Understanding the Social Construction of Environmental Concern. *Human Ecology Review*. 4(2): 101-105

Kearns, R., Moon, G.2002. From medical to health geography: novelty, place and theory after a decade of change. *Progress In Human Geography* 26(5): 605-625

Kearns, RA. 1995. Medical geography: Making space for difference. *Progress in Human Geography*. 19(2): 251-259

Kellstedt, P., Zahran, S., Vedlitz, A., 2008. Personal Efficacy, the Information Environment, and Attitudes Toward Global Warming and Climate Change in the United States. *Risk Analysis.* 28(1): 113-126

Krosnick, J. et al., 2006. The origins and consequences of democratic citizens' policy agendas: a study of popular concern about global warming. *Climatic Change*. 77: 7-43

Kruger, R., & Gericke, GJ. 2003. A qualitative exploration of rural feeding and weaning practices, knowledge and attitudes on nutrition. *Public Health Nutrition*. 6(2): 217-223

Leiserowitz, A. 2005. American Risk Perceptions: Is Climate Change Dangerous? *Risk Analysis.* 25(6): 1433-1442

Leiserowitz, A. 2006. Climate change risk perception and policy preferences: the role of affect, imagery and values. *Climatic Change.* 77: 45-72

Litva, A., Eyles, J., 1995. Coming out: exposing social theory in medical geography. *Health & Place*. 1(1): 5-14

Lock, C., et al., 2002. A qualitative study of nurses' attitudes and practices regarding brief alcohol intervention in primary health care. *Journal of Advanced Nursing.* 39(4): 333-342

Lorenzoni, I., Hulme, M., 2009. Believing is seeing: laypeople's views of future socio-economic and climate change in England and in Italy. *Public Understanding of Science.* 18: 383-400

Lorenzoni, I., Nicholson-Cole S., & Whitmarsh, L. 2007. Barriers perceived to engaging with climate change among the UK public and their policy implications. *Environmental Change*. 17(3-4): 445-459

Luginaah, I. 2009. Health geography in Canada: Where are we headed? *The Canadian Geographer, 53(1): 91-99*

Maibach, E., Roser-Renough, C. & Leiserowitz, A. 2008. Communication and Marketing as Climate Change Intervention Assets: A Public Health Perspective. *American Journal of Preventive Medicine*. 35(5): 488-500

Malka, A., Krosnick, J., Langer, G. 2009. The Association of Knowledge with Concern About Global Warming: Trusted Information Sources Shape Public Thinking. *Risk Analysis.* 29(5): 633-647

McMichael, A., Nyong, A., Corvalan, C. 2008. Global environmental change and health: impacts, inequalities, and the health sector. *British Medical Journal*. 336: 191-194

Mubyazi, G. et al., 2005. Intermittent preventive treatment of malaria during pregnancy: a qualitative study of knowledge, attitudes and practices of district health managers, antenatal care staff and pregnant women in Korogwe District, North-Eastern Tanzania. *Malaria Journal.* 4: 31-41

Myers, S., Patz, J. 2009. Emerging Threats to Human Health from Global Environmental Change. *Annual Review of Environment and Resources.* 34: 223-252

Napoles-Springer, A., & Stewart, A. 2006. Overview of qualitative methods in research with diverse populations. Making research reflect the population. *Medical Care*. 44(11): S5-9

Norgaard, K., 2006. "We Don't Really Want to Know": Environmental Justice and Socially Organized Denial of Global Warming in Norway. *Organization & Environment.* 19(3): 347-370

Norton, A., & Leaman, J. 2004. The Day After Tomorrow: Public Opinion on Climate Change. Retrieved from the MORI Social Research Institute Website: http://climateprediction.net/schools/docs/mori_poll.pdf

Ockwell, D., Whitmarsh, L., & O'Neill, S. 2009. Reorienting Climate Change Communication for Effective Mitigation – Forcing People to be Green or Fostering Grass-Roots Engagement? *Science Communication*. 30(3): 305-327

O'Connor, R., Bord, R., & Fisher, A. 1999. Risk Perceptions, General Environmental Beliefs, and Willingness to Address Climate Change. *Risk Analysis.* 19(3): 461-471

O'Connor, R., Bord, R., Yarnal, B., Wiefek, N. 2002. Who Wants to Reduce Greenhouse Gas Emissions? *Social Science Quarterly.* 83(1); 1-17

O'Neill, S. & Nicholson-Cole, S. 2009. "Fear Won't Do It": Promoting Positive Engagement With Climate Change Through Visual and Iconic Representations. *Science Communication*. 30(3): 355-379

Palutikof, J., Agnew, M., Hoar, M. 2004. Public perceptions of unusually warm weather in the UK: impacts, responses and adaptations. *Climate Research.* 26: 43-59

Patton, M.Q. *Qualitative Research and Evaluation Methods*. Sage Publications, 2002.

Pietsch, J., McAllister, I. 2010. 'A diabolical challenge': public opinion and climate change policy in Australia. *Environmental Politics.* 19(2): 217-236

Plotnikoff, R., Wright, M., Karunamuni, N. 2004. Knowledge, attitudes and behaviours related to climate change in Alberta, Canada: implications for public health policy and practice. *International Journal of Environmental Health Research.* 14(3): 223-229

Richmond, C., & Ross, N., 2009. The determinants of First Nation and Inuit health: A critical population health approach. *Health & Place*. 15(2): 403-411

Ritchie, D., et al., 2010. Public places after smoke-free: a qualitative exploration of the changes in smoking behaviour. *Health & Place.* 16(3): 461-469

Roudsari, H.R.S., et al., 2006. Reproductive health knowledge, attitudes and practices of Iranian and Afghan men in Tehran province. *Eastern Mediterranean Heath Journal.* 12(6): 862-872

Sandvik, H. 2008. Public concern over global warming correlates negatively with national wealth. *Climatic Change.* 90(3): 333-341

Schuldt, J., Konrath, S., Schwarz, N. 2011. Global Warming or Climate Change? Whether the planet is warming depends on question wording. *Public Opinion Quarterly*. 75(1): 115-124

Semenza, J., et al. 2008 a. Public Perception of Climate Change: Voluntary Mitigation and Barriers to Behavior Change. *American Journal of Preventive Medicine*. 35(5): 479-487

Semenza, J., et al. 2008 b. Public perception and behavior change in relationship to hot weather and air pollution. *Environmental Research.* 107(3): 401-411

Slimak, M., Dietz, T. 2006. Personal Values, Beliefs, and Ecological Risk Perception. *Risk Analysis.* 26(6): 1689-1705

Solomon, S., D. Qin, M. Manning, R.B. Alley, T. Berntsen, N.L. Bindoff, Z. Chen, A. Chidthaisong, J.M. Gregory, G.C. Hegerl, M. Heimann, B. Hewitson, B.J. Hoskins, F. Joos, J. Jouzel, V. Kattsov, U. Lohmann, T. Matsuno, M. Molina, N. Nicholls, J. Overpeck, G. Raga, V. Ramaswamy, J. Ren, M. Rusticucci, R. Somerville, T.F. Stocker, P. Whetton, R.A. Wood and D. Wratt, 2007: Technical Summary. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Stamm, K., Clark, F., Eblacas, P. 2000. Mass communication and public understanding of environmental problems: the case of global warming. *Public Understanding of Science.* 9(3): 219-237

Statistics Canada, 2006. Community Profiles from the 2006 Census, Statistics Canada. Retrieved 23 November, 2010 from Statistics Canada Website: http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E

Stedman, R., 2004. Risk and Climate Change: Perceptions of Key Policy Actors in Canada. *Risk Analysis.* 24(5): 1395-1406

Tehrani, R. & Malek-Afzail, H. 2008. Knowledge, attitudes and practices concerning HIV/AIDS among Iranian at-risk sub-populations. *Eastern Mediterranean Health Journal*. 14(1): 142-156

UNFCCC. 1992. United Nations Framework Convention on Climate Change. Retrieved 1 May, 2011 from UNFCCC Website: http://unfccc.int/resource/docs/convkp/conveng.pdf

Viscusi, W.K., Zeckhauser, R. 2006. The perception and valuation of the risks of climate change: a rational and behavioural blend. *Climatic Change.* 77: 151-177

Wakefield, S., et al., 2007. Social capital, environmental health and collective action: a Hamilton, Ontario case study. *The Canadian Geographer*. 51(4): 428-443

Welsh, E. 2002. Dealing with Data: Using NVivo in the Qualitative Data Analysis Process, *Forum: Qualitative Social Research.* 3(2): 1-9

Whitmarsh, L. 2008. Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response. *Journal of Risk Research.* 11(3): 351-374

Whitmarsh, L., 2009. What's in a name? Commonalities and differences in public understanding of "climate change" and "global warming". *Public Understanding of Science.* 18: 401-420

Williams, A., et al., 2010. Sense of Place in Hamilton, Ontario: Empirical Results of a Neighbourhood-Based Survey. *Urban Geography*. 31(7): 905-931

Wilson, K., et al., 2010. Health status and health behaviours in neighbourhoods: A comparison of Glasgow, Scotland and Hamilton, Canada. *Health & Place*. 16(2): 331-338

Winchester, H., & Rofe. M. 2010. Qualitative research and its place in human geography. In Haye, I. (Ed), *Qualitative Research Methods in Human Geography*. Don Mills: Oxford University Press.

World Health Organization (WHO). 2008. Advocacy, communication and social mobilization of TB control: A guide to developing knowledge, attitude and practice surveys. http://whqlibdoc.who.int/publications/2008/9789241596176_eng.pdf (Accessed April 15th, 2011)

Yap, J., et al., 2010. Knowledge, attitudes and practices towards pandemic influenza among cases, close contacts, and healthcare workers in tropical Singapore: a cross-sectional survey. *BMC Public Health*. 10: 442-450

Yeager, D.S., Larson, S., Krosnick, J. & Tompson, T. 2011. Measuring Americans' issue Priorities: A New Version of the Most Important Problem Question Reveals More Concern About Global Warming and the Environment. *Public Opinion Quarterly.* 75(1): 125-138

APPENDIX A: INTERVIEW SCHEDULE

Health	So to start off, I'd like us to talk a little bit about the health of Canadians.	
- Meaning	Could you tell me a little bit about what you think makes a person healthy?	(Possibilities include social, mental, physical, environmental aspects) Explain
	And what about what makes a community healthy?	
	(Depending on their previous answer, they may have already answered this question). Do you think health and the environment are linked in any way?	What role do you think it plays in making a person or a community healthy or unhealthy? Explain
	So how would you describe your own health compared with other people your own age?	Is there anything else?
	What are some of the things you do to keep yourself healthy?	Are there any other reasons you do these things? (Possibilities include being cheap, social benefits, saves time, good for environment [ie. biking/walking instead of driving]) Why is that?
- Priorities		Don't worry if you have already mentioned some of these things, you can repeat yourself.
	So going back to your	

	community, what are some health concerns you think are important?	
	Is there anything you would change in your community to make it a healthier place for you/your family?	
Environment	Now I'd like us to talk a little bit about the environment.	
	What do the words global environmental change mean to you?	Explain
	What about climate change?	Do you think there's a difference between climate change and global warming?
	Do you think the average person understands?	
	Did you ever study the environment in school?	What in particular?
	Other than in school have you heard these terms mentioned anywhere else?	Explain
	What sorts of things can people do to help the environment?	(Possibilities include: - - Recycle/Green Bin - Car pool - Public transit - Biking - Unplugging/switching off lights

	- Water bottles - Purchase local/in season produce - Decrease home energy use - Reducing use of spray cans
What do you do?	
(If they explain how they behave in environmentally friendly ways…) Why do you think people should do these things?	(Possibilities include: - out of concern? - Altruism? - Feel obliged/that it's the 'right' thing to do?)
And do a lot of people you know/in your community _____ (act in these ways)?	Explain
Do you think anything would encourage or discourage people from acting in more 'environmentally friendly' ways?	(Possibilities include: - Save time? - Save money? - Convenience? - More time outdoors? - Why/why not?)
Could you tell me about any environmental organizations or community programs or resources related to environmental issues that you know of offered in your community?	(For example, Royal Botanical Gardens, Environment Hamilton, Bruce Trail Association, Conservation areas, library resources, etc…)
Are you involved in any of these programs?	Why/why not?
Are you satisfied with what you do to help the environment?	Why/why not? Would you change anything? If so, what?

Could you explain to me any reasons these changes couldn't be made?	(Possible barriers could include: - Inability to change (money) - Lack of knowledge - Fatalist attitude - Skepticism/uncertainty - Do not feel accountable - Distrust (of information sources) - Saturation (I'm already doing everything I can do) - Inconvenience (time) - Self-Interest - Lack of motivation) Is there anything else?

Conclusion

Thank you very much for taking the time to participate in my research today. It has helped me have a better understanding of how you perceive health and the environment.

You have expressed that you feel (brief summary), is there anything else you would like to add?

Demographic Information

Just to finish up, I have a short one-page anonymous questionnaire for you to complete. This information will be used to make sure all of our participants are different from one another so we get answers that represent all different groups of Canadians.

If there is any information you don't feel comfortable including in this survey you can skip any question without consequence.

If you have any questions about the questionnaire or if anything is unclear, please don't hesitate to ask.

APPENDIX B: DEMOGRAPHIC QUESTIONNAIRE

Year of Birth: _____

Gender: M F

Marital Status (circle one):

Single Married Separated Divorced Widowed

Do you have any children? Y N

If so, how many? _____

What is your country of birth? _____

In what municipality do you currently reside? _____

What is your current employment status? (circle one)

Unemployed Student Full-time Part-time Retired

What is the highest level of education you have completed?

_____

Place an X on the line to indicate your political views:

Conservative **|----------|** Liberal

Place an X on the line to indicate your level of community involvement:

Not involved **|----------|** Very involved

How did you hear about this research? _____

APPENDIX C: LETTER OF CONSENT

November, 2010

LETTER OF CONSENT

Assessing Public Perceptions of Health and Environmental Change: Towards Sustainable Behaviour Change?

Investigators:

Principal Investigator: **Dr. Susan Elliott**
Department of Geography & Earth Sciences
McMaster University
Hamilton, Ontario, Canada
905 525-9140 ext. 23139
E-mail: elliotts@mcmaster.ca

Graduate Student Researcher: **Francesca Cardwell**
Department of Geography & Earth Sciences
McMaster University
Hamilton, Ontario, Canada
905 525-9140 ext. 20440
E-mail: cardwefs@mcmaster.ca

Purpose of the Study

In this study we would like to talk to citizens of the Golden Horseshoe region of Ontario about health and how you perceive environmental issues in your community. We are interested in increasing our understanding of the Canadian public's knowledge, attitudes and practices related to health and the environment.

Procedures involved in the Research

Participation involves a one-on-one interview that will last approximately 1 hour. This interview will take place at a time most convenient to you in a room at your local library. Prior to the interview you will be asked to fill out a short questionnaire that will take less than five minutes. If you do not feel comfortable answering any questions on this questionnaire you can skip them without penalty. With your permission, interviews will be audio recorded. You will be discussing issues related to health and environmental change.

Following the interview, you will be given the opportunity to ask me any questions related to the study, add any information you think is relevant but you did not get a chance to discuss during the interview, and express whether you would like to be notified of the results when the research is complete. To thank you for your participation you will be given a gift card for a local grocery store.

Potential Risks

There are minimal risks involved in participating in this study. You may feel uncomfortable answering some questions in the interview, and you do not need to answer any questions that you do not want to. You can withdraw at any time without penalty. I describe below the steps I am taking to protect your privacy.

Potential Benefits

The research will not benefit you directly. What is learned as a result of this study will help us to better understand how the public in Southern Ontario understand global environmental change and health.

Reimbursement

To thank you for your time and participation, you will be given a gift card for a local grocery store upon completion of the interview.

Confidentiality

Every effort will be made to protect your confidentiality and privacy. I will not use your name or any information that would allow you to be identified in any presentations or published work related to the research. The information obtained will be kept in a locked desk where only I will have access to it, and electronic information will be protected by a password. Once the study has been completed, all of the information will be destroyed.

Participation and Withdrawal

Your participation in this study is voluntary. If you decide to be part of the study, you can decide to withdraw at any time, even after signing the consent form or part-way through the research. If you decide to withdraw, there will be no consequences to you. In cases of withdrawal, any data you have provided will be destroyed unless you indicate otherwise. If you do not want to answer some of the questions you do not have to, but you can still be in the study. Your decision to withdraw will have no effect on your compensation.

Information about the Study Results

I expect to have this study completed by approximately August, 2011. If you would like to receive the summary personally, please let me know how you would like me to send it to you.

Questions about the Study

If you have questions or require more information about the study itself, please contact me.

This study has been reviewed by the McMaster University Research Ethics Board. and received ethics clearance. If you have concerns or questions about your rights as a participant or about the way the study is conducted, please contact:

McMaster Research Ethics Secretariat
Telephone: (905) 525-9140 ext. 23142
c/o Office of Research Services
E-mail: ethicsoffice@mcmaster.ca

CONSENT

I have read the information presented in the information letter about a study being conducted by Dr. Susan Elliott and Francesca Cardwell of McMaster University. I have had the opportunity to ask questions about my involvement in this study and to receive additional details I requested. I understand that if I agree to

participate in this study, I may withdraw from the study at any time. I have been given a copy of this form. I agree to participate in the study.

Signature: _____

1. I agree that the interview can be audio recorded.
… Yes
… No

2. …Yes, I would like to receive a summary of the study's results. Please send them to this email address _____ or to this mailing address _____.
…..No, I do not want to receive a summary of the study's results.

APPENDIX D: ADVERTISEMENT

APPENDIX E: ENVIRONMENTAL RESOURCES

Environment Canada
http://www.ec.gc.ca/default.asp?lang=En&n=FD9B0E51-1

Ministry of the Environment - Ontario
http://www.ene.gov.on.ca/en/index.php

Health Canada – Environmental and Workplace Health
http://www.hc-sc.gc.ca/ewh-semt/index-eng.php

Halton Region – Public Health Unit
http://www.halton.ca/cms/One.aspx?portalId=8310&pageId=9090

City of Hamilton – Public Health Services
http://www.hamilton.ca/HealthandSocialServices/

Niagara Region – Public Health Unit
http://www.niagararegion.ca/liing/health_wellness/default.aspx

APPENDIX F: CODEBOOK

1. Health - Individual
    a. Physical
        i. Food/Diet
        ii. Exercise
        iii. Smoking
        iv. Genetics
        v. Disease/Illness/Sickness/Absence of
        vi. Other
    b. Mental
        i. Depression
        ii. Anxiety
        iii. Stress
    c. Spirituality/Religion
    d. Social
        i. Friends
        ii. Family
        iii. Community
        iv. Access to facilities/resources
        v. Education
        vi. Safety
        vii. Employment
    e. Environmental
        i. Identified themselves
            1. Pollution
                a. Air Quality
            2. Water
            3. Population Growth
            4. Chemicals/Fertilizers
            5. Food
            6. Natural Disasters
            7. Deforestation
            8. 'Clean' Neighbourhood/Garbage
        ii. With probe
            1. Pollution
            2. Water
            3. Population Growth
            4. Chemicals/Fertilizers
            5. Food

6. Natural Disasters
7. Deforestation
8. 'Clean' Neighbourhood/Garbage

2. Health – Community
    a. Resources
        i. Infrastructure
        ii. Transportation
        iii. Access to Child Care
        iv. Access to Education
        v. Access to Physical Exercise
        vi. Community Centers
        vii. Education
        viii. Safety
    b. Number of healthy people
    c. Social
        i. Friends
        ii. Family
    d. Environmental
        i. Air Quality
        ii. Water
        iii. 'Clean' Neighbourhood/Garbage
        iv. Green Space
        v. Self-Sufficient
            1. Identified themselves
            2. With probe

3. Self-identified health
    a. Good
    b. Average
    c. Bad

* given reasons fit within individual or community health codes

4. Health-related Behaviours
    a. Drinking
        i. Do it
        ii. Don't do it
    b. 'Good' genes
    c. Diet
        i. Fruit/Vegetables
        ii. Taking vitamins
        iii. Caffeine

d. Habits/Upbringing
e. Exercise
    i. Walking
    ii. Biking
    iii. Gym/Work Out
    iv. Jogging/Running
    v. Organized sports/dancing/yoga
    vi. Swimming
    vii. Hiking
    viii. Other outdoor activities
f. Reasons for behaviours
    i. Enjoyment
    ii. Social benefits
    iii. Physical Disability
    iv. Time
    v. Cost

5. Community Health Concerns
    a. Transportation
        i. Cars
        ii. HSR/Public Transportation
        iii. Walk
        iv. Bike
        v. One-way streets
    b. Poverty
    c. Crime/Safety
    d. Drugs
    e. Mental Illness
    f. Accessibility
        i. Services
            1. Medical
            2. Education
            3. Housing
        ii. Information
    g. Immigrant Segregation
    h. Aging population
    i. Environment
        i. Air Pollution
        ii. Garbage
    j. Obesity/Nutrition
    k. Other

6. Global Environmental Change

a. Knowledge
    i. Climate Change
        1. Natural Disasters
            a. Flooding
            b. Tsunamis
            c. Hurricanes
            d. Volcanoes
            e. Earthquakes
        2. Greenhouse gas emissions
            a. Transportation
            b. Industry
            c. Personal
        3. Pollution
            a. Water
            b. Air
        4. Natural Cycles
        5. Wildlife
            a. Polar Bears
            b. Species Extinction
        6. Rainforests
        7. Glaciers/ice melting
        8. Storms
        9. Sea-level rise/Increased water levels
        10. Ozone hole
        11. Global cooling
        12. Health effects
            a. Individual
            b. Family/Friends/Community
            c. National
            d. International
    ii. Global Warming
        1. Natural Disasters
            a. Flooding
            b. Tsunamis
            c. Hurricanes
            d. Volcanoes
            e. Earthquakes
        2. Greenhouse gas emissions
            a. Transportation
            b. Industry
            c. Personal
        3. Pollution
            a. Water

        b. Air
    4. Natural Cycles
    5. Wildlife
        a. Polar Bears
        b. Species Extinction
    6. Rainforests
    7. Glaciers/ice melting
    8. Storms
    9. Sea-level rise/Increased water levels
    10. Ozone hole
    11. Global cooling
    12. Health effects
        a. Individual
        b. Family/Friends/Community
        c. National
        d. International
iii. Environmental Change/Issues
    1. Natural Disasters
        a. Flooding
        b. Tsunamis
        c. Volcanoes
        d. Hurricanes
        e. Earthquakes
    2. Pollution
        a. Water
        b. Air
    3. Wildlife
    4. Rainforests
    5. Deforestation
    6. Storms
    7. Ozone hole
    8. Health effects
        a. Individual
        b. Family/Friends/Community
        c. National
        d. International

b. Attitudes
    i. Climate Change
        1. Cynical/Skeptical
        2. Humans responsible
        3. Curious
        4. Helplessness/I won't make a difference
        5. Overwhelmed with information

6. Sad
7. Concern/worry
    a. Yes
    b. No
8. Spatially Distant
9. Time frame identified
    a. Long-term (temporally distant effects)
    b. Short-term
10. Don't want to think about it/hear bad news
11. Political Agenda
    a. Bad science
    b. Financial gain
    c. Trust
12. Benefits
    a. Canada will benefit
    b. Warmer is better
13. Too much hype/buzz word

ii. Global Warming

1. Cynical/Skeptical
2. Humans responsible
3. Curious
4. Helplessness/I won't make a difference
5. Overwhelmed with information
6. Sad
7. Concern/worry
    a. Yes
    b. No
8. Spatially Distant
9. Time frame identified
    a. Long-term (temporally distant effects)
    b. Short-term
10. Don't want to think about it/hear bad news
11. Political Agenda
    a. Bad science
    b. Financial gain
    c. Trust
12. Benefits
    a. Canada will benefit
    b. Warmer is better
13. Too much hype/buzz word

iii. Environmental Change/Issues (if neither identified)

1. Cynical/Skeptical
2. Humans responsible

3. Curious
4. Helplessness/I won't make a difference
5. Overwhelmed with information
6. Sad
7. Concern/worry
    a. Yes
    b. No
8. Spatially Distant
9. Time frame identified
    a. Long-term (temporally distant effects)
    b. Short-term
10. Don't want to think about it/hear bad news
11. Political Agenda
    a. Bad science
    b. Financial gain
    c. Trust
12. Benefits
    a. Canada will benefit
    b. Warmer is better
13. Too much hype/buzz word

c. Use terms interchangeably
    i. Yes
    ii. No
        1. Prefer climate change
        2. Prefer global warming

7. Learn about issues
    a. School
        i. High School
        ii. University
        iii. Children (their own/others) at School
    b. Media
        i. Newspapers
        ii. TV
        iii. Radio
        iv. Internet
    c. Family/Friends
    d. Other

8. Environmental Behaviours
    a. Recycle/Reduce/Reuse
        i. Useful
        ii. Not

b. Water Bottles
    i. Useful
    ii. Not
c. Green Bin
    i. Useful
    ii. Not
d. Compost
    i. Useful
    ii. Not
e. Food
    i. Personal Gardens
    ii. Organic
    iii. Buy local
    iv. Vegetarianism/Veganism
f. Energy Consumption
    i. Smart Meter
    ii. Air conditioner
    iii. Heating
    iv. Use clothes line
    v. Unplugging appliances
    vi. Switching off lights
g. Transportation
    i. Car use
        1. Reduce
        2. Idling
        3. Environmentally friendly cars
    ii. Walk/Bike
    iii. Environmentally friendly cars
    iv. Carpool
    v. Public Transit
        1. HSR
        2. GO Transit
h. Public Initiatives
    i. Useful
    ii. Not
i. Plastic Bags
    i. Useful
    ii. Not

9. Reasons to pursue these behaviours
    a. Believe it's the right thing to do/Moral Obligation
    b. Concern
    c. Habit

d. Education
e. Media messaging
f. Incentives
    i. Cost
    ii. Convenience
    iii. Enjoyment
    iv. Time
g. Guilt
h. Altruism
    i. Children/Family

10. Environmental Resources/Programs
    a. Identified
        i. Participate
        ii. Don't participate
            1. Negative Perception
            2. Time
            3. Don't have enough details
            4. Don't care
    b. Identified aspects of what they do but not name
        i. Participate
        ii. Don't participate
            1. Negative Perception
            2. Time
            3. Don't have enough details
            4. Don't care
    c. Do not know any

11. Satisfaction
    a. Yes
    b. No
        i. Barriers to Pursuing Environmental Behaviours
            1. Economic Harm
            2. Personal Cost
            3. Don't care
            4. Don't feel accountable
            5. Already doing everything I can do
            6. Don't know what to do
            7. Don't know results of my actions
            8. Politics
            9. Convenience
            10. Not easy enough
            11. Time

12. Discomfort
13. Availability of options
14. Physical