University of Alberta

Perception of Climate Change

Among Egyptians Living in Egypt and Canada

By

Tarek Ahmed Zaki

A thesis submitted to the Faculty of Graduate Studies and Research

in partial fulfillment of the requirements for the degree of

Master of Science

In

Rural Sociology

Department of Resources Economics and Environmental Sociology

©Tarek Ahmed Zaki

Fall 2011 Edmonton, Alberta

Abstract

This thesis explores the risk perception of climate change among Egyptians who reside in Canada and Egyptians who reside in Egypt. It applies a quantitative comparative analysis of these two populations to assess differences in risk perception of climate change and the influence of world views. Data for Egyptian residents was taken from a World Bank study about global perspectives on climate change; data for Canadian residents was taken from two Egyptian associations in Alberta. To explore factors associated with risk perception of climate change (and to explore the Canadian social context of risk perception in more detail) variables were added to the Canadian dataset such as access to information about climate change, socio-economic conditions and belief in self-responsibility. Results show that the Egyptian population has a significantly higher risk perception of climate change than the Egyptian Canadian population. Also there are significant differences in the way world views are associated with risk perception of climate change. Access to general knowledge about climate change and belief in self-responsibility about climate change was significantly associated with risk perception of climate change in the Egyptian Canadian sample. This research outcome raises questions about sources and content of this knowledge of climate change, and implications for public risk perception and policy development options for climate change mitigation and adaptation.

Perception of Climate Change Among Egyptians Living in Egypt and Canada

Table of Contents

Figures

Tables

Chapter 1: Introduction

Climate change is considered one of the main environmental phenomena that has drawn the world's attention in recent decades. Climate change has the potential for multiple negative impacts on human life and human health generally, especially in developing countries because of the difficulty of adapting and implementing public health programs (Patz et al. 2002; Haines et al. 2006). It may also cause changes in the way and place that diseases develop and transform (Haines et al. 2006). Mortality rates are expected to be higher with the increase in temperature, as heat waves are expected to increase in some parts of the world (Patz et al. 2005).

Climate change is expected to have a great effect on regional water resources and water supply, as the demand for water and water quality is expected to change. Climate change is likely to affect many water-related aspects of human well-being, from agricultural productivity and energy use to flood control, municipal and industrial water supply, water quality, and water quality-related human health. Climate change can alter the amount of water available for use through increased evaporative losses from bodies of water, reduced runoff, and increasing competition between different sectors (McCarl, 2006).

Climate change has affected different species, populations, distributions, and interactions; it also jeopardized some species to the point of extinction (Thomas et al., 2004; Parmesan et al. 2006). Biodiversity is expected to be negatively impacted through reduced habitat suitability and reproduction performance (Hulme 2005). Many organisms in various geographic regions have been affected; common changes relate to timing of spring activities: earlier breeding of birds, spawning of amphibians, and flowering of plants (Walther et al. 2002).

All of these climate change impacts make it vitally important to implement mitigation and adaptation policies on a national and international level. Scholars recognize the policy-

making process is influenced by public risk perception; members of the general public apply positive or negative pressure on the policy process depending on their perceived risk. In a democratic country such as Canada, it is important to understand public's capacities and tendencies in using information in order to form opinions about climate change; as it has a strong influence on effectively implementing related public policies (Leiserowitz, 2005). This is due to a strong link between public perception, public opinion and public policy development. Historically quite minimal, public knowledge about climate change is now on the rise, as is the relative importance of the issue to the public agenda (Leiserowitz, 2005). Public understanding of climate change and public risk perception is therefore becoming a more important field of study, as public awareness is an initial aspect of public willingness to take necessary action in the face of climate change.

Previous studies on risk perception of climate change have focused on the measurement of risk perception and the factors influencing it (O'Connor et al. 1998; Leiserowitz et al. 2007). Most of these studies were focusing on a single population, while few studies have included different populations in a comparative approach. There was an assumption that risk perception varied according to differences in cultural background, so previous studies also have tried to measure the effect of cultural factors on risk perception (Sjoberg 2000; Steg 2000).

Other studies have compared different populations in different countries and have confirmed differences in risk perception based on cultural distinctions (Leiserowitz 2008; Lorenzoni 2009). None of the previous studies, however, have attempted to compare two populations with similar cultural backgrounds in two different countries of residence. This particular comparison is the focus of this study. One of the reasons for taking this comparative approach is to understand the impact of immigration on a population's perception of risk,

assuming that a shift in residence from one country to another (in this case from Egypt to Canada) might result in a different understanding of this global environmental problem. This study is aimed at learning more about the factors that influence risk perception and how these factors might vary within a population of Egyptians living in two different parts of the world. Although cultural theory points to the influence of culture on risk perception, very few studies have investigated the role of immigration and cultural transition on risk perception, and therefore more scholarly attention is needed in this area of risk research.

Since Canada is a country of immigrants, with relatively high annual rates of immigration, this study also focuses on the relationship between risk perception of climate change among new Canadians and the prospects for stronger public policy development for adaptation and mitigation.

Research Approach

This research focuses on the risk perception of Egyptians who reside in Egypt and Egyptians who reside in Canada. With the Canadian immigration rate at about 250,000 annually, Egyptian immigrants are one example of immigration that is a common part of the Canadian experience; in-migration from an economically developing country to a developed one. In this case, Egyptian immigrants come from an Arab culture and are assumed to have different experiences and perspectives in comparison to natives of western countries. Also, economic and social levels are lower in Egypt than in Canada, therefore potentially impacting risk perception of climate change. These differences between countries may lead to differing views on climate change, which could remain a part of the world-view of Egyptians who become residents of other countries. Given the high annual rate of immigration to Canada, understanding risk perception among immigrant groups may provide insight into public perceptions of climate

change risk, and result in public policy development in Canada for mitigation and adaptation to climate change.

In order to study these differences in risk perception; research is based on World Bank (2009) data on the risk perception of climate change among Egyptians living in Egypt and a similar study on risk perception of climate change among Egyptians living in Alberta, Canada. Data on Egyptians living in Canada was collected from members of the Egyptian Student Association (ESA) and the Canadian Egyptian Society of Edmonton (CESOE), which are the main two Egyptian associations in Alberta. The main research questions are as follows:

1. Are there differences in risk perception of climate change between Egyptians living in Egypt and Egyptians living in Canada?

2. If so, what are the factors associated with this difference?

This research takes a comparative approach between the Egyptian dataset and the Canadian dataset in order to identify the differences in attitudes and beliefs (world-views) and the differences in factors influencing risk perception of climate change between these two datasets.

The research provides insight into the conditions under which risk perceptions are maintained or transformed through a process of immigration. Research results can also be used as an indication of general attitudes toward climate change among Egyptian immigrants, and the potential for shifting beliefs and attitudes with regard to climate change that stems from integration with Canadian society. Since this study draws on two independent samples, rather than a cohort study of Egyptians who migrate to Canada, there are however limits to this analysis. See the section on study limitations for more discussion on these limitations.

Research Objectives and Significance

The following objectives provide direction for this study:

Objectives:

1- Contribute to a better understanding of risk perceptions among Egyptian immigrants to Alberta, Canada. Most of the research in this area focuses on general population studies rather than on minorities or immigrants, yet minority or immigrant populations may have unique attributes associated with the maintenance or transformation of risk perception within a post-immigration context.

2- Identify the factors associated with Egyptian immigrants' risk perception of climate change. A novel aspect of this study is to identify these factors in the context of an immigration process.

3- Identify ways to raise awareness of climate change issues in the Canadian Egyptian population. This objective relates primarily to decision makers who are interested in building public support and responses to the growing challenges of climate change in countries such as Canada and Egypt.

Significance:

Canada has an increasingly multicultural population, and each immigrant or cultural group is thought to maintain distinct perceptions and values that are related to their country of origin. The results of this research can indicate to researchers and policy makers some insights into general attitudes toward climate change among Egyptian immigrants, and also the potential for different world views to emerge with regard to climate change that stem from integration into Canadian society. Finally, the results of this research can be used to raise climate change

awareness, by determining the factors that affect Egyptian immigrants' understanding of climate change and how these factors can be addressed or influenced in various ways.

Organization of thesis

This research begins with a literature review exploring the definition of "climate change" as a scientific concept. It then moves on to how climate change is being perceived as an environmental phenomenon, and the role of risk perception in forming public policies. The literature review also explores the concept of risk perception, global risk perception of climate change, and cultural theory as key perspectives in this study.

The third chapter provides a research methodology which includes a description of the World Bank report, the Canadian Egyptian sample details and finally a description of the depended and independent variables that are utilized in this analysis. The fourth chapter details the results of the analysis, starting with a descriptive analysis of the data and ending with multivariate analysis and a regression model. The fifth chapter contains a discussion of the results. The sixth chapter includes a conclusion, study limitations and future work. These comments are followed by a list of references and an appendix.

Chapter 2: Conceptual background and literature review

In this chapter I explore studies and published literature that relate to my research. I begin by defining climate change as a concept, which is the environmental phenomenon that provides the focus of this research. I then explain the global nature of climate change, which makes it important on a global scale. Some global reports on climate change will be presented in this research; I focus mainly on the World Bank report issued in December 2009. The main social concept in this research is risk perception, which I explain in detail. As this research includes two different cultural settings, cultural theory will be presented and some previous research related to this research topic will be reviewed. Also, to explain why studying public opinion is important in dealing with climate change, I explain the relation between public opinion and the policy process. To explain why it is important to study public perceptions of climate change, I begin this review with a discussion of climatic change and its associated impacts.

Global Climate change

Climate change as a concept refers to "all forms of climatic inconstancy, regardless of their statistical nature (or physical causes)" (Mitchell 1966). United Nation's Framework Convention on Climate Change (UNFCCC) defines climate change as "a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and that is in addition to natural climate variability over comparable time periods" (UN 2004). The Intergovernmental Panel on Climate Change (IPCC) defines climate change broadly as "any change in climate over time whether due to natural variability or as a result of human activity" (IPCC 2007).

There is a growing global awareness that human activities are the main cause of climate change. Temperatures are increasing at a rate twice the normal global average, and weather

conditions are rapidly changing in both magnitude and frequency (Barber 2008; Comiso 2008). Atmospheric composition is changing through the emission of greenhouse gases (GHGs) such as carbon dioxide (CO_2) and methane (CH_4), which is known as anthropogenic forcing of changes to the climate. Since the industrial revolution, the global concentration of carbon dioxide has been estimated to have been increased 31% (Karl and Trenberth 2003). Anthropogenic greenhouse gases trap radiation produced by the Earth and prevent it from leaving the atmosphere, which increases the global temperatures in what is called the warming effect (Karl and Trenberth 2003, National Academies 2008). The anthropogenic climate change caused by the increase in CO_2 concentration is irreversible for at least one thousand years, even if emissions stop (Solomon et al. 2009).

Therefore, it is important to examine the effects of increasing atmospheric concentrations of greenhouse gases on climate at three levels before examining overall climate change: global, national, and regional (Karl et al. 2009). Globally, the IPCC predicts that continuing GHG emissions at or above current rates will further warm the Earth and induce many changes in the 21st century global climate system that are very likely to be greater than those experienced in the previous century (Meehl et al. 2007). Heat waves are expected to be more intense and to extend over larger time periods, while cold spells are projected to decrease in a warmer global climate (Meehl et al. 2007). On a daily cycle, daily minimum temperatures are expected to increase faster than daily maximum temperatures (Meehl et al. 2007). Model outputs regarding global precipitation envisage that tropical areas near the equator will become wetter, mid-latitude areas will generally be subject to decreases in precipitation, and conversely, high latitudes will become wetter (Meehl et al. 2007).

As of 2008, atmospheric CO_2 concentration was estimated to be 385 ppm (Tans 2010). CO_2 concentrations in the atmosphere are expected to rise to 450-650 ppm over the next 100 years, dry season- rainfall is expected to decrease 20% because of the global mean warming of 2°C in various regions of the world such as northern Africa, southern Europe, and western Australia (Solomon et al. 2009). Dry season rainfall is also expected to decrease to a lesser extent, 10%, for the same global mean warming in south western North America, eastern South America, and southern Africa (Solomon et al. 2009).

What is risk perception?

Researchers and analysts often understand risk perception in terms of subjective or objective judgments; subjective judgement of risks tends to be biased and influenced by personal perceptions (Shaw and Woodward 2008). People may overestimate or underestimate risks as compared to science-based calculations, as shown by a study on the risk perception of lung cancer among smokers and non-smokers (Lundborg and Lindgren 2004). Non-smokers have a higher risk perception of lung cancer, which indicates a relation between behavior and risk perception. On the other hand, objective risks are expected to be less biased and less influenced by personal perceptions. Studies relate ongoing debate in political and scholarly circles about the legitimacy of public risk perception and the relative value of determining risk perceptions on topics such as climate change.

A major contributor to this literature on risk perception is Paul Slovic (1987; 2000). According to Slovic, "the majority of citizens rely on intuitive risk judgments typically called risk perception" (Slovic, 1987: 280). Although risk can be calculated in scientific terms, it is perceived by people in different ways (Slovic, 1987). To illustrate this point, Slovic studied technological hazards and the ways that people perceive them (Slovic 2000). His results show a

certain type of rationality that is evident in the perception of risk among different groups. Whereas experts calculate risks in terms of scientific measurement and the calculation of probabilities, lay people use a different set of criteria to determine their perception of risk, such as equity concerns, controllability, and levels of trust with managing institutions (Slovic 2000).

Although risk perception is viewed as being "systematic and predictable", it is difficult to measure in a consistent way (Slovic 2000). It can be said that perceptions of risk related to climate change may possibly also vary considerably across different groups of people.

Global reports on climate change risk perception:

Global reports have shown a variation in public opinion with respect to the awareness and perceived seriousness of climate change as an environmental phenomenon. The Pew Research Center for the People and the Press issued a report in 2006 on the global risk perception of climate change. As shown in Figure 1, the majority of respondents from the developed countries (Great Britain, Japan, France, Germany, and USA) have a high level of awareness of climate change as an environmental phenomenon.

On the other hand respondents from the developing countries (Pakistan, Indonesia, Nigeria, and Egypt) have a lower awareness of climate change as an environmental phenomenon. This general trend has important implications for development of public policy related to climate change, where weak political support may limit a government's ability to act in serious ways. At the same time, it may also be the case that people in developing countries have adapted to changes in their climate, without understanding climate change as a theoretical and environmental concept (Leiserowitz 2008).
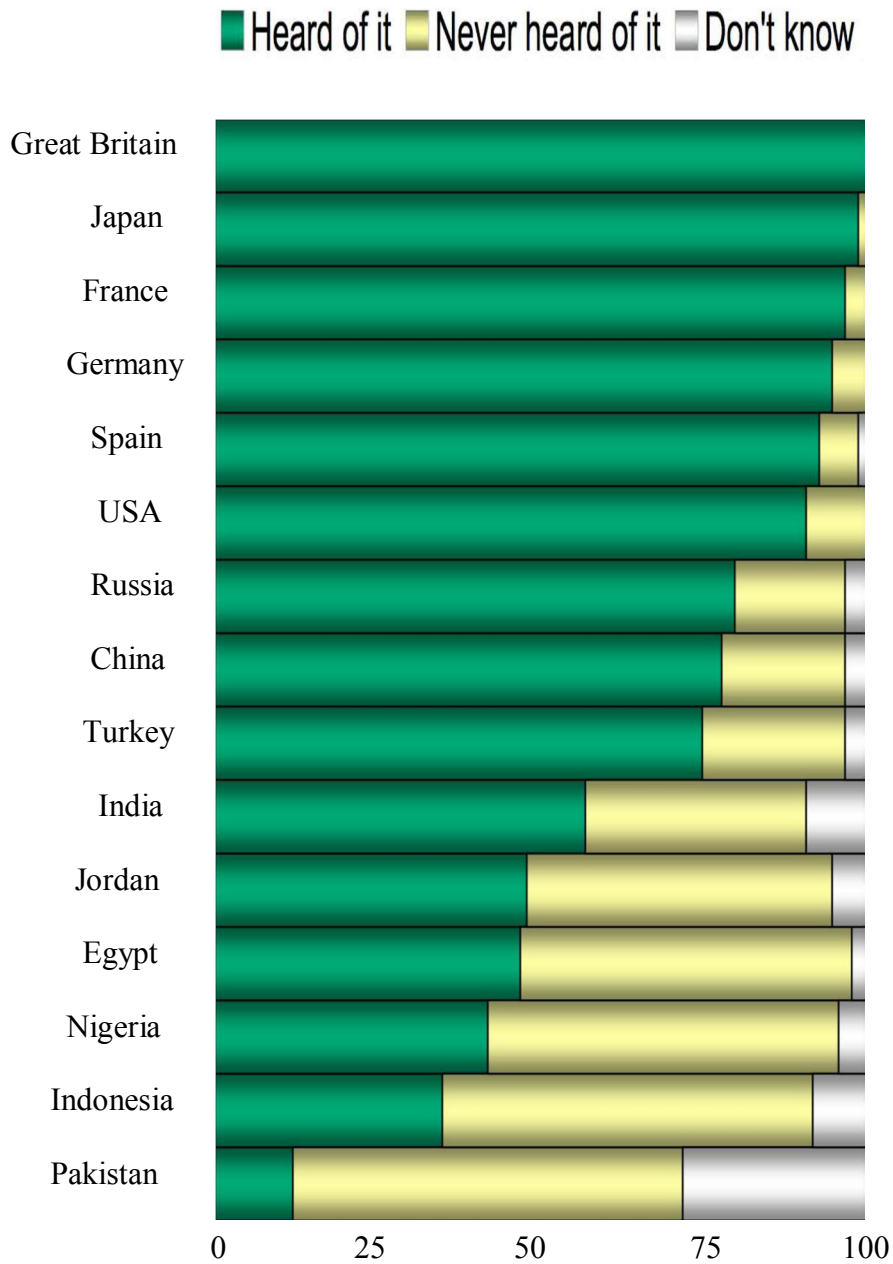
Figure 1. Country by country response to the question: "Have you ever heard of the environmental problem of global warming?"(Leiserowitz 2008).
"This image has been reproduced and included in this research paper for the purpose of review under the s.29 Fair Dealing provision in the Canadian *Copyright Act*."

The "GlobeScan" center conducted six surveys related to global risk perception of climate change and climate related impacts (GlobeScan 1998, 1999, 2000, 2001, 2005, 2006) there results are summarized in (Leiserowitz 2008). Examining the results of these surveys, there was no specific repeated pattern regarding public opinion in the developing or the developed countries included in these reports.

In Dec 2009, the World Bank issued a report to evaluate the global risk perception of climate change (World Bank 2009). The polling was conducted among 15,518 respondents in 16 countries (Bangladesh, Brazil, China, Egypt, France, India, Indonesia, Iran, Japan, Kenya, Mexico, Russia, Senegal, Turkey, the United States, and Vietnam). This multi-national study consisted of surveys in high-income countries (United States-France-Japan), upper-middle-income countries (Mexico-Russia-Turkey-Brazil), lower-middle-income countries (Iran-China-Indonesia-Egypt-India), and low-income countries (Vietnam-Senegal-Kenya-Bangladesh).

The report included four dimensions: level of concern, beliefs about climate change, attitudes towards international climate change cooperation and willingness to bear economic costs to support national action. The World Bank report used four separate aspects to measure the level of concern: the perception of the seriousness of climate change, the perception of climate change as a priority, the perception of the effects of climate change, and the perception of the timing of the impact of climate change.

Examining the results of the first question, the seriousness of climate change (Figure 2), we can see that developing countries such as (Egypt, Indonesia, Vietnam, Senegal, Bangladesh and Kenya) have a higher level of concern compared to developed countries (US, Japan, Russia and China). In contrast to the Pew 2006 report, the World Bank report shows a pattern of the

international level of concern; according to this pattern the developing countries have a higher

level of concern.

Is Climate Change a Problem?

Legend: ■ Very serious ■ Somewhat serious □ Not too serious ■ Not a problem

Country	Very serious	Somewhat serious	Not too serious	Not a problem
US	31	39	18	12
Japan	38	50	11	
France	43	45	8	4
Russia	30	42	16	5
Mexico	90		7	
Turkey	79	12	3	2
Iran	63	17	5	6
China	28	48	21	
Egypt	60	33	6	
Indonesia	61	19	17	
India	62	18	12	3
Vietnam	69	21	9	
Senegal	72	19	7	2
Bangladesh	85	14		
Kenya	75	17	8	
Average	59	27	9	3

Blank space between bars represents Don't Know/Refused

Figure 2. Country by country response to the question: "Is climate change a problem?" (World Bank 2009).
"This image has been reproduced and included in this research paper for the purpose of review under the s.29 Fair Dealing provision in the Canadian *Copyright Act*."
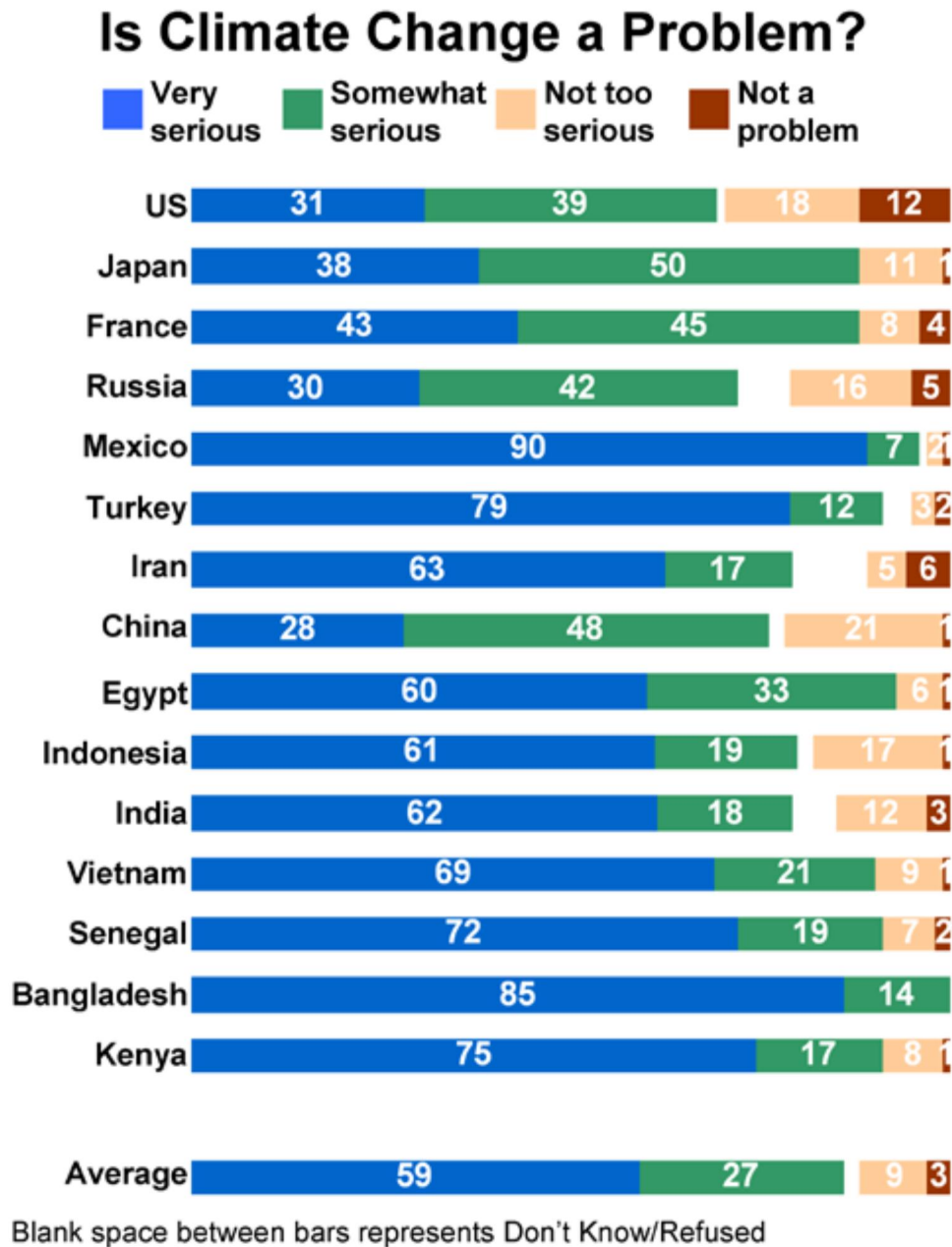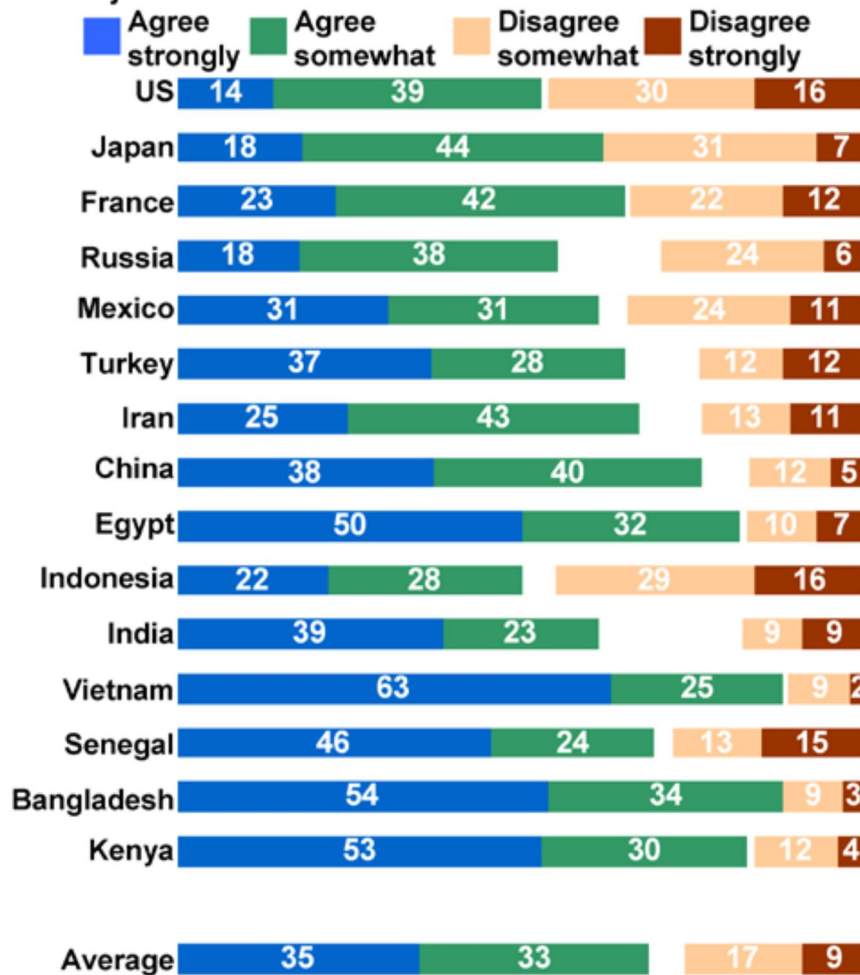
This pattern remains constant in the answers to the second and third questions about the priority of dealing with climate change and the timing of impact (Figures 3 and 4). These results show the possibility of there being common factors in the developed countries that may negatively affect the level of concern. Socio-economic factors are known to be significantly different between developed and developing countries, but the change in these factors and the impact of change on the level of concern is not well researched. The perception of the different effects of climate change is unfortunately not represented in the World Bank report in such a way as to show the variation in public response between countries (Figure 5).

When this research started, the World Bank report was the most recent global research that included Egypt, and the data used in the results chapter for comparison are taken from it. The World Bank report includes social concepts that need to be explained in the next section of this review, because they will be the main concepts in the data analysis. The concept that will be used as a dependent variable in this study is risk perception, which had four different possible variables in the World Bank report. These include: seriousness of climate change, timing of the impact, effects of climate change, and climate change as a priority. Each of these variables represents a different aspect of risk perception of climate change. These variables will be discussed in more detail in the results chapter.

Dealing with Climate Change

Dealing with the problem of climate change should be given priority, even if it causes slower economic growth and some loss of jobs.

- Agree strongly
- Agree somewhat
- Disagree somewhat
- Disagree strongly

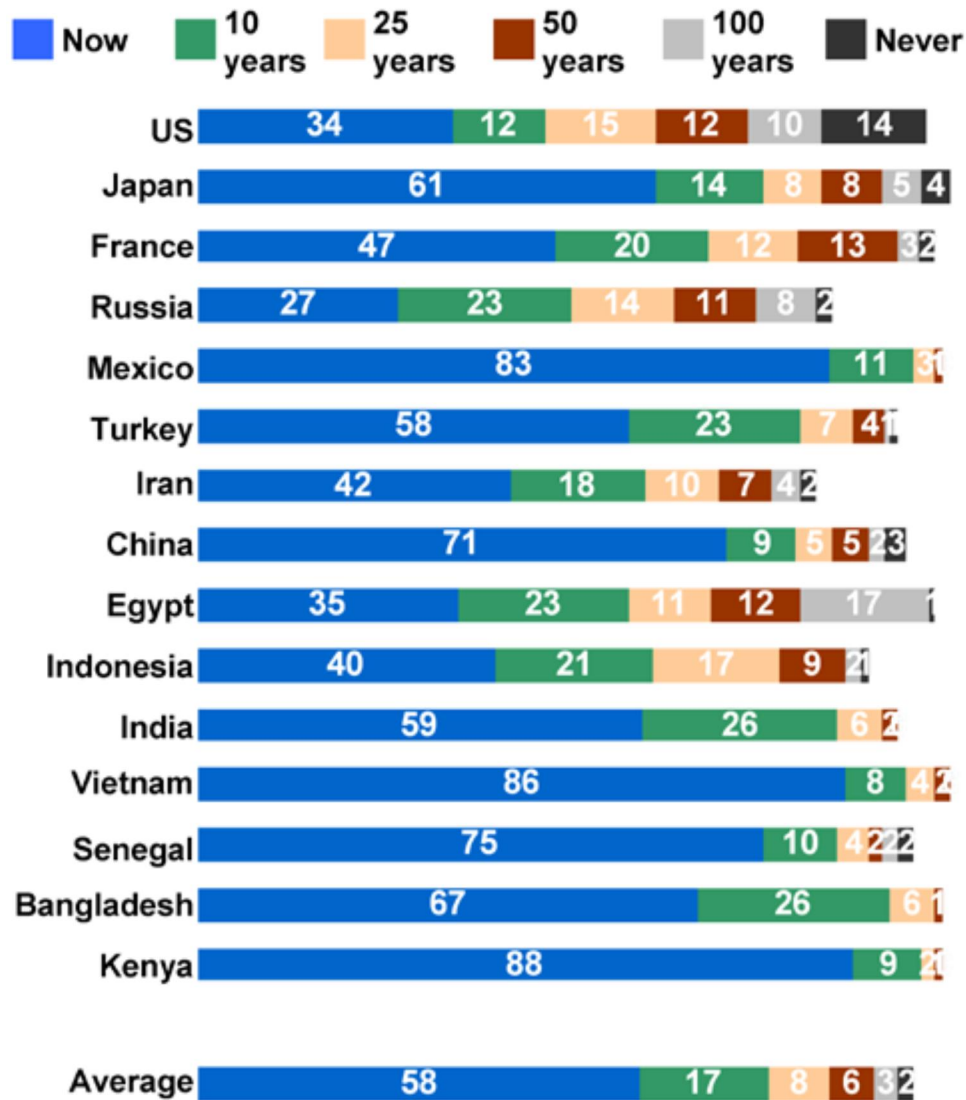| Country	Agree strongly	Agree somewhat	Disagree somewhat	Disagree strongly
US	14	39	30	16
Japan	18	44	31	7
France	23	42	22	12
Russia	18	38	24	6
Mexico	31	31	24	11
Turkey	37	28	12	12
Iran	25	43	13	11
China	38	40	12	5
Egypt	50	32	10	7
Indonesia	22	28	29	16
India	39	23	9	9
Vietnam	63	25	9	2
Senegal	46	24	13	15
Bangladesh	54	34	9	3
Kenya	53	30	12	4
Average	35	33	17	9

Blank space between bars represents Don't Know/Refused

Figure 3. Country by country response to the statement: "Dealing with the problem of climate change should be given priority" (World Bank 2009).
"This image has been reproduced and included in this research paper for the purpose of review under the s.29 Fair Dealing provision in the Canadian *Copyright Act*."

When Will Climate Change Harm People Substantially?

Legend: Now | 10 years | 25 years | 50 years | 100 years | Never

Country	Now	10 years	25 years	50 years	100 years	Never
US	34	12	15	12	10	14
Japan	61	14	8	8	5	4
France	47	20	12	13	3	2
Russia	27	23	14	11	8	2
Mexico	83	11	3	1		
Turkey	58	23	7	4	1	
Iran	42	18	10	7	4	2
China	71	9	5	5	2	3
Egypt	35	23	11	12	17	1
Indonesia	40	21	17	9	2	1
India	59	26	6	2		
Vietnam	86	8	4	2		
Senegal	75	10	4	2	2	2
Bangladesh	67	26	6	1		
Kenya	88	9	2	1		
Average	58	17	8	6	3	2

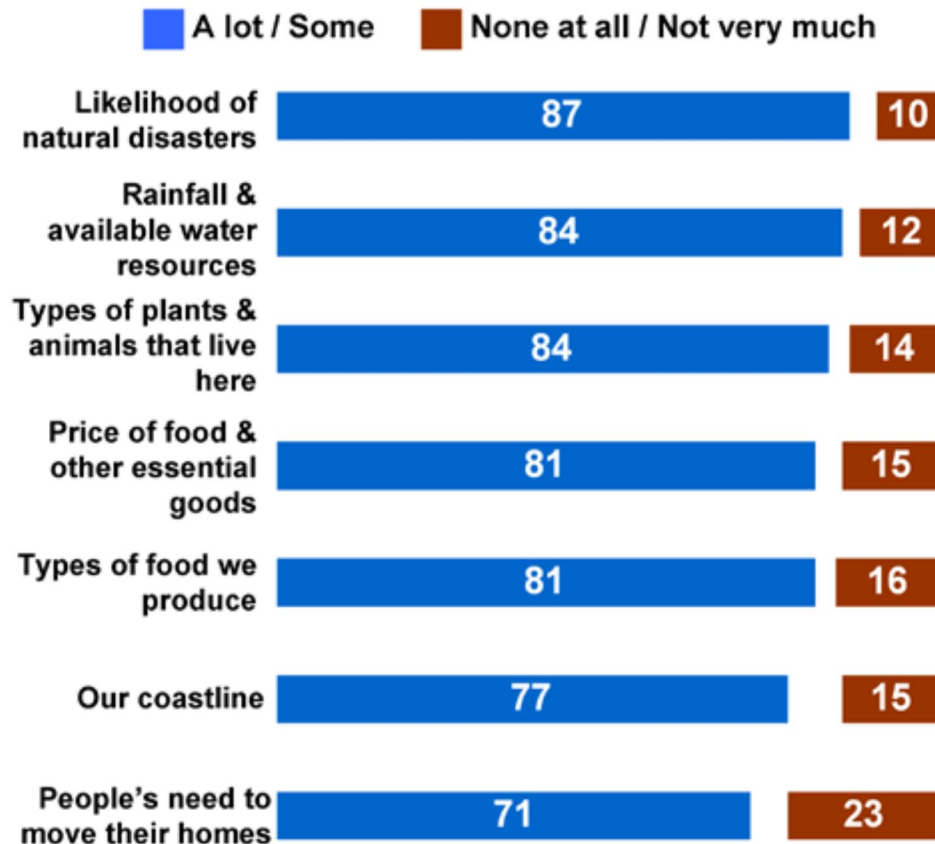Blank space at end of bars represents Don't Know/Refused

Figure 4. Country by country response to the question: "When will climate change harm people substantially?"   (World Bank 2009).
"This image has been reproduced and included in this research paper for the purpose of review under the s.29 Fair Dealing provision in the Canadian *Copyright Act*."

Effects of Climate Change

Average responses across 15 countries

If climate change is left unchecked worldwide, how much do you think climate change will affect each of the following in our country?

■ A lot / Some   **■ None at all / Not very much**

	A lot / Some	None at all / Not very much
Likelihood of natural disasters	87	10
Rainfall & available water resources	84	12
Types of plants & animals that live here	84	14
Price of food & other essential goods	81	15
Types of food we produce	81	16
Our coastline	77	15
People's need to move their homes	71	23

Blank space between bars represents Don't Know/Refused

Figure 5. Average country response to questions about the effects of climate change (World Bank 2009).
"This image has been reproduced and included in this research paper for the purpose of review under the s.29 Fair Dealing provision in the Canadian *Copyright Act*."

Theories of risk:

Risk perception is the core concept of the World Bank report, and a brief explanation of this concept was included in the previous section. In this section, to provide further insight into the social, economic and cultural determinants of risk perception, I explore briefly the main theories of risk perception.

Rational choice theory: According to rational choice theory people respond to warnings as an outcome of a combination of their motivation, attitudes and emotions. Their response is rarely considered a social process or a series of events that can be explained logically or projected collectively (Sorenson 1982). In other words, public response to risk involves personal actions that differ from one individual to another. It has been stated that "Rational choice theory (RCT) has been the single most influential model of human behavior in the social sciences" (Bridge 2009: 100). Rational choice theory assumes that individuals are able to rank their different preferences according to their perceptions of what is better for them (Bridge 2009). Beliefs are an important concept in rational choice theory with regard to individual rankings of risk preferences (Bridge 2009).

Social amplification theory: The social amplification theory has focused on the role of key social actors, the role of media, and the role of organizational setting as an important aspect of risk perception (Kasperson et al. 1988; Freudenberg 2003; Bubsy et al. 2009).This theory also views social status, cultural identity, values, attitudes, and education as factors in forming risk perception (Renn et al. 1992).

Emergent Norm Theory (ENT): ENT offers a framework for the study of collective behaviour, mainly depending on basic questions that could be applied in any situation: What's going on? (To determine the different dimensions and factors included in a certain situation).

What made this happen? Who is responsible? (to understand and have an explanation for a certain situation). Who is in charge? And why? (to determine the main social actors in a certain situation).

ENT aims to identify key social actors and their source of significance (Turner and Killian 1987). However, ENT is criticized for the ambiguity of the relation between attitude and behaviour; moreover, the social analysis of ENT has been described as more theoretical than empirical (McPhail 1991). Also, the mechanism of how a personal attitude transforms into group behaviour remains unclear.

Mileti has indicated that studying public response to risk involves an understanding of various social processes. These processes include: beginning with understanding the warning, believing the warning, confirming the existence of a threat, personalizing the features of this threat, determining the importance of taking a defensive action, and determining the feasibility of the protective action (Mileti 1999). Although this model explains risk perception as a social process, it neglects the importance of social interactions and collective behaviour. Also, the relationship between attitude and behaviour remains ambiguous.

Knowledge theory: This theory sees risk perception about a certain action as related to the individual's knowledge of the risk this action may cause (Wildavsky, 1990). This theory views knowledge and information as key factors in forming risk perception.

Social cognitive theory: According to this theory individuals choose their actions after evaluating a range of possible behaviours (Bandura 1986). A study has used this theory to show that individuals with liberal views, women, and individuals highly exposed to media reports of hazards have increased feelings of insecurity (Weigman and Guetteling 1995).

Using insights from these theoretical approaches to understand risk perception, we can form general conclusions that risk perception is an outcome of both individual characteristics and social factors. Accordingly, the World Bank report shows a pattern of risk perception of climate change, and this pattern of risk perception could then be a reflection of the different social contexts represented in each country where the World Bank survey was conducted. Therefore, in our study we expect that risk perception will be influenced by social context, social interaction within a peer group, and individual responses that vary within this group. These determinants of risk perception are reflected in the structure of the research design in the following sections of this thesis.

Beliefs and attitudes:

This research is mainly concerned with beliefs and attitudes regarding climate change. Beliefs are the propositions that an individual holds and perceives to be real (Schwitzgebel 2006). Attitudes are the positive or negative perceptions that an individual holds towards an event or a place or a social situation or a social condition (Breckler et al. 1992).

Beliefs and attitudes are two important social concepts that the World Bank report contains. The role of values and beliefs in forming social behavior is explained chiefly in two theories. The first is the theory of reasoned action (Schwartz 1999); attitudes and subjective norms are its core concepts. According to this theory, norms are beliefs that substantial members or groups have within a society. On the other hand, the rest of society members must be willing to comply with these significant members or groups. Social norms are therefore also a result of social pressure (Schwartz 1999).

The second theory is the norm-activation theory (Schwartz 1999); where values are the base of social norms and social norms are what form patterns of social behavior. Some studies

have highlighted the importance of norms in understanding environmentally responsible individual behavior (Hopper and Nielsen 1991; Balmey 1998; Biel and Thøgersen 2007).

According to another study, norms are generally defined as the common understanding that determines the standards of behavior basing on common beliefs (Fehr & Fischbacher, 2004). As it has been shown with this literature, beliefs are the basis of norms and common beliefs are what shape social norms. Beliefs are a core concept in the World Bank survey, as they are measured in relation to risk perception of climate change. It can be summarized therefore that norms are socially perceived beliefs; in other words, beliefs are more general concepts than norms. Beliefs do not have to be socially perceived, but after they are, they become norms (Paluck, 2009).

Some scholars have highlighted the direct relation between attitude and behaviour, in that attitude guides behaviour (Fishbein and Azjen 1975). Psychology literature has also pointed to the relationship between attitude and behaviour; some of these studies are relatively old, such as Tversky and Kahneman (1974) and Starr (1969), but they remain quite influential within the field. Starr found that the more control a certain individual has in a certain situation the less risk he perceives. Tvesky and Kahneman have conducted a study regarding the degree of risk about the way people determine what is acceptable and not acceptable. They concluded that the possibility of being able to imagine the situation is positively related to the degree of perceived risk.

This thesis is mainly concerned with beliefs and attitudes regarding climate change. The available data from World Bank survey is mainly concerned with those aspects. The literature shows the relationship between beliefs, attitudes and behavior is stated at times as ambiguous and at other times to be more direct, but in general there remains an ongoing interest and concern

for the link between thought and action within the literature, and one that has clear implications for future adaptation and mitigation of climate change.

Risk perception studies:

The relation between knowledge and risk perception has been the interest of previous research, such as O'Connor et al. (1998), who concluded that there is no relation between environmental knowledge and risk perception of environmental phenomena. Regarding risk perception of climate change, environmental knowledge has explained 5% to 16% of the variance of risk perception, when it was analyzed in a regression model (O'Connor et al. 1998). It was also found that individuals who were aware of the causes of anthropogenic climate change have a higher level of risk perception of the phenomenon. The final conclusion was the following: knowledge may not be the main factor that affects the risk perception of climate change, but it may have a large influence on the public opinion about mitigation and adaptation policies.

Demographic factors such as race, gender, nationality, ethnicity and culture have a general influence on risk perception (Vaughn and Nordenstam 1991; Bateman and Edwards 2002; Bontempo, Bottom, and Weber 1997; Douglas and Wildavsky 1983).The specific relation between gender and risk perception was the concern of many researchers, who found that women are keen to acquire knowledge and information about natural disasters such as earthquakes (O'Brien and Atchison 1998). That knowledge prepares a woman to develop a more aware and correct response to risks, and to mitigate or adapt afterwards. Another study in the United States and Scotland on the social aspects of floods shows that generally, women perceive risk more than men do. In addition, race, ethnicity and class differences cause a variation in perceived risk among women (Enarson and Fordham 2001). One interesting study done in the United States on

the American risk perception of climate change found that although most Americans do believe that climate change is taking place and will have destructive effects, the same group also believes that the effects will not be felt in their communities or in their lifetimes (Leiserowitz et al., 2007).

Beliefs and attitudes were addressed in other studies as a key factor in forming risk perception (`Dietz et al. 2007; Stern et al.1999). It can be said that gender, beliefs, and attitudes are important factors in forming risk perception generally. Therefore, this study also includes nationality and the social and economic environment as factors.

The cost of dealing with risk and its relation to risk perception was also indicated in other studies estimating the "willingness-to-pay" for risk reduction (Dickie and Gerking 2007; Jenkins, Owens and Wiggins 2000).

Researchers have generally included personal characteristics, attitudes toward and awareness of risk, actual behavior, and experience with risk, depending on the availability of the information in the risk perception model (Dickie and Gerking, 2003; Dickie and Gerking 2007). Individual characteristics such as gender or education may influence how individuals perceive and react (Renn, Burns, J., Kasperson, R. Kasperson and Slovic 1992; Weber, Blais, Betz 2002). Men and women perceive different risks and attach different meanings to the same risks (Gustafon, 1998).

Many studies also have highlighted the relation between risk perception and decisions. For instance Liu and Hsieh (1995) and Hsieh (1998) have studied the relation between risk perception and the decision to quit smoking, Also, Abrahams et al. (2000) have studied the relation between risk perception and the choice of bottled water, tap water, or water passed through a filter.

Most of the research on risk perception that has included culture as a dimension was attempting to prepare a comparable model for future work (Legesse & Drake 2005) or trying to compare different countries as sets of cultures (Leiserowitz 2008). In this study, I use a slightly different approach wherein the Egyptian risk perception of climate change is compared across two different countries of residence. In the next section I will present a definition of culture theory and mention some previous work related to it. Cultural theory is widely used in studies that deal with cultural differences of various kinds, and in the next section I will discuss this theory in some detail.

Cultural theory and risk perception:

Cultural theory identifies culture as a significant factor influencing risk perception. Mary Douglas is an important contributor to cultural theory, which views the way people perceive risk to be affected by their culture and social structure (Douglas 1966, 1970; Douglas and Wildavsky 1982; Douglas et al. 1998). Cultural theory is customarily used in policy-related studies, to explore and determine the most appropriate political aspects to deal with climate change according to cultural rules (Thompson 2003; Kelly and Adger 2000). According to this theory, different cultural groups interpret the same global phenomenon differently, because their understanding of the world as a whole varies. Cultural theory recognizes the importance of values and beliefs in constructing risk perception, suggesting that risk perception is determined by culture (Wildavsky 1990). Beliefs, values and attitudes construct together what is called a "world-view", a basic concept in cultural theory (Wildavsky 1990). Cultural theory defines another concept, "social relations", where social relations are the patterns of interaction between individuals and organizations (Wildavsky 1990). It is used in environmental studies to explore the reasons for risk perception variation among individuals (Slovic 1990; Peters 1996; Thompson

1990). Cultural theory generally emphasizes the same perspectives and conclusions as the World Bank report, because it assumes different groups perceive the same "physical risk" differently, yet in a patterned way (Thompson 1990).

In this research the term "world-view" is important to explaining the theoretical background. World-view refers to the shared values, beliefs and attitudes that together form a shared perception of reality, which eventually guides individual behavior and responses (Slovic 1998). The World Bank report shows a pattern in risk perception of climate change in developing versus developed countries, and this can be identified as a shared world view. Comparing similar ethnic samples (Egyptians) in two different social settings (Egypt and Canada) will help us to understand the differences in world view that relate to a global environmental challenge such as climate change.

Cultural theory focuses on public perception rather than the risk itself; therefore the other concept in this discussion, social relations, helps in forming a specific world view. Based on cultural theory, the public can be divided into distinct cultural orientations: egalitarians, individualists, hierarchists, and fatalists (Douglas and Wildavsky 1982). Each group has a different pattern in perceiving risk. Egalitarians are considered to perceive more risk from environment and technology. Individualists are more concerned with the risk of sudden market change leading to market failure and wars. Hierarchists perceive risk related to law and order to be more perilous than the other types of risk. Finally, fatalists usually feel they are excluded from membership in the decision making groups, which makes them feel they have less control of their lives, and they tend to have their own unique ideas about risk,. This classification goes along with the idea of risk perception as a function of culture (Dake 1991). Most researchers used cultural theory focused on the classifications above and tried to empirically measure each of

these concepts (Slovic 1998; Dake 1990; Steg 2000). Other studies also developed detailed regression models but found non-significant outcomes in terms of inter-country differences in risk perception (Sjoberg 1996). However cultural theory in another study explained 5% to 10% of the relationship between individuals and their risk perceptions (Sjoberg, 2000). Dividing the public into individualist, egalitarian, hierarch and fatalist groups has been used in climate change studies to understand the variation in perceiving and understanding the risk of climate change (Mamadouh, 1999).

Cultural theory also has been used in climate change policy studies (Thompson 2000; Verweij &Thompson 2006; Verweij et al. 2006; Ney 2006). Cultural theory measures principally demographics, partisanship, ideology, and knowledge for use in explaining policy preferences and opinion when applied in survey research (Wildavsky & Dake, 1990 Kahan & Braman, 2007). These studies relating cultural theory and risk perception of climate change are helpful in understanding how individuals in the four categories vary in their understanding of the risk of climate change (Raynor & Malone 1998; Ney & Thompson 2000; Verweij et al. 2006). However, none of the previous studies dealt with differences in world view associated with climate change in relation to an individual's country of origin or residence.

Anthony Leiserowitz is one of the most well-known scholars in this area of research, and has tried to compare different perceptions in different countries using global reports (Leiserowitz 2008). Leiserowitz has concluded that in Islamic countries and in rural areas in the developing countries especially in India remain unaware of the scientific concept of climate change, while the rest of the modern world are aware. His work also shows that risk perception is increasing over time within many populations of the world.

Another interesting study (Lorenzoni 2009) has taken a comparative approach, exploring the perceptions of future socio-economic and climate change scenarios among citizens in Norwich (UK) and Rome (Italy). The results of this study showed strong similarities in risk perception between the two countries but a large difference in influences through specific attitudes and beliefs.

The study presented in this thesis seeks to add to this research on culture and climate change with comparative empirical work on risk perception in Egypt and Canada. This study focuses on the idea of shared beliefs and attitudes as a basis for understanding world views and how world view might differ or shift over time by a change in country of residence.

Immigration and Egyptian immigrants:

Although immigration is not the main focus in this research, a study involving Egyptian immigrants to Canada requires at least some basic understanding of the immigration experience. The rate of immigration from developing to developed countries has increasing in the recent decades due to globalization (Naidoo 2003). Because of world trade agreements and growing economic inequality between countries, globalization has formed pushing factors in the developing countries and pulling factors in the developed one (Naidoo 2003). Developing countries became more disadvantaged compared to developed countries that benefited more from the process of economic globalization. Therefore, as a developing country, Egyptian immigrants are either temporary immigrants who came to work or to study or they are permanent immigrants who have immigrated in order to settle in Canada. Temporary immigrants have a limited integration with the society (Berry 2007); this kind of immigration is associated with initial low status in the new society, as immigrants fill low-status jobs that are not desired by the locals. This is not always the case in Canada, as some jobs are offered immigrants with average status,

because of a lack of Canadian workers. Canada is considered a multicultural society, with many minority groups. In a multicultural society, immigrants' values and cultural backgrounds are maintained to some extent and citizenship is more easily attained (Berry 2007). The vast majority of Egyptian immigrants to the Western world are well-educated, and education is the most significant quality that distinguishes these immigrants (Gielen 2003). Some studies have indicated that around 70% of the Arab graduate students who went to the U.S.A, Canada and Europe have never returned to their home countries (Gielen 2003). The factors pushing Egyptian immigrants are government policy, desire for more personal freedom, insecurity, political discrimination and instability, and bad economic conditions (Abu-Laban 1980). Pulling factors for Egyptians to immigrate to Canada, as was indicated in the Abu-Laban study, were a hope for a better standard of living and a better future. Immigrants in a multicultural society tend to have a dual identity, a political one associated with the new citizenship, and a social one associated with their original citizenship (Walzer 1998). It can be said that the question of whether their world views are changing towards their new citizenship should be raised. With many newer immigrants being socially associated with their country of origin, it is important to focus on questions of transition and assimilation in this study of risk perception.

Few studies have focused on the relation between immigration and risk perception. In a recent example, Balaz et al. (2011) tried to measure the differences between perceived risk among immigrants and non-immigrants. This research focuses on changes in risk perception related to the immigration process.

Public opinion and policy process:

Public opinion is considered a key component of the socio-political context for public policy development. Policy makers depend on public opinion as an indication of the possibility

of supporting or constraining the political process. Public support or opposition to climate change policies is expected to be influenced by public risk perceptions of climate change. In addition to applying these policies, members of the public are expected to collectively change certain behaviors, which require a certain level of awareness (Leiserowitz 2007). Therefore in a study such as this on climate change risk perception, there are important implications for policy development and social change.

The United Nations Framework on Climate Change has adopted a five-year program to help countries initiate climate change adaptation policies. At the EU's latest Sustainable Development Strategy, adaptation to and mitigation of climate change should be taken into consideration as a key factor in future policies (Ford 2010).

However, to date, identifying the means of adaption and mitigation remain unclear and ineffective. Existing literature has successfully suggested different key factors that may control the adaptation or the mitigation policies, for example; scientific uncertainty, available technology, available financial resources (Lorenzoni 2000; West and Gawith 2005). Other studies pointed to the policy context, where the political approach of adaptation and mitigation policies was highlighted (Burton 2002).

Integrating adaptation and mitigation policies between different sectors and actors is a key factor in insuring the success of these policies (Niang-Diop 2005). Several studies and projects tried to identify a practical integration of the adaptation and mitigation into the policy process; EU's Green Paper is one of these (Ford 2010). The UK Environment ministry indicated that policy conflicts respecting barriers to adaptation and mitigation policies are a major research priority (DEFRA 2006).

The relation between public opinion and the policy process was a principal interest of many social scientists for a long time. Their views can be divided into traditionalists and revisionists (Herron and Jenkins-Smith 2006); the traditionalists view public opinions to be only weakly influential on the policy process, as it is guided by the elites (Lippman 1955). According to traditionalists, special interests and inconsistency are what is weakening the influence of public opinions on the policy process (Lippman 1925). Many studies have been done on the relation between public opinion and the police process; (Converse 1964) has measured the relation between liberalism, conservatism and public opinion. He concluded that the ideology itself does not structure the public opinions, but the elites use their personal advantages (such as high education, social connections, high financial resources, etc.) to employ abstract political beliefs and to use them to support their political parties. The public varies in its ability to do the same as the elites; the outcome is the elites manipulate public opinion to serve their interests in the policy process. More recent studies have confirmed the lack of awareness of the public regarding the policy process, and confirmed a "converse" conclusion (Zaller 1992; Gilens 2001).

On the contrary, revisionists view public opinions to be mobilized, organized around certain beliefs and of considerable influence on the policy process (Herron & Jenkins-Smith 2006). Usually public opinion is organized around common belief (Jenkins-Smith, Mitchell, & Herron 2004). In spite of public opinion not always being fully aware of the policy process or the debatable issues, it can be mobilized, consistent, rational and organized around certain beliefs (Page & Shapiro 1992; Shapiro et al 1994; Lupia & McCubbins 1998). People tend to simplify facts in order to understand issues and to build a collective point of view. This research adapts the revisionists' point of view, as the importance of this research arises out of the power of public opinion to influence policy development. The global reports show how public opinion

varies between countries and this thesis provides insight into how public perception of climate change is perceived across a single cultural group where the members reside in two different countries.

Summary

The World Bank report shows a pattern in perceiving risk in both developing and developed countries. This pattern is assumed to be related to shared beliefs and attitudes in both developed and developing countries, and forms what cultural theorists call a "world view". The World Bank report offers a measure of beliefs and attitudes that will be mentioned in detail in the research methodology chapter; however, it does not include any measurement of knowledge, any information about sources of knowledge about climate change, or any information on socio-economic status and its relation to risk perception of climate change. These inquiries will be a point of focus in the data collected from the Egyptian Canadian sample. Previous research has shown the importance of attitudes, beliefs, demographic factors, knowledge, and socio-economic status in forming risk perceptions. In this research I include all these variables in the analytical model, which is based on a comparison between similar samples in two different countries. This approach can indicate how differences in risk perception are associated with differences in social context and socioeconomic status. In other words, the analysis will show how "risk perception" differs according to key World Bank criteria, and will measure the differences in risk perception in relation to differences in world view.

Chapter 3: Research methodology

Research Design:

I took a quantitative approach in this research by using a survey to measure Egyptian immigrants' risk perception of climate change. A comparison research approach is taken to compare the World Bank (2009) reported results with the gathered data from Egyptian immigrants in Edmonton, Alberta, Canada. A detailed description of this primary data collection process is provided in this chapter. The World Bank report includes a detailed description of the Egyptian risk perception of climate change compared to the public perception of other countries. The questions used in the World Bank survey are used in this research to provide comparable data. In addition, some questions are added to the World Bank survey in order to measure specific variables related to Egyptian immigrants.

World Bank report background:

According to the World Bank report, data was gathered by experienced survey agencies using indigenous staff in each of the 16 countries included in the report. The data gathering and field work was managed by the staff of the Program on International Policy Attitudes. In general, interviews were conducted between mid-September and late October, 2009 (World Bank 2009).

The questionnaire was designed by the staff of the World Bank and staff of the Program on International Policy Attitudes. The final questionnaire was translated into different languages depending on the country where the data was being gathered and back-translated later (World Bank 2009).The World Bank report shows the Egyptian sample to include 600 cases, while the actual number of cases of the data set is 701 cases, as reported in the next chapter.

World Bank surveys

Surveys were conducted by face-to-face interviews (Bangladesh, Brazil, Egypt, India, Indonesia, Kenya, Russia, Senegal, Turkey, and Vietnam), by telephone (China, France, Iran, Mexico), and online (Japan and the United States). Sample sizes ranged from a low of 600 completed interviews in France to a high of 1,410 in India. The margin of error for samples of these sizes range from ± 4 percentage points in France to ± 2.6 percentage points in India (World Bank 2009).

Egyptian sample:

Table 1. **The Egyptian sample (World Bank 2009)**

Governorate	Population	Sample Quota	N	Suggested sample	Male	Female
Cairo	8026454	46%	276	260	130	130
Alexandria	4317398	25%	149	120	60	60
Gizeh	3347333	19%	115	100	50	50
Subra	1059343	6%	36	40	20	20
Tanta	433779	2%	15	40	20	20
Menia	250322	1%	9	40	20	20
Total	17,434,629	100%	600	600	300	300

As shown in Table 1, Egyptian data was gathered from six different governorates; Cairo, Alexandria, Gizeh, Shubra-El-Khema, Tanta and Menia. Most of the sample (46%) was taken from Cairo, the capital of Egypt, while 1% of the sample was taken from Menia, located in the south of Egypt. The sample reported in the World Bank report has included an equal number of males and females.

Sample demographic characteristics:

As it is shown in Table 2, the World Bank report provides a demographic distribution of the Egyptian sample. The largest age category is 25-34; 25% of the total sample is between 25 and 34, while only 7% of the sample is above 65.

Table 2. Demographic characteristics table (World Bank 2009)

Age	Percentage	Total	Male	Female
18-24	24%	144	72	72
25-34	25%	150	75	75
35-44	21%	126	63	63
45-54	15%	90	45	45
55-64	8%	48	24	24
65+	7%	42	21	21
Total	100%	600	300	300

Table 3 shows the levels of education in the Egyptian sample; the largest categories are the Egyptians who completed elementary school (120), and Egyptians who completed a university degree (108). Only 12 participants had a post graduate degree. Other categories are quite close.

Table 3. Levels of education (World Bank 2009)

Education	Sample
1 – No formal education/cannot read or write	60
2- Some of elementary school	90
3- Completed elementary school	120
4- Some of High/Secondary School	60
5- Completed High/Secondary School [Qualification for College/University]	90
6- Some of college university	60
7- Completed university or equivalent/ University Degree/Diploma	108
8- Post Graduate Degree	12
Total	600

Egyptian Canadian Sample:

The two Egyptian societies in Canada that were chosen for comparison purposes are the Egyptian Students Association (ESA) and the Canadian Egyptian Society of Edmonton (CESOE). There are two main reasons for choosing the members of these societies to represent Egyptian immigrants. First, because of their involvement, the members of both societies are considered to be more attached to the Egyptian culture than other Egyptian immigrants, which makes comparing their risk perception of climate change to the Egyptian risk perception of climate change feasible. Second, it is hard to include a random sample of all Egyptian

immigrants in Edmonton as it will need time, funding and information about Egyptian immigrants that is currently unavailable.

ESA has 82 Egyptian members; all of them are Egyptian immigrants. CESOE has 70 Egyptian members; most of them are Egyptian immigrants. This research tried to include all members of both societies to create the best possible results for data analysis; two methods were taken to gather the required data. First an online questionnaire was sent by e-mail to members of the two societies. Second, a printed questionnaire was given to members during events and in a snow-ball sampling style, members were asked to invite other Egyptians they knew to take the survey. Data collection started in November 2010 and ended in February 2011. The two methods were expected to create the best possible response among the Egyptian immigrants. Once the survey was completed, data was entered into SPSS, coded and analyzed. Eighty-six participants out of the 152 members responded to the survey, 57% of the membership. Most of the respondents were members of the ESA, which means that the students were more willing to take the survey. Also it is important to mention that most of the ESA members are graduate students. This bias within the Alberta sample is addressed within the following analysis by selecting cases from the Egyptian sample that also had higher educational status. Aside from this educational bias, it is assumed for statistical purposes that these 86 respondents offer a random sample of Egyptian residents in Edmonton.

Operational Definitions:

Dependent variable:

Risk perception of climate change: In this study, risk perception of climate change means the level of concern that Egyptian immigrants have about climate change as an environmental phenomenon.

This dependent variable is expressed in the World Bank report through four variables that were measured separately: Seriousness of climate change as a problem, Climate change as a priority, Effects of climate change on one's country, and Timing of impacts.

Each of these variables is measured using the same questions as used in the World Bank report to achieve a valid comparison. Survey questions 1 to4 measure the risk perception of climate change variables (see Chapter 7 (Appendix) for details).

The independent variables:

World Bank variables:

Beliefs about climate change: For the purposes of this research, beliefs about climate change mean the perceptions, expectations and understandings that Egyptian immigrants have about climate change and about various social and economic aspects related to it.

This variable is explored through four indicators, which are Belief about the status of climate change science, Trajectory of greenhouse gas emissions, Impact of climate change on wealthy vs. poor countries and Government responsibly. Each of these indicators is used in the analysis as an independent variable. I did not use them as an index in order not to miss the possibility of measuring the influence of each indicator separately. Survey questions 5 to8 measure beliefs about climate change.

Attitudes towards climate change: This variable means the expected behavior that the Egyptian immigrants will exhibit towards climate change as a global phenomenon. This variable includes the following six indicators: Effect of one country's example on other countries, Willingness to commit to emissions cuts in the context of an agreement, Necessity of accepting higher energy costs, Willingness of a country to pay a specified individual amount, Willingness to support national steps with economic costs, and assisting poor countries with adaptation to

climate change. Also, each of these indicators is used in the analysis as an independent variable. Survey questions 11 to17 measure attitudes towards climate change.

Demographic factors: Demographic factors in this research include age, gender and education.

Additional contextual variables:

In addition to the variables included in the World Bank report, the survey of Egyptians living in Edmonton, Canada, included additional contextual variables. These variables were intended to enhance understanding of how risk perception of climate change is related to these other factors.

Available information: This variable explores the change in the available information about climate change, as a result of moving to Canada and changing the country of residence. The source of this information was also taken into consideration, by specifying five different possible sources for the information: local media, conferences, general conversations, scientific articles and general information.

*Duration of living in Canada***:** This variable means the number of years that the immigrant has spent in Canada. It was added to measure the possible effect of time spent in Canada on an assumed change of the risk perception of climate change.

Belief about self-responsibility about climate change: It was noticed that the set of beliefs the World Bank used included beliefs about Government's responsibility and action, but the study did not include any belief about self-responsibility, so this belief was added in the research.

Socio-economic status: This aspect was measured by two indicators: available leisure time and fulfillment of economic needs. Leisure time is an indicator of the opportunity to interact with other members of the society outside the work environment. I avoided asking the

participants direct questions about their socio-economic status, which might have resulted in sensitivity and resistance toward the whole survey.

Analytical approach:

In order to achieve the purpose of this study, which measures the difference in risk perception and the relation between world view and risk perception, a comparison analytical approach was taken. An independent sample t-test was used in order to determine the level of significant difference in risk perception between samples. Then I moved to using frequencies in the descriptive analysis, and providing a detailed descriptive analysis of both samples. Also in the descriptive analysis, I use means tables to describe the remainder of the variables. Finally I develop three regression models. One is for the Egyptian sample, to indicate the relation between the dependent and independent variables that were indicated by the World Bank report. The second model is for the Egyptian Canadian sample using the World Bank report variables, and finally a third regression model using the World Bank variables and the researcher added variables for the Canadian sample. These results are reported in the following section.

Chapter 3: Findings

Descriptive Analysis

In this section I compare the data that I have collected to the data that was collected from Egypt. I use frequencies, percentages, means and t–test to give the best possible analysis of the data, and the best possible insight into the differences in risk perception of climate change between Egyptian residents and Canadian residents.

The first t-test was done to compare the means of the four variables related to risk perception of climate change using the whole Egyptian sample (N=701), and the Canadian Egyptian sample (N=86). As it is shown in Table 4, there was a significant difference in the two samples between the means for the perception of the seriousness of climate change, the perception of the effects of climate change and the perception of the timing of the impact.

Table 4**. Mean attitude score of statements about risk perception**

Statement	Canadian Egyptian n=86	Egyptian n=701	T value (p)	Egyptian (highly educated) n=142	T value (p)
Seriousness of climate change[a]	3.3	3.5	0.004	3.6	0.006
Climate change as a priority[a]	3.2	3.2	0.761	3.3	0.448
Effects of climate change[b]	21.7	20.6	0.053	21.5	0.737
Timing of impacts[c]	3.8	4.4	0.005	4.4	0.012

[a] *Rated on a scale from 1=strongly disagree to 4=strongly agree.*
[b] *Rated on a scale from 7=None at all to 28=a lot.*
[c] *Rated on a scale from 1=never to 6=now.*

Before choosing a dependent variable for the regression model at the end of this chapter, I conducted an independent sample t-test on the four possible dependent variables that measure risk perception of climate change. The importance of doing the t-test is to determine which of these four variables is significantly different between the two sample populations and therefore what variable might be most closely associated with a difference in country of residence. The dependent variables with significant differences between countries were then used in the regression analysis.

The means associated with the perception of the seriousness of climate change and the perception of the timing of impacts were significantly higher in the Egyptian sample, while the means associated with the perception of the effects of climate change were the same. The Canadian Egyptian sample had an insignificantly higher mean associated with the perception of the effects of climate change.

After reviewing the education frequencies (Table 5), it was noticed that only 20% of the Egyptian sample has completed a university degree, while 100% of the Egyptian Canadian sample has done so. To avoid any possible effect on both samples of education as an independent variable, I used only the highly educated 20% of the Egyptian sample. The t-test was repeated again to compare the means of the four variables using only the highly educated part of the Egyptian sample in comparison with the Canadian sample. The results came out different, as only the mean of the perception of the seriousness of climate change was significantly different between the two samples. Table 4 shows the mean of the seriousness of climate change was 3.3 out of 4.0 in the Egyptian Canadian sample, while it was 3.6 out of 4.0 in the Egyptian sample ($p < 0.01$). The risk perception of climate change is higher in the Egyptian sample, which matches what was shown in the literature review, that individuals from developing countries have a

41

higher risk perception of climate change than is the case in developed countries. The timing of impact was also significantly different between these two samples, but not at the same level of significance ($p<0.05$).Based on this analysis, I have chosen the seriousness of climate change as my dependent variable in the regression model, but all of these variables provide interesting insights into the similarities and differences between these two datasets.

Table 5. Levels of Education within the Egyptian Sample

Education level	Frequency	Percent (%)
Illiterate	73	10.4
Primary basic and elementary school or less	104	14.8
Some of high, preparatory and secondary school	211	30.1
Completed high, preparatory and secondary school	102	14.6
Some progress toward a college or associate degree	69	9.8
Completed university Bachelor's degree	142	20.3
Total	701	100

Descriptive analysis using frequencies and percentages:

As shown in Table 6, 63.4% of the Egyptian sample thought that climate change was a very serious problem, while only 50% of the Canadian Egyptian sample did so.

Table 6. Is climate change a serious problem

Statement	Egyptian sample		Egyptian Canadian sample	
	Frequencies	Percent (%)	Frequencies	Percent (%)
Not a problem	1	.7	5	5.8
Not too serious	7	4.9	9	10.5
Somewhat serious	44	31	29	33.7
Very serious	90	63.4	43	50
Total	142	100	86	100

Canadian Egyptian sample N= (86), Egyptian sample (Highly educated) N= (142).

42

Regarding climate change as a priority, as it is shown in Table 7, the higher percentage in both samples is for strongly agree; 53.5% in the Egyptian sample and 44.2% in the Canadian Egyptian one. The percentage of Egyptians who strongly disagreed that climate change is a priority is 8.5%, which is higher than the Canadian Egyptian who did the same 5.8%.

Table 7. Climate change as a priority

Statement	Egyptian sample		Egyptian Canadian sample	
	Frequencies	**Percent (%)**	**Frequencies**	**Percent (%)**
Strongly disagree	12	8.5	5	5.8
Somewhat disagree	12	8.5	12	14
Somewhat agree	42	49.5	31	36
Strongly agree	76	53.5	38	44.2
Total	142	100	86	100

Canadian Egyptian sample N= (86), Egyptian sample (Highly educated) N=(142).

Seven suggested effects of climate change are presented in Table 8. It can be noticed that most of the percentages in both samples are quite close except the effect of climate change on types of plants and animals that are found in the current country of residence, and prices of foods and other essential goods. Of the Egyptian Canadian sample, 81.4% thought plants and animals that live in Canada will be affected a lot, while only 61% of the Egyptian sample thought the same.

Table 8. Description of indicators of effects of climate change

Statement	Egyptian		Egyptian Canadian	
	A lot (%)	Not at all (%)	A lot (%)	Not at all (%)
1-Likelihood of natural disasters	76.8	23.2	76.9	23.1
2- Rainfall and available water resources	82.5	17.5	86	14
3-Types of plants and animals that live here	61	39	81.4	18.6
4-Price of foods and other essential goods	72.5	27.5	84.7	15.3
5-Types of food we produce	74.7	25.3	79	21
6-Our coastline	81	19	82.6	17.4
7-People needing to move their homes	69.7	30.3	68.8	31.2

Canadian Egyptian sample N= (86), Egyptian sample (Highly educated) N=(142).

As shown in Table 9, in both samples there is a large difference between the percentages of people who think that climate change is affecting their life now.

Table 9 Timing of impact from climate change

	Egyptian sample		Egyptian Canadian sample	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Statement				
People are being harmed	53	37.3	16	18.6
In 10 years	31	21.8	18	20.9
In 25 years	15	10.6	19	22.1
In 50 years	17	12	12	15.1
In 100 years	20	14.1	9	10.5
Never	2	1.4	11	12.8
Total	142	100	86	100

In the Egyptian sample 37.3% thought climate change is harming their life now while less than half this percentage thought the same in the Egyptian Canadian sample. This suggests that the Egyptian population can feel the current effect of climate change on their lives more than the Egyptian Canadian population. The highest percentage in the Egyptian Canadian sample was the percentage of participants who expected climate change to start affecting their lives in the next 25 years. Also it can be noticed the 11% of people who thought climate change would never affect their lives in the Egyptian Canadian sample is significantly higher than in the Egyptian sample (2%).It is also important to present the frequencies of gender (Table 10) in order to explore the characteristics of both samples. The percentage of females is higher in the Egyptian sample (53%), while the percentage of the males is higher in the Egyptian Canadian sample (60.5%). The significance of these gender differences are explored in further detail in the regression analysis that is reported later in this chapter.

Table 10. Distribution of males and females in the two samples

	Egyptian Sample		Egyptian Canadian Sample	
Gender	**Frequency**	**Percentage (%)**	**Frequency**	**Percentage (%)**
Male	66	46.5	52	60.5
Female	76	53.5	34	39.5

Canadian Egyptian sample N= (86), Egyptian sample (Highly educated) N= (142).

The final Table I thought to be important to present in the frequencies and percentages section is the difference in the socioeconomic condition and source of knowledge for the Egyptian Canadian sample. As shown in Table 11, 77.9% of the Egyptian Canadian sample has stated they have been hearing more about climate change in the local media since they have come to Canada. This fact suggests that the local media in Canada is more active in presenting

45

information about climate change or has used it as a news item, regardless of the content. Of the Egyptian Canadian sample, 37.2% indicated they have not been attending more lectures or meeting about climate change, while 34.9% indicated they had been. The result is quite expected as most of the Egyptian residents in Edmonton are or were students. It is also interesting that 67.4% of the Egyptian Canadian sample have indicated they have been engaging in more conversations about climate change, which suggest that the Canadian society is more talkative about the phenomenon although it has a lower risk perception of it.

Table 11. Changes in knowledge and socio-economic conditions

Statement	Agree (%)	I don't know (%)	Disagree (%)
Hearing more about climate change in the local media	77.9	8.1	12.8
Attending more meetings and lectures about climate change	34.9	26.7	37.2
Engaging more in general conversations about climate change	67.4	7	24.5
Reading more scientific articles about climate change	51.1	17.4	30.2
Reading more general information about climate change	66.3	11.6	20.9
Your economic needs are met more	68.6	11.6	17.4
Leisure time has increased	48.8	18.6	30.2

Canadian Egyptian sample N= (86).

Within this sample, 51.1% are reading more scientific articles about climate change, which also could result from most of the Egyptian Canadian sample being students who belong to the Egyptian Students Association. Of the Egyptian Canadian sample, 68.6% have indicated their economic needs are met more since they have come to Canada, while only 17.4% said their

needs have not been met. Also, 40.8% of the Egyptian Canadian sample said their leisure time has increased since they came to Canada, while 30.2% said it had not been increased. It can be noted in the previous table that in relative terms the local media is the most important source of information about climate change.

Descriptive analysis using minimum, maximum and means:

In this section, I present a descriptive analysis using minimum, maximum and mean values. As shown in Table 12, the mean for the variable trajectory of greenhouse gas emissions in the Egyptian Canadian sample is considered high at 2.6 out of 3, while the mean of impact of climate change on wealthy vs. poor countries is considered low at 1.87 out of 4.

Table 12. Beliefs about climate change

Egyptian Canadian sample				
Variable	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Trajectory of Greenhouse Gas Emissions	1	3	2.64	0.529
Impact of Climate Change on Wealthy vs. Poor Countries	1	4	1.87*	1
Government responsibility	1	2	1.9*	.546
Beliefs about the status of climate change science	1	3	1.94	.986
Egyptian Sample(Highly Educated)				
Variable	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Trajectory of Greenhouse Gas Emissions	1	3	2.73	0.6
Impact of Climate Change on Wealthy vs. Poor Countries	1	4	2.25*	0.95
Government responsibility	1	2	1.4*	.94
Beliefs about the status of climate change science	1	3	1.92	.27

*Canadian Egyptian sample N= (86), Egyptian sample (Highly educated) N=(142). *=significant difference between the two means, independent sample t-test, P<0.05.*

The mean of responsibility and government action is very high, 1.9/2, while the mean of beliefs about the status of climate change science is considered moderate, 1.94/3. It can be noticed from Table 12 that the means of all variables except the mean of government responsibility is higher in the Egyptian sample. In the two samples, only two means have a significant difference between them, the mean of government responsibility and the mean of impact of climate change on wealthy vs. poor countries. Canada as a developed country is expected to have a more powerful and trustworthy government than Egypt, which may cause people to expect actions from it regarding the issue of climate change. It is also not surprising that the mean of impact of climate change on wealthy vs. poor countries is higher in the Egyptian sample, as Egypt being a poor country compared to Canada would possibly make Egyptians perceive the risk of climate change on Egypt more than on a wealthy country. In Table 13 it can be noticed that the mean of effect of one country's example on others is high in the Egyptian Canadian sample 1.9/2, and significantly higher than the same mean in the Egyptian sample 1.7/2.

Table 13. Attitudes about climate change

Egyptian Canadian sample				
Variable	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Effect of One Country's Example on Others	1	2	1.9*	0.568
Willingness to Commit to Emissions Cuts in the Context of an Agreement	1	2	1.9	0.833
Egyptian Sample(Highly Educated)				
Variable	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Effect of One Country's Example on Others	1	2	1.7*	0.461
Willingness to Commit to Emissions Cuts in the Context of an Agreement	1	2	1.9	.257

*Canadian Egyptian sample N=(86),Egyptian sample (Highly educated)N=(142). *=significant difference between the two means, independent sample t-test, P<0.05.*

This finding indicates that Egyptian Canadians have a slightly stronger belief that their country Canada has an influence on other countries, more so than the Egyptians feel about their country. This fact could have to do with Canada being a developed country, with better social and economic conditions. In more general terms, this finding tells us that Egyptian residents have slightly different beliefs about the current role of their country as compared to the Canadian sample. Both samples had the same mean respecting willingness to commit to emissions cuts in the context of an agreement, 1.9/2. In table 14; Egyptian Canadians have a higher mean when it comes to their perception of necessity of higher energy costs, 1.72/2, than the Egyptians, 1.51/2.

Table 14.Willing to bear economic cost to support national actions

Egyptian Canadian sample				
Variable	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Necessity Of Higher Energy Costs	1	2	1.72*	.746
Willingness to Support National Steps with Economic Costs	4	16	10.26	4.9
Assisting Poor Countries with Adaptation to Climate Change	1	2	1.98	.433
Egyptian Sample(Highly Educated)				
Variable	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Necessity Of Higher Energy Costs	1	2	1.51*	.568
Willingness to Support National Steps with Economic Costs	4	16	11.6	3.05
Assisting Poor Countries with Adaptation to Climate Change	1	2	1.92	.268

*Canadian Egyptian sample N= (86), Egyptian sample (Highly educated) N=(142). *=significant difference between the two means, independent sample t-test, P<0.05.*

This is an expected result as the Egyptian Canadians have indicated their economic needs are better met, which means they are more able to bear the cost of higher energy than the Egyptians.

Another possibility is the Egyptian Canadian's feeling that the current role their country plays (Canada) makes them more willing to economically support national climate change steps. Surprisingly the Egyptian sample has a higher mean of willingness to support national steps with economic costs; still, the differences are insignificant. Both samples have almost a similar mean with respect to assisting poor countries with adaptation to climate change.

The final table in this descriptive section is Table 15, the demographic factors table, which includes age after excluding education. The mean of age in both samples is quiet close 34.8 years in the Egyptian sample and 31.21 years in the Egyptian Canadian sample.

Table 15. Age of Egyptian and Canadian samples and duration living in Canada

Variable	Minimum	Maximum	Mean	Std. Deviation
Age (Egyptian Canadian)	16	42	31.2	5.772
Age (Highly Educated Egyptian)	18	66	34.8	11.97
Duration living in Canada	2	15	5.4	1.04

Canadian Egyptian sample N= (87), Egyptian sample (Highly educated) N=(142).

As it can be noticed the minimum of duration living in Canada is 2 years with a mean of 5.4, which suggests there is a low variation in this variable.

The regression models

Based on the previous analysis, perception of seriousness of climate change is the dependent variable used in this model as an indicator of risk perception of climate change. Three regression models are reported in Table 16: the first for the Egyptian sample, the second for the Canadian Egyptian sample using the original independent variables in the World Bank report. The third regression model is for the Canadian Egyptian sample using the original independent and the researcher-added variables.

Table 16. OLS Regression models

Variables	Model (1) Egyptian sample	Model(2)Egyptian Canadian sample	Model(3)Egyptian Canadian sample research added variables
Beliefs about climate change			
Belief about the status of climate change science	.246**	.070	−.019
Trajectory of greenhouse gas emissions	.404***	.115	−.596
Impact of climate change on wealthy vs. poor countries	.013	.054	.324
Government responsibility	−0.10	−.321**	−.201*
Government action	−.123*	−.052	−.890
Attitudes towards climate change			
Effect of one country's example on others	.011	.184*	.956
Willingness to commit to emissions cuts in the context of an agreement	−.001	−.222*	−1.87
Willingness to support the necessity of higher energy costs	.005	-.016	.586
Willingness to support national steps with economic costs	.057	.237*	.262**
Assisting poor countries with adaptation to climate change	.008	−.073	−.128
Demographic factors			
Gender	.002	.080	.588
Age	.009	.228	.252
Available information (reading more general information)	___	___	−.337**
Duration living in Canada	___	___	−1.07
Socio-economic status			
Fulfilment of economic needs	___	___	−2.66
Leisure time	___	___	.205
Personal responsibility about climate change	___	___	.356**

***=p<.001; **=P<.01; *=p< 0.05 R^2 Model1=0.242 R^2Model2=0.213 R^2Model3=0.323

The use of OLS regression with categorical variables in this case is consistent with similar research on this topic that is published within the field of environmental sociology (Zahran et al. 2006).

As is shown in Table 16, the first model explains approximately 24% (0.242) of the change in the dependent variable. The factor associated with risk perception most significantly is the perception of the trajectory of greenhouse gas emissions. This fact (the most significant variable in Model 1) shows the importance of the perception of the current and future status of greenhouse gas emissions in forming the risk perception of climate change generally. The second significant factor is a belief about the status of climate change in science. It shows the relationship between belief in climate science and risk perception. In this first model, beliefs generally explain most of the change in the risk perception of climate change, as the model shows, with emphasis on previous research mentioned in the literature review. Beliefs are a factor in risk perception.

Surprisingly, however, the more people think their government should do more about climate change, the more their risk perception of climate change reduces. In other words, people who count on government to address certain risks are less concerned about the impacts of those risks to themselves. People who are more self-reliant have a sense that the government will not deal with the problem. Although it is the weaker factor in significance and influence, still it is an interesting result, it could result from the perception that people have about the government doing more work means less work for themselves. In other words, the more people shift the blame to government the more they shift the blame away from themselves, which leads to a reduced risk perception of climate change.

The second regression model explains approximately 21% of the variance in the dependent variable (.213), slightly less than the first model. None of the significant variables in the first model are significant in the second one, which shows the factors associated with risk perception in the Egyptian sample are different in the Egyptian Canadian sample. This fact suggests differences in risk perception patterns between the same cultural group in different countries resulting from different beliefs and different social context. It also suggests the difficulty of using generalized socio-psychological models to analyze specific cultural groups, as the same cultural groups might have quite different contributing factors to their perception of risk depending on the broader social context.

The most significant factor influencing risk perception of climate change is the perception of government responsibility, which the descriptive results show varies by population. The change in perception of government responsibility varies quite significantly with the change in risk perception of climate change (-.321). Again this result seems surprising; still the negative coefficients in the second and third model are relatively important as explanatory variables in the model. The more people believe government is responsible for dealing with climate change the more their risk perception goes down, which again shows the negative relation between relying on government responsibility and risk perception. Their feeling of confidence in government responsibility might be just another way to reduce and deflect their own sense of responsibility.

The second factor influencing risk perception is willingness to support national steps with economic costs. The model suggests that a change in risk perception is strongly linked to willingness to support national steps (.237). It is apparent that this action is related to personal responsibility and not to governmental responsibility, which may support the earlier conclusion of a relation between feeling governmental responsibility and risk perception of climate change.

In other words, people who are willing to bear the economic cost of dealing with the risk of climate change are likely to have a higher risk perception of climate change, while those who plan to rely on the government to deal with climate change tend to perceive less risk.

The third significant factor in the second model is willingness to commit to emissions cuts in the context of an agreement, which has a negative correlation with risk perception of climate change. This may appear to be a surprising result, but taking into consideration the previous results, this result is again related to governmental action and does not reflect a personal reaction.

The fourth significant factor is the perception of the importance of Canada's actions as an example to other countries. It has a positive correlation with risk perception of climate change (.184). That means that people who see Canada as a country that takes the lead and that gives an example to other countries tend to have higher risk perception of climate change. The reason for that may be that they may strongly feel the importance of dealing with climate change to keep their country in a good developmental situation as a first world country.

Generally speaking, comparison between the first and second model shows that beliefs in the first model are the main factors linked to risk perceptions, whether negatively or positively. In the second model, attitudes have a mainly positive role, while beliefs have a negative relationship only. These results indicate a shift in the role of beliefs related to differences in the country of residence. The results also indicate a bigger role for attitudes, which might be caused by additional reading and talking activities about climate change in the Canadian society.

The third model explains 32% of the variation in the dependent variable (.323), which is more than the other two models. The most significant factor is personal responsibility about

dealing with climate change (.356). This result supports the previous analysis, as personal responsibility has a significant influence on risk perception on climate change.

The second factor influencing risk perception of climate change in this third model is reading general information about climate change. The relation is significant yet it is a negative relation, in spite of some previous studies that indicate a positive relationship between level of knowledge and risk perception. The source of the knowledge maybe the key factor here, as the previous research suggests that general knowledge about climate change is not associated with risk perception. The reason for that might be debates about the nature of climate change and the uncertainty of it within the Alberta context. These debates and existence of contradictory information might have raised doubts about the fact of climate change existence.

The third significant factor in this model is willingness to support national steps with economic outlays, and it is positively influencing risk perception of climate change. This factor was significant in the second model as well, which demonstrates the consistency of its significance. The fourth significant factor is government responsibility, which is a negative relation as in the second model but less significant.

As far as general comparisons between the third and the second models, the additional context variables explained more of the variation in the risk perception of climate change. Two of the factors in the second model, willingness to support national steps with economic costs and government responsibility, were significant in the third model. Taking personal responsibility for dealing with climate change seem to be highly significant in forming a positive risk perception of climate change, while reading to obtain more general knowledge seems to be highly significant in forming a negative risk perception of climate change.

Chapter 4: Discussion

This research uses a new perspective in exploring culture and risk perception of climate change, focused on the differences in world view and risk perception among Egyptians who live in two distinct social settings (Egypt and Canada). As mentioned in the literature review chapter, previous studies compared different public perceptions in different countries, or compared trends over time. This study compared data from two different countries using similar samples with Egyptian cultural backgrounds, which is another way to understand the impact of culture and cultural change on risk perception of climate change. The differences between the results of analyzing the two samples therefore can be attributed to the influence of the country of residence and associated social, economic and cultural change.

At the outset, this research confirmed the pattern that was established by the World Bank report on public perception of climate change. This report showed a pattern where risk perception of climate change was higher in developing countries than it was in developed countries. The t-test confirmed that risk perception, expressed by public perception of the seriousness of climate change, is higher in the Egyptian sample than the Egyptian Canadian sample.

As previously mentioned, the World Bank report showed a pattern of risk perception of climate change in developed countries. This pattern suggests the possibility that developed countries tend to share common factors that drive down public risk perception of climate change. One might assume that patterns of risk perception in developed and developing countries are fairly stable over time, with risk perception being closely anchored to cultural background, regardless of the country of residence. What we found in this study, however, is that risk perception of climate change between Egyptians and Egyptian Canadians is significantly

different, and these differences seem to be present regardless of how long an Egyptian has lived in Canada. Egyptian Canadians, even those who have migrated only recently, appear to reflect a risk perception of climate change that conforms to the direction of Canadian society. Of course as the World Bank report did not include Canada, it is difficult to tell from this secondary data that the Canadian society has a lower risk perception than the Egyptian society, as other developed countries do. However previous global reports that included Canada have shown Canadian society to have a low risk perception of climate change, very close to the American perception (Leiserowitz 2008).

The difference in risk perception could be taken as an indication of better integration in the Canadian society and shifting of world views toward Canadian ones. In the descriptive part of the research findings, some interesting results need to be highlighted before discussing the regression models. The first result is in how people perceive the effects of climate change; two indicators have interesting differences in the Egyptian sample and in the Egyptian-Canadian sample. The first indicator is how people expect differences in types of plants and animals that live in their current country of residence to be a result of climate change. It is noticed that the percentage of people who are expecting the types of animals and plants to change a great deal is 20% higher in the Egyptian Canadian sample. This could be taken as an indicator that Egyptians have changed their perception of nature after they moved to Canada. Canada is known to be a richer natural habitat than Egypt, but it is important to highlight that Canadian Egyptians appear to have realized this fact.

The second indicator is how people expect the price of food and other essential goods to change as a result of climate change. The percentage of people in the Egyptian Canadian sample who thought it would change is higher, 12%. This shows a higher awareness of the effects of

climate change on food prices and economic security in the Egyptian Canadian sample. Especially when it is taken into consideration that 69% of the Egyptian Canadian sample indicated that more of their economic needs are met since they came to Canada. In other word they realize the negative effect of climate change on food prices in spite of the fact their overall economic condition was enhanced.

It is important also to highlight that the local media is the source most Egyptian Canadian knowledge of climate change. Therefore, the local media is critically important in building general knowledge of risk perception of climate change within this population. It also means that respondents view the local media in Canada to be more concerned with issues of climate change than is the case in Egypt.

Another interesting result in the descriptive area is that all the beliefs indicators are higher in the Egyptian sample, except that the government responsibility is higher in the Egyptian Canadian sample. This result shows how the belief about government responsibility for dealing with climate change differs from the other beliefs. Perhaps this is because of the higher expectations Egyptian Canadians have of their government in Canada. The reason for this difference might not be their risk perception of climate change but their belief in the ability of the Canadian government as compared to their beliefs about ability of the Egyptian government to deal with the risks associated with climate change.

This conclusion is supported by the attitudes measurement indicating that Egyptian Canadians believe their country has a leading role over other countries, and more so than the Egyptians do. That emphasizes the idea that Egyptian Canadians believe in the power of Canada as a developed country more than Egypt. It indicates they are changing their perception of the

importance of their country after changing the country of residence, and they realize that Canada is a country with different political and social conditions than Egypt.

The main purpose of the three regression models is to allow a comparison between three different samples and to explore differential relationship between social context and risk perception. The first model on the Egyptian sample, using the original variables from the World Bank report, indicated beliefs about climate change to be the main factor in forming the risk perception. The factors that influences risk perception of climate change according to the first model are the perception of the Trajectory of greenhouse gas emissions, beliefs about the status of climate change in science, and the belief in the importance of government action.

The second regression model, based on the Egyptian Canadian sample, using the original variables from the World Bank report, offers almost the same explanatory power (R^2). However the significant variables in the second model are totally different: perception of government responsibility, attitude towards willingness to support national steps with economic costs, willingness to commit to emissions cuts in the context of an agreement and the perception of the importance of Canada's actions as an example to other countries. In the second model, attitudes also have a role in forming risk perception of climate change, while the first model showed beliefs only to be significant. This result suggests that the Egyptian immigrants have different attitudes towards climate change; it also suggests that their beliefs reflect their attitudes.

Generally comparison of the first and second model shows that beliefs in the first model are the main factors associated with risk perceptions, negative or positive. In the second model, attitudes have a mainly positive role, while beliefs have only a negative role. This outcome indicates an important difference in the role of beliefs related differences in country of residence.

The third model better explains the variation in the risk perception of climate change, more so than the previous two models. The most significant factor is believing in personal responsibility for dealing with climate change, but the second factor influencing risk perception of climate change in this model is reading general information about climate change (-.337).

The relation is significant, yet it is a negative relation, in spite of some previous studies indicating a positive relation between knowledge and risk perception. The source of knowledge is perhaps the key factor here, as the previous result suggests that general knowledge about climate change does not support the idea of risk. The reason for this significant factor in the model might be the debates about the nature of climate change and its uncertainty, particularly within the Alberta context. These debates and the contradictory information introduced might have raised doubts about the truth of the existence of climate change, and therefore lowered risk perception among Egyptian Canadians

The third significant factor in this model is the willingness to support national steps with economic outlays, and it positively influences risk perception of climate change in the model (.262). This factor was significant in the second model as well, which shows its significance is somewhat consistent. The fourth significant factor is government responsibility, which is a negative relation (like the second model) but with less significance.

Generally in comparison between the second and the third model, the researcher added variables that explained more of the variation in the risk perception of climate change. Two of the factors in the second model were significant in the third model: willingness to support national steps with economic costs, and government responsibility. The personal responsibility regarding climate change seem to be highly significant in forming a positive risk perception of climate change, while reading more general knowledge seems to be highly significant in forming

60

risk perception of climate change negatively. It is interesting how gaining additional general knowledge negatively affect risk perception of climate change. This means that knowledge of climate change in this context of Edmonton, Alberta, reflects the debates and contradictions within our local energy producing economy and our status as a global supplier of carbon-based energy sources, such as oil sands. These local discussions and debates seem to be strongly related to risk perception of climate change within the Egyptian Canadian sample.

Summary

This study has emphasized and extended information contained in the World Bank report; that developing countries perceive risk more than developed ones. It can be said that some beliefs and attitudes are different in each sample, which offers evidence for a different "world view" in each sample. That means the possibility of the "world view" being changed by the change of country of residence from Egypt to Canada. Some changes were positive – believing in government responsibility, and beliefs about the scientific status of climate change, believing in the effect of their country on other countries, willingness to accept higher energy costs to deal with climate change, and willingness to assist poor countries to adapt to climate change. Some other aspects were negative, such as beliefs about the trajectory of greenhouse gas emissions, beliefs about the impact of climate change on wealthy countries vs. poor countries and willingness to support national steps with economic outlays. The indication of a changing "world view" as a result of changing country of residence supports the cultural theory assumption about the role culture plays in risk perception. Since we do not have a cohort study to actually examine pre- and post-migration changes in world view, these conclusions are only tentative, but our data suggest that Egyptians living in Canada do have a different world view about climate change than their cohort in Egypt.

Furthermore, the regression models show that beliefs and attitudes influence risk perception differently, depending on the country of residence. The first and second regression model shows that beliefs and attitudes are the main factor controlling risk perception of climate change, confirming the results of previous studies (Dietz et al. 2007; Stern et al. 1999). What is interesting is that the first model indicates only some beliefs are significant in forming risk perception of climate change, while the second model adds some attitude indicators as well. This outcome suggests a possibility that a change in country of residence tends to increase the influence of attitudes, and to decrease the influence of beliefs, taking into consideration that both regression models explain approximately the same percentage of change in the dependent variables.

The third model shows the importance of general knowledge in influencing risk perception of climate change, which matches the knowledge theory (Wildavsky 1990). It appears to negatively influence risk perception of climate change. Possibly the type of knowledge is an important factor also. Also belief in self-responsibility has a high influence on risk perception of climate change.

Chapter 5: Conclusion

This research started with the question of whether the risk perception of climate change varies depending on the country of residency. This research has found important differences along these lines that show climate change risk perceptions are more consistent with the new country of residence. Egyptian immigrants to Canada have different beliefs and attitudes about climate change, beliefs and attitudes that moved towards those held by average Canadians. This outcome might indicate their positive integration into the Canadian society, possibly important to Canadian policy makers. As the question of immigrants' ability to integrate into the society is often raised by policy makers for evaluating or designing immigration programs, there is evidence from this study that immigrant risk perceptions of climate change are different than their country of origin, and seem to fall in line with Canadian averages. It also supports the possibility that risk perception of climate change can be influenced by a change in cultural context. This idea might suggest the difficulty of dealing with risk perception as constant and associated with cultural groups, as these cultural groups might change their risk perception as a result of changes in the surrounded cultural context.

Egyptian immigrants view Canada as different from Egypt and they recognize these differences are represented in the natural way of life in Canada, the stronger role expected from a strong Canadian government compared to the Egyptian one, and the expectation of the Canadian international role as a leading nation. These results may also reflect a change in world view as an indication of changing beliefs and attitudes to be more integrated into Canadian society.

The pattern of results from the World Bank data was confirmed in this study; developed countries have something in common that causes a change in the risk perception of climate change in a negative way. This might be caused by totally depending on the government to take

responsibility for dealing with climate change. People tend to perceive climate change to be less risky when they believe more in government responsibility. It is important for the Canadian government and politicians to realize that it is important to demonstrate government willingness to deal with climate change, but emphasizing the responsibility of each individual is really important, as the analysis shows a significant relation between belief in self-responsibility and increasing risk perception of climate change. Emphasizing the individual's responsibility could be via new regulations to limit the over usage of energy sources, also by enhancing knowledge of the danger or climate change.

Risk perception among Egyptian immigrants is positively influenced by a belief in self-responsibility, while it is influenced negatively by reading about climate change. The role of media is an important component of this analysis, since knowledge of climate change is significantly related to risk perception. It is obvious in the Canadian context that general knowledge is negatively associated with risk perception of climate change. It is often the case, based on insights from other research, that sources of knowledge do not have a significant influence on risk perception, but this study found this outcome to be different. Therefore, a new perspective is needed to build general knowledge about the role of knowledge dissemination on topics related to climate change. Based on these results, policy developments to raise awareness of climate change amongst residents would do well to focus on issues of personal responsibility and alternative sources of knowledge about the risks of climate change.

Study Limitations:

The purpose of this research is to compare two similar samples of Egyptians who reside in different countries. This comparison was achieved but there are some important limitations to this study which require some attention. First, the World Bank report was published in December 2009, while the data for this research was collected in January 2011, which means a gap of more than a year between the two sets of data. It is possible to say this gap affected the data very little, as the world is expected to be more aware of climate change over time, while the second set of data showed a lower risk perception from the first set. However, there may be important difference in risk perception between datasets that are a function of when the data was collected.

The Egyptian Canadian sample was taken from Alberta only, and it does not represent the Egyptians all over Canada, while the Egyptian sample was taken from all over Egypt and it does represent Egyptian society as a whole. Time and cost constraints prevented the research from going deeper in the data collecting process. Also, Egyptian immigrants to Alberta could be considered an exceptional group, who had the motivation to immigrate to Canada and were therefore different from the Egyptian sample from the outset. The only way to address this limitation is to conduct a cohort study of Egyptians in a pre-migration and a post-migration setting, therefore testing change in risk perception as opposed to difference in risk perception which was done in this study.

Finally, with regard to the quantitative analysis, although the study is based on a theory of risk perception that suggests causal relationship between independent and dependent variables, this study does not allow for deeper empirical analysis of causality.

Future work:

This data can be compared to an average Canadian sample, and allows one to see the difference between risk perceptions in the three samples. If the Canadian sample has a lower risk perception than the Egyptian sample, that would confirm the results and validate the conclusion of this research. Also a similar study could be done on a different cultural group who have taken up residence in Canada. A broader study of this nature could provide more robust insights into the role of migration on risk perception of climate change, and provide even more insights on the possibilities for climate policy development in Canada under conditions of increased immigration to this country. Knowledge and information on climate change was an important factor in this study, yet we have little insight into the content of Canadian media when it comes to issues of climate change, and how this content might relate to risk perception. Based on the results of this study, more research on this relationship is warranted.

References

Abu-Laban, B. 1980. *An olive branch on the family tree: the Arabs in Canada* Toronto: McClelland and Stewart Ltd.

Balaz, V. and Williams, A. 2011. " Risk attitudes and migration experience." *Journal of risk research 14(5), 583-596.*

Blamey, R. 1998. "Contingent valuation and the activation of environmental norms." *Ecological Economics*, *24 (1): 47-72*

Barber, D. 2008. "The changing climate of the arctic." *Arctic* 6(1). 7-26.

Bärring, L. 1993. "Climate - change or variation?" *Climatic Change.* 251-13.

Bateman, J.M. and B. Edwards. 2002. "Gender and Evacuation: A Closer Look at Why Women are More Likely to Evacuate for Hurricanes." *Natural Hazards Review*. 3: 107-117.

Bandura, A.1986. *Self-Efficacy, Social Foundation of Thought & Action: A Social Cognitive Theory.* Englewood Cliffs, N.J.: Prentice-Hall.

Beck, U. 2009. *World at Risk.* Cambridge, UK: Polity press

Berry John and David Sam eds. 2006. *The Cambridge Handbook of Acculturation Psychology.* Cambridge, UK: Cambridge University Press.

Bontempo, R.N., W.P. Bottom, Elke U. Weber. 1997. "Cross-Cultural Differences in Risk Perception: A Model-Based Approach." *Risk Analysis*. 17: 479-488.

Burton, I. 2002. "From impacts assessment to adaptation priorities: the shaping of adaptation policy." *Climate Policy* 2: 145–159.

Breckler, S. J., & Wiggins, E. C. 1992. "*On defining attitude and attitude theory: Once more with feeling.*" In A. R. Pratkanis, S. J. Breckler, & A. C. Greenwald (Eds.), Attitude structure and function. Hillsdale, NJ: Erlbaum. pp. 407–427.

Bridge, G. 2009. " Rational choice theory and rational choice Marxism" *International Encyclopedia of Human Geography* pp. 100-106

Brown, A.1995. *Organizational Culture* London: Pitman

Bubsy, J.; R.A and B.M. 2009. "Interrupting the social amplification of risk process: a case study in collective emissions reduction" *Environmental Science & Policy, 12 (2): 297-30.*

Christianson, G. E.1999. *Greenhouse : the 200-year story of global warming*. New York: Walker and Company.

Converse, Philip E. 1964. "The Nature of Belief Systems of Mass Publics.*"* In *Ideology and Discontent*, ed. David Apter. London: Free Press, pp. 206-261.

Comiso, J. 2008. "Accelerated decline in the arctic sea ice cover". *Geophysical Research Letters 35.*

DEFRA, 2006. "*Adaptation Policy Framework: A Summary of Responses to the Consultation*". /http://www.defra.gov.uk/environment/climatechange/uk/adapt/policyframe.htmS.

Dickie, M. and S. Gerking. 2007. "Altruism and Environmental Risks to Health of Parents and their Children." *Journal of Environmental Economics and Management* 53: 323-41

Dickie, M. and S. Gerking. 2003. "Parents' Valuation of Latent Health Risks to their Children." Chapter 14 in *Risk and Uncertainty in Environmental and Natural Resource Economics*, Edward Elgar, 251-78

Douglas, M. 1966. *Purity and danger an analysis of concepts of pollution and taboo.* London: Routledge and Kegan.

Douglas,M. 1970. *Natural symbols: Explorations in Cosmology.* London: Barrie and Rockliff.

Douglas, M. & Wildvasky, A. 1982. *Risk and Culture: An essay on the selection of environmental and technological dangers.* Berkeley: University of California Press.

Douglas, M. 1992. *Risk and blame: Essays in cultural theory.* London: Routledge.

Enarson, E. and M. Fordham. 2001. "Lines that Divide, Ties that Bind: Race, Class, and Gender in Women's Recovery in the U.S. and UK." *Australian Journal of Emergency Management.* 15(4): 43-52.

Eom, Y.S. 1994. "Pesticide Residue Risk and Food Safety Valuation: A Random Utility Approach." *American Journal of Agricultural Economics 76(4):760-77.*

Fehr, E. & Fischbacher, U. 2004. "Social norms and human cooperation". *TRENDS in Cognitive Sciences.* 8 (4): 185-190

Fishbein, M. and I. Ajzen. 1975. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Ford, J. 2010. "Climate change policy responses for Canada's Inuit population: The importance of and opportunities for adaptation." *Global Environmental Change 20 (10) 177–191.*

Freudenberg, W.R. 2003. "Institutional failure and the organizational amplification of risk: the need for a closer look" *The Social Amplification of Risk.* Cambridge, UK: Cambridge University Press, pp. 102–120

Gielen, P. Uwe and L. Loeb. 2003. *Migration, Immigration and Emigration In International Perspective* U.S.A.: Praeger

Gilens, Martin. 2001. "Political Ignorance and Collective Policy Preferences." *American Political Science Review* 95(02): 379-396.

GlobeScan. 2006. "30-country poll finds worldwide consensus that climate change is a serious problem." http://www.worldpublicopinion.org/pipa/articles/btenvironmentra/187.php?nid=&id=&pnt=187&lb=bte

Haines A., R.S. Kovats, D. Campbell-Lendrum, C. Corvalan. 2006. *Climate change and human health: impacts, vulnerability, and mitigation*. London: School of Hygiene and Tropical Medicine.

Hopper, J. R., & Nielsen, J. M. 1991 " Recycling as altruistic behavior: normative and behavioral strategies to expand participation in a community recycling program" *Environment and Behavior, 23, 195–220.*

Hulme, P.E. 2005. "Adapting to climate change: is there scope for ecological management in the face of a global threat?" *Journal of Applied Ecology, 42(5): 784-794.*

IPCC report http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

Jenkins, R.R., N. Owens, and L.B. Wiggins. 2001. "Valuing Reduced Risks to Children: the Case of Bicycle Safety Helmets." *Contemporary Economic Policy 19:397–408*

Jenkins-Smith, Hank C., Neil J. Mitchell, and Kerry G. Herron. 2004. "Foreign and Domestic Policy Belief Structures in the U.S. and British Publics." *Journal of Conflict Resolution* 48(3): 287-309.

Karl, T.R., and K.E. Trenberth. 2003. "Modern global climate change." *Science, 302: 1719-1723*

Karl, T.R., J.M. Melillo, and T.C. Peterson. 2009. *Global climate change impacts in the United States: 188 pp.*

Kasperson, R.E., Renn, O., Slovic, P., Brown, H.S., Emel, J., Goble, R., Kasperson, J.X., Ratick, S. 1988. "The social amplification of risk: a conceptual framework." *Risk Analysis* 8, 177–18

Leiserowitz, A., Kates, R. W., & Parris, T. M. 2005. "Do global attitudes and behaviors support sustainable development?" *Environment, 47*(9), 22-38.

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

Leiserowitz, A. and Feinberg, G. 2007 "American support for local action on global
warming." *The GKF Roper / Yale Survey on Environmental Issues.* New Haven, CT: Yale
University.

Leiserowitz, A. 2008. *International public opinion, perception, and understanding of global
climate change.* Yale University.

Lim, B. 2005. *Adaptation Policy Frameworks for Climate Change: Developing Strategies,
Policies and Measures*. Cambridge: Cambridge University Press.

Lippman, Walter. 1955. *Essays in Public Philosophy*. Boston: Little, Brown.

Liu, J.T. and C.R. Hsieh. 1995. "Risk Perception and Smoking Behavior: Empirical Evidence
from Taiwan." *Journal of Risk and Uncertainty 11:139–157*

Lorenzoni, I. 2000. "A co-evolutionary approach to climate change impact assessment: Part I.
Integrating socio-economic and climate change scenarios." *Global Environmental Change 10:
57–68.*

Lundborg, P., and B. Lindgren. 2004. "Do They Know What They are Doing? Risk Perceptions
and Smoking Behavior among Swedish Teenagers." *Journal of Risk and Uncertainty,
Springer, 28(3): 261-286.*

Lupia, Arthur, and Mathew D. McCubbins. 1998. *The Democratic Dilemma: Can Citizens Learn
What They Need to Know?* Cambridge University Press.

Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A.T. Gaye, J.M. Gregory, A.

Kitoh, R. Knutti, J.M. Murphy, A. Noda, S.C.B. Raper, I.G. Watterson, A.J. Weaver

and Z.C. Zhao. 2007 "Global Climate Projections." 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, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

McCarl, B.A. 2006. *US Agriculture in the climate change squeeze: Part 1: Sectorial Sensitivity and Vulnerability.* Report to National Environmental Trust.

Mitchell, J. 1966. "*Climatic Change.*" WMO Technical Note No 79, World Meteorological Organization, Geneva, 79 p.

McPhail, C. 1991. *The Myth of the Maddening Crowd*. Hawthorne, NY: Walter de Gruyter, Inc.

Mileti, D.S and J.H. Sorensen. 1990. *Communication of Emergency Public Warnings: A Social Science Perspective and State-of-the-Art Assessment*. Oak Ridge, TN: Oak Ridge National Laboratory.

Mileti, D.S. 1999. *Disasters by Design*. Washington, D.C.: Joseph Henry Press.

Naidoo, C.J. 2003. *South Asian Canadian Women: A Contemporary Portrait.* Waterloo, Ontario, Canada: Wilfrid Laurier University.

National Academies. 2008. *Understanding and responding to climate change: highlights of National Academies Reports.* 2008 Edition.

Niang-Diop, I. 2005. "Formulating an adaptation strategy." In *The Gendered Terrain of Disaster*. Westport, CT: Praeger Publishing.

Nigg, J.M. 1995. "Risk Communication and Warning Systems*." In *Natural Risk and Civil Protection*. London: E and FN Spon.

O'Connor, R.E, Bord, R.J. & Fisher, A. 1998. "The curious impact of knowledge about climate change on risk perception and willing to sacrifice." *Risk decision and policy, 3 (2), 145-155.*

Page, Benjamin I., and Robert Y. Shapiro. 1992. *The Rational Public: Fifty Years of Trends in Americans' Policy Preferences*. 1st ed. University Of Chicago Press.

Paluck, E. 2009. "What's in a Norm? Sources and Processes of Norm Change." *Journal of Personality and Social Psychology*. 96 (3): 594-600

Parmesan, C. 2006. "Ecological and evolutionary responses to recent climate change". *Annual Review of Ecology, Evolution, and Systematics,* 37: 637-669.

Patz, J.A., and R.S. Kovats. 2002. "Hotspots in climate change and human health." *British Medical Journal, 325: 1094–1098.*

Patz, J.A., D. Campbell-Lendrum, T. Holloway, and J.A. Foley. 2005. "Impact of regional climate change on human health." *Nature ,438: 310–317.*

Peters, E., & Slovic, P. 1996. "The role of affect and worldviews as orienting dispositions in the perception and acceptance of nuclear power." *Journal of applied social psychology, 26(16), 1427–1453*

Pew Global Attitudes Project. 2006. *No global warming alarm in the U.S., China*. Washington, D.C.: The Pew Research Center for the People & the Press.

Pielke, R. 2004. "What is climate change?" *Issues in Science and Technology Summer* pp. 1-4.

UN Conference http://www.balmun.de/previous-conferences/balmun-2010/committees/special-conference/

Renn, O., Burns, W., Kasperson, J., Kasperson, R. & Slovic, P. 1992. "The social amplification of risk: Theoretical foundations and empirical applications." *Journal of Social Issues, 48(4), 137-160.*

Rodríguez, H., W. Díaz, W., J. Santos, and B. E. Aguirre. 2006. "Communicating Risk and Uncertainty: Science, Technology, and Disasters at the Crossroads." in *Handbook of Disaster Research*. New York: Springer.

Schwartz, S. H. 1999. "A theory of cultural values and some implications for work." *Applied Psychology, An International Review, 48, 23–47.*

Schwitzgebel, Eric. 2006, "Belief" in Zalta, Edward, *The Stanford Encyclopedia of Philosophy*, Stanford, CA: The Metaphysics Research Lab.

Shaw, W.D., and R.T. Woodward. 2008. "On Why Environmental and Resource Economists Should Care about Non-Expected Utility Models." *Resource and Energy Economics 30(1): 66-89.*

Shapiro, Robert Y., and Benjamin I. Page. 1994. "Foreign Policy and Public Opinion." In *The New Politics of American Foreign Policy*. New York: St. Martin's Press, p. 216-235.

Siegfried, E., Burton, I., Malone, E., Huq, S. *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures.* Cambridge: Cambridge University Press.

Slovic, P. 1987. "Perception of Risk." *Science 236:280-28*

Slovic, P. 1999. "Trust, Emotion, Sex, Politics, and Science: Surveying the Risk Assessment Battlefield." *Risk Analysis 19:689–701.*

Slovic, P. 2000. *The perception of risk.* Sterling, VA: Earthscan Publications.

Solomon, S., G.-K. Plattner, R. Knutti, and P. Friedlingstein. 2009. "Irreversible climate change due to carbon dioxide emissions." *Proceedings of the National Academy of Sciences, 106(6): 1704-1709.*

Sorensen, J.H. 1982. *Evaluation of Emergency Warning System at Ft. St. Vrain Nuclear Power Plant.* Oak Ridge, TN: Oak Ridge National Laboratory.

Starr, C. 1969. "Social Benefit Versus Technological Risk." *Science.* 165: 1232

Tans, P. 2010. NOAA/ESRL (www.esrl.noaa.gov/gmd/ccgg/trends/).

Thomas, C.D., et al. 2004. "Extinction risk from climate change." *Nature*, 427: 145-148.

Thompson, M., Ellis, R and Wildavsky, A. 1990. *Cultural Theory*. San Francisco: Westview
Press.

Thøgersen, J. and Anders, B. 2007 "Activation of social norms in social dilemmas: A review of
the evidence and reflections on the implications for environmental behaviour" *Journal of
Economic Psychology, 28(1) : 93-112*

Turner, R.H. and L.M. Killian. 1987. *Collective Behavior*. Third Edition. Englewood Cliffs, NJ:
Prentice-Hall, Inc.

Tversky, A. and D. Kahneman. 1974. "Judgment under uncertainty: Heuristics and biases."
Science 185**:** 1124-1130.

Walzer, Michael 1998. *Tolerance*. Roma-Bari, Laterza Editori.

Walther, G.R., E. Post, P. Convery, A. Menzel, C. Parmesan, et al. 2002. "Ecological responses
to recent climate change." *Nature, 416: 389-395.*

Weber, E., Blais, A.-R., & Betz, N. 2002. "A domain-specific risk-attitude scale: Measuring risk
perceptions and risk behaviors." *Journal of Behavioral Decision Making 15, 1-28.*

West, C. 2005. *Measuring Progress: Preparing for Climate Change through the UK Climate
Impacts Programme.* Oxford: UKCIP.

Wildavsky, A. & Dake, K. 1990. "Theories of risk perception: Who fears what and why?."
Daedalus, 119(4), 41-60.

World Development Report. 2009. *Public attitudes toward climate change: findings from a
multi-country poll.* World Bank

Vaughan, E. and B. Nordenstam. 1991. "The Perception of Environmental Risks Among
Ethnically Diverse Groups in the United States." *Journal of Cross-Cultural Psychology*. 22:
29-60.

Zahran, S., Brody, S.D., Grover, H., Vedlitz, A. 2006. "*Climate change vulnerability and policy support",* Society & Natural Resources 19, 771-789.

Zaller, John R. 1992. "*The Nature and Origins of Mass Opinion*." Cambridge: Cambridge University Press.

Chapter 7: Appendix – Survey Instrument

Perception of Climate Change among Egyptians Living in Egypt and Canada

Purpose: The purpose of this study is to explore how Egyptians living in Canada understand the risks of climate change. The information that is collected in this study will be compared with information from a World Bank study (published in 2009) about perception of climate change risk in Egypt. In comparing the results of these two studies, we hope to answer the following questions: Is Egyptian risk perception of climate change affected by a change in residence from Egypt to Canada? If so, what is causing this change?

Methods: We will be using a questionnaire to measure Egyptian immigrants' risk perception of climate change. This questionnaire will be conducted with two groups of Egyptians in the Edmonton area: (1) Egyptian Student Association, (2) Canadian Egyptian Society of Edmonton.

Benefits and risk: The results of this research can be used to indicate general attitudes toward climate change among newer Canadians and also the potential for shifting values with regard to climate change that stems for integration with Canadian society. This research has no direct personal benefits or risk to the participants.

Confidentiality and consent to participate: The information that is gathered from participants will be confidential. Only a summary of survey results will be made public. The questionnaire does not ask for personal information and the contact information from ESA and CESOE will be deleted from our files once the research is completed. Detailed information from the research will be available to the researchers only (Tarek Zaki, Dr. John Parkins and Dr. Debra Davidson), and will be stored for a minimum of 5 years on password protected computers of the researchers.

We invite you to participate in this study by completing the attached questionnaire. Completion of this questionnaire implies your consent to participate in the study. Participation is completely voluntary and you are free to withdraw from the study at any time without consequence.

Time needed to complete the survey: around 20 minutes.

Contacts: If you have questions or concerns about the study, please contact the individuals below:

John Parkins   Tarek Zaki
Associate Professor   Masters Student
Department of Rural Economy   Department of Rural Economy
University of Alberta   University of Alberta
Phone Number: 780-492-3610   Phone Number: 780-708-1541
Email: jparkins@ualberta.ca   Email: tzaki@ualberta.ca

For any additional questions or concerns about this study, please contact the university ethics review board at 780-492-0302.

QUESTIONNAIRE
Perception of Climate Change among Egyptians Living in Egypt and Canada

Please circle the response below that reflects your personal opinion.

1- Is climate change a problem?

    A- Very serious
    B- Somewhat serious
    C- Not serious
    D- Not at all serious

2- Dealing with climate change should be given priority, even if it causes slower economic growth and some loss of jobs.

    A- Agree strongly
    B- Agree somewhat
    C- Disagree somewhat
    D- Disagree strongly

3- When will climate change harm people substantially?

    A- Now
    B- 10 years
    C- 25 years
    D- 50 years
    E- 100 years
    F- never

4- If climate change is left unchecked worldwide, how much do you think climate change will affect each of the following in Canada?

	A lot	Some	Not very much	Not at all
1-Likelihood of natural disasters	1	2	3	4
2- Rainfall and available water resources	1	2	3	4
3- Types of plants and animals that live here	1	2	3	4
4- Price of foods and other essential goods	1	2	3	4
5-Types of food we produce	1	2	3	4
6- Our coastline	1	2	3	4
7- People needing to move their homes	1	2	3	4

5- Is it your impression that among scientists

    A- Most think the problem is urgent and enough is known for action

B- Views are pretty evenly divided

C- Most think the problem is not urgent, not enough known for action

6- If Canada does not do things differently in the future, do you think the amount of greenhouse gases that Canada produces will?

A- Go up

B- Stay the same

C- Go Down

7- Do you think climate change will be?

A- More harmful to wealthy countries

B- About equally harmful

C- Both affected differently

D- More harmful to poor countries

8- Do you think Canada has a responsibility to take steps to deal with climate change?

A- It does

B- It doesn't

C- I don't know

9- Do you think Egypt has a responsibility to take steps to deal with climate change?

A- It does

B- It doesn't

C- I don't know

10- To deal with the problem of climate change, do you think your government is doing?

A- Not enough

B- Right amount

C- Not much

D- I don't know

11- Do you think that if Canada takes steps to deal with climate change?

A- Other countries will be willing to act

B- It wouldn't make much difference

C- I don't know

**12- As you may know Canada and other countries from around the world met
in Copenhagen to develop a new agreement to take steps against climate change by limiting
greenhouse gas emissions. If the other countries come to an agreement, do you think Canada should
or should not be willing to commit to limiting its greenhouse gas emissions as part of such an
agreement?**

    A- Should be willing
    B- Shouldn't be willing
    C- I don't know

**13- Do you think will it be or will it not be necessary to increase the cost of energy, to encourage
individuals and businesses to conserve more or to use alternative forms of energy?**

    A- Will be necessary
    B- Will not be necessary
    C- I don't know

**14- Are you willing to pay more for energy and other products as part of taking steps against
climate change?**

    A- Agree
    B- Agree somehow
    C- Don't agree
    D- I don't know

**15- Do you think Canada should or should not contribute to international efforts to help poor
countries deal with climate induced changes?**

    A- Should contribute
    B- Should not contribute
    C- I don't know

**16- Do you think Egypt should or should not contribute to international efforts to help poor
countries deal with climate induced changes?**

    16- Should contribute
    17- Should not contribute
    18- I don't know

**17- Would you favor or oppose Canada taking each of the following steps to help deal with climate
change?**

A- Limiting the rate of constructing coal-fired power plants, even if this increases the cost of energy.
B- Gradually increasing the requirements for fuel efficiency in automobiles, even if this raises the cost of cars and bus fares.
C- Gradually reducing government subsidies that favor private transportation, even if this raises its cost.
D- Preserving or expanding forested areas, even if this means less land for agriculture or construction.

18- Since you came to Canada you have been:

	Strongly Agree	Agree	I don't know	Disagree	Strongly disagree
	1	**2**	**3**	**4**	**5**
- Hearing more about climate change in the local media					
- Attending more conferences and lectures about climate change	**1**	**2**	**3**	**4**	**5**
-Attending more educational campaign s about climate change	**1**	**2**	**3**	**4**	**5**
- Engaging more in general conversations about climate change	**1**	**2**	**3**	**4**	**5**
- Reading more scientific articles about climate change	**1**	**2**	**3**	**4**	**5**
- Reading more general information about climate change	**1**	**2**	**3**	**4**	**5**
-Your Economic needs are met more	**1**	**2**	**3**	**4**	**5**
-Leisure time has increased	**1**	**2**	**3**	**4**	**5**

19 – I feel I should do something about climate change

A- Strongly agree
B- Agree
C- I don't know
D- Disagree
E- Strongly disagree

20-I feel that government in Canada should do something about climate change

A- Strongly agree
B- Agree
C- I don't know
D- Disagree
E- Strongly disagree

21- How long have you been in Canada?

_____ Years

22- What is your gender?

A-Male
B-Female

23-How old are you?

_____ Years

24-What is your current level of formal education?

_____ (e.g., High School Diploma, Technical School Diploma, Bachelors, Graduate
Degree)