

North End Narratives: Grid-Group
Analysis for Environmental Justice in
Hamilton, Ontario

by

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A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Arts
in
Anthropology

Waterloo, Ontario, Canada, 2016

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

This paper explores environmental inequality and perceptions of environmental risk among people living in proximity to the industrial sector of Hamilton, Ontario (Canada). This sector is adjacent to Hamilton's lower city, where on average socioeconomic status is low and rates of poverty, ill-health, and exposure to air pollution are high compared to the upper City of Hamilton ("the Mountain"). Using interviews with lower Hamilton residents and local environmental activists and ethnographic data, I seek to assess whether the grid-group and Cultural Theory approaches developed by anthropologist Mary Douglas are suited as tools for recognizing and analysing perceptions of environmental risk among Hamiltonians and making visible populations or cultural views that may be overlooked otherwise. I also assess grid-group and Cultural Theory as means for improving risk communication and informing public policy-making regarding environmental health hazards. I conclude that grid-group and Cultural Theory can serve as valuable tools for making visible some of the social influences on risk perception, but also identify drawbacks of the classificatory nature of Cultural Theory. As such, this paper contributes to the existing literature on environmental risk and offers an exploratory approach to this topic by using grid-group and Cultural Theory as a framework for conceiving of risk.

Acknowledgements

I would like to thank my family and friends for their constant encouragement, support, and enthusiasm.

I would also like to thank my supervisor, Dr. Goetz Hoeppe, for his guidance and for challenging me to think in new ways.

Thank you to my committee members, Dr. Susan Elliott and Dr. Secil Dagtas for their helpful suggestions and thought provoking questions. I would also like to thank the faculty and the staff in the Department of Anthropology for their kindness as well as the generous Sally Weaver and Iris Yuzdepski donors who helped make this research possible.

I would like to thank Lynda Lukasik, Environment Hamilton, and all of the research participants and community members who contributed to this study. I am grateful for your kindness and honesty.

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Chapter 1

Public Issues Anthropology and Environmental Inequality in Hamilton, Ontario

Environmental and human health are prominent issues in public discourse and thus constitute an important topic to explore from a public issues anthropology perspective. While the relationship between humans and the environment has long been a focus of anthropology, the growing presence of environmental hazards resulting from globalization, growing populations, and ever-increasing human production and consumption has brought this relationship into the public eye. An anthropological perspective of the cultural and social factors that lead people to perceive and manage their environment differently is thus an important public issue to be explored and my research endeavours to consider a case study of this grander environmental issue. Although global health disparities are undeniably a leading research concern, I stress the importance of local social justice research. There are people living in deplorable conditions in developing countries but also here in Canada; both circumstances call for increased engagement from anthropologists and other scholars. This paper seeks to engage with social justice issues through a qualitative research study in Hamilton, Ontario.

Poverty in Hamilton is unevenly distributed and income inequality continues to grow. Since 1970, income inequality in Hamilton has increased more rapidly than most other Canadian metropolitan areas (Harris et al. 2015). This uneven distribution favours the upper city and disadvantages the lower city, particularly the neighbourhoods located in close proximity to Hamilton's industrial core. Residents living below the poverty line are concentrated among several neighbourhoods within the north and east end of the lower city, with poverty rates reaching up to 46 percent (see Figure 3) (Mayo and Pike 2013). Many of the neighbourhoods in lower Hamilton have significantly higher rates of hospital admissions, emergency room visits, and lower birth weight infants than neighbourhoods

in the upper city. Education attainment is also severely reduced, as is age-at-death (Mayo et al. 2012). There is a startling 21-year age gap in life expectancies between the best and worst neighbourhoods in Hamilton (Buist 2010). The uneven distribution of wealth, health, and environmental hazards between upper and lower city neighbourhoods indicates that environmental inequality exists in Hamilton and calls for a public issues anthropology approach.

Environmental inequality is the notion that low-income and visible minority groups tend to be unequally exposed to environmental health hazards such as air pollution. Uneven exposure follows from the formation of public policies and industrial practices that result in disadvantaged groups bearing more of the costs and less of the benefits of economic development. These policies and practices are reinforced by government, legal, economic, and political institutions (Buzzelli and Jerrett 2004; Bullard 1999; Westra and Lawson 2001). Although the term “environmental racism” is commonly used in literature in the United States, I use the term “environmental inequality” throughout this paper because unequal exposure to hazards in Canada is not always determined by race (Buzzelli and Jerrett 2004; Jerrett et al. 2001; Handy 1977).

My research involves using interview and ethnographic data from lower Hamilton residents and local environmental activists to explore environmental inequality and perceptions of environmental risk among people living in close proximity to the industrial sector of Hamilton. The use of qualitative research methods to explore environmental health risks in Hamilton is essential in order to supplement the statistical data mentioned above, and is particularly important in a public issues context. Ethnographic studies are a method through which anthropologists can seek to understand how locals make sense of environmental inequality and complement studies of risk analysis and perception. Checker (2007) suggests the type of epidemiological studies that are typically part of risk assessments often fail to provide scientific confirmation of risk to the government, leaving communities unprotected. Checker (2007) calls for a “citizen-centred conception of justice” which pairs scientific data with lay expertise in the development of risk assessments. The anthropologist’s role as ethnographer involves interviewing residents, doing archival research on community history, and sometimes acting

as a mediator between communities and government to bring important local knowledge about risk exposure to the attention of policy makers. A study by Elliott et al. (1999) combines a quantitative health risk assessment conducted by scientists with input from a grassroots community group in Hamilton, exemplifying how the introduction of lay participation to decision-making processes has improved the relevance and quality of analysis and increased the legitimacy of the resulting decisions. Ethnographic research thus contributes to a more complete understanding of environmental inequality.

Using interview and ethnographic data, I seek to assess Mary Douglas's grid-group and Cultural Theory (CT) as a tool for recognizing and analysing the variety of residents' attitudes toward environmental risk in a given locale. Grid-group and CT is neglected by many anthropologists but it has properties that may make it useful for revealing the social structures that influence risk perception in a given context. As an exploratory research endeavour, I aim to assess CT as a means for improving risk communication and informing public policy-making regarding environmental hazards in Hamilton. By making the social structures in Hamilton visible I seek to identify multiple voices in the context of environmental risk in Hamilton and bring anthropological knowledge and approaches to bear on the public issue of environmental inequality.

While I strive to provide a stronger voice to the disadvantaged communities in Hamilton through the application of CT, I am also voicing the opinions of the local activists I encountered during interviews and ethnographic fieldwork. There is an eagerness in Hamilton among many newcomers to the city to reduce industrial pollution and re-engage the local population in fighting for the right to clean air and healthy neighbourhoods. My fieldwork included working closely with a not-for-profit environmental organization called Environment Hamilton (EH), a group that aims to "provide Hamiltonians with the knowledge and skills they need to enhance and protect the environment around them" (Lynda Lukasik, interview correspondence). EH engages volunteers as citizen scientists to initiate community conversations about what residents can do to improve quality of life in Hamilton neighbourhoods and work toward long-term solutions. Working in line with the priorities of groups like EH, I aim to illuminate the importance of increasing transparency among the provincial government, local industries, and

residents of Hamilton's north and east end. Monitoring standards ought to be better enforced, and information ought to be shared with the public more frequently and easily, particularly the causes and effects of industrial emissions. I hope that my research and resulting publication can contribute to a rise in public discourse regarding pollution, health, and environmental risk in Hamilton.

An appropriate venue for the publication of the second chapter of my MA thesis is *Health & Place*. *Health & Place* is an international interdisciplinary journal centred on the relationship between health and location, considering issues such as how place influences ill-health, and the development of health policy. This is an ideal venue for a publication on the topic of environmental inequality. Several scholars have previously published in *Health & Place* on topics relating to environmental inequalities in Hamilton, such as perceptions of quality of life in lower Hamilton (Wakefield and McMullan 2005); determinants of health in Hamilton neighbourhoods (Wilson et al. 2009); and civic involvement in issues of air pollution (Wakefield et al. 2001). An anthropological perspective can contribute to the collection of articles published in this journal, as my thesis research concentrates on perceptions of place and the effects of local environment on human health while providing a unique exploratory theoretical approach.

Chapter 2

Grid-Group Analysis for Environmental Justice in Hamilton, Ontario

2.1 Introduction

Unequal exposure to environmental hazards is concentrated in the lower City of Hamilton, Ontario, where on average socioeconomic status (SES) is low and rates of poverty, ill-health, and exposure to air pollution are high compared to the upper City of Hamilton (“the Mountain”). Poor air quality in northeast Hamilton can be attributed to traffic and industrial emissions, a notable source being Hamilton’s steel industry (Buzzelli et al. 2003; Buzzelli and Jerrett 2004; Jerrett et al. 2001). The purpose of this paper is to explore environmental inequality and perceptions of environmental risk among people living in proximity to the industrial sector of Hamilton. Using interviews with lower Hamilton residents and local environmental activists and ethnographic data, I seek to assess whether the grid-group and Cultural Theory approaches developed by anthropologist Mary Douglas are suited as tools for recognizing and analysing perceptions of environmental risk among Hamiltonians and making visible populations or cultural views that may be overlooked otherwise. I also assess grid-group and Cultural Theory as means for improving risk communication and informing public policy-making regarding environmental health hazards. As such, this paper contributes to the existing literature on environmental risk and offers an exploratory approach to this topic by using grid-group and Cultural Theory as a framework for conceiving of risk.

2.1.1 Literature Review

Environmental justice research in the United States has united around the notion that visible minority status, along with SES, conditions exposure to environmental health hazards such as polluting industries and hazardous waste sites (Bullard 1999; Buzzelli and Jerrett 2004; Westra and Lawson 2001). The environmental justice movement politicizes the inequality of human health impacts, suggesting that disadvantaged groups bear more of the costs of economic development and do not share proportionately in economic benefits; the movement remains strongest in the United States due to ties with the African-American Civil Rights

Movement (Buzzelli et al. 2003; Buzzelli and Jerrett 2004). Linked to the environmental justice movement is the term “environmental racism¹”. In the United States, environmental racism is commonly defined as:

An environmental policy, practice or directive that differentially affects or disadvantages (whether intended or unintended) individuals, groups or communities based on race or colour... [It] is reinforced by government, legal, economic, political and military institutions. Environmental racism combines with public policies and industry practices to provide benefits for whites while shifting costs to people of colour. (Bullard 1999:5-6)

A significant element of environmental racism is the reality that disadvantaged communities lack the resources and political power to resist the introduction of polluting technologies as well as the mobility of wealthier citizens to move away from areas falling into industrial and environmental decline.

The question of whether race guides environmental exposure in countries other than the United States has been explored to a lesser degree. In Canada’s urban centres populations are not clearly defined along lines of race and some scholars argue that the racial gradient that exists in the United States does not exist in Canada (Buzzelli and Jerrett 2004). However, environmental inequality research in Canada has heavily focused on discrimination against Canada’s Aboriginal groups (Dhillon and Young 2010; Langston 2010; MacDonald and Rang 2007; Westra and Lawson 2001) where distinct inequalities exist. Buzzelli and Jerrett (2004) suggest that Canada’s high immigration rates and multicultural policies, in contrast to a history of racial segregation in the United States, result in more varied and nuanced issues of inequality in Canada. Because there are mechanisms other than race contributing to unequal exposures, “environmental inequality” is a more inclusive term for the unequal exposure to hazards in Canada.

Hamilton, Ontario is a Canadian city where environmental inequality persists. Indeed, Hamilton is a particularly strong case of environmental inequality as it exemplifies both

¹ In the context of this paper the term “race” ought to be understood as a social mechanism that has been embedded in American thought, and the inequalities that exist between groups are the product of historical, social, political, cultural, and economic influences opposed to biological difference (AAA 1999).

process and outcome studies. In environmental justice research, process studies concentrate on the bias toward siting hazardous facilities in disadvantaged communities (e.g. the current proposed siting of a gasification plant at Pier 15 without a full environmental assessment (Stepan 2015)) whereas outcome studies focus on the presence of inequality in terms of disparities in current exposure (e.g. persistent air pollution resulting from industrial emissions) (Buzzelli et al. 2003; Buzzelli and Jerrett 2004). Three studies (Handy 1977; Jerrett et al. 2001; Buzzelli and Jerrett 2004) have addressed the relationship between SES and exposure to air pollution in Hamilton. Handy (1977) reported a correlation between air pollution exposure and neighbourhood dwelling values in Hamilton, suggesting that persons of low SES endure greater air pollution exposure than persons of high SES. Jerrett et al.'s (2001) study builds on this premise, using a GIS environmental health database with pollution estimates from 23 monitoring stations in Hamilton operated by the Ontario Ministry of the Environment (MOE), based on ten years of particulate air pollution data between 1985 and 1994. The study suggests a significant correlation between low housing costs, low-income residents, and unemployment in areas of the city with greater exposure to particulate air pollution.

Buzzelli and Jerrett (2004) use similar methods of a GIS analysis of air pollution estimates collected by the MOE compared to SES and visible-minority² data from the 1996 Census of Canada. Importantly, results suggest a negative correlation between several visible-minority groups and air pollution exposure, most notably black Canadians. Black Canadians were positively associated with wealth, which is in direct contrast to the academic understanding of environmental racism in the United States. In comparison, Latin-Americans presented the most consistent study population, indicating a positive association with air pollution exposure. However, when all visible minorities are combined as one population, the association with exposure to air pollution is insignificant, suggesting that status as a visible minority does not determine exposure. The authors conclude that environmental inequality research in Canada may require a more refined classification than in the United States and that Hamilton and

² In the Census of Canada, visible minorities refer to “persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour” (Buzzelli and Jerrett 2004:1860).

Canada generally represent a dimension of environmental inequality driven by economic status at time of entry.

A variety of other geography, environment, and health-based studies exist that address environmental inequality in Hamilton. These include: research on perceptions of ill-health as a result of air quality in lower Hamilton (Elliott et al. 1999; Gallina and Williams 2014); perceptions of quality of life in lower Hamilton (Eby et al. 2012; Wakefield and McMullan 2005); determinants of health in Hamilton neighbourhoods (Luginaah et al. 2001; Wilson et al. 2009); and civic involvement in issues of air pollution (Wakefield et al. 2001; Wakefield et al. 2007). Scholars have also taken an urban anthropology approach to space and place, including research on spatial inequalities and the politics of pollution in a variety of urban locales (Choy 2011, Checker 2005, 2007; Giesecking et al. 2014; Low 2011). Anthropological research on environmental inequality is largely focused on risk perception and risk communication, with particular attention to the ineffectiveness of scientific risk assessment in properly assessing perceived risks. Anthropologists and social scientists emphasize the value of qualitative research and socio-cultural expertise in contextualizing and mediating environmental inequalities, participatory research, and the expert-lay knowledge divide (Bickerstaff 2004; Checker 2007; Fortun 2001, 2004; Murphy 2013; Wynne 1992, 2004).

This paper uses anthropologist Mary Douglas's grid-group and CT to explore environmental inequality and perceptions of risk among people living in close proximity to the industrial sector of Hamilton, Ontario. Douglas's grid-group and CT have been applied by a diverse group of scholars in a variety of settings; for example, grid-group and CT have been used as an approach to: mediating the global climate change debate (Ney and Thompson 2000); explaining the political conflicts around the geo-politics of water policy (Gyawili 2002); conceptualizing organizational modes of thinking such as Islamic terrorist organizations (Almond et al. 2002; Mishal and Rosenthal 2005); and improving corporate management (Evans 2007). Over the last decade grid-group and CT have thus been used as a framework for writing on risk in a number of fields including economics, policy making, business management, and contemporary politics.

2.2 Grid-Group and Cultural Theory

The basis of grid-group and CT is traceable to anthropologist Mary Douglas's most familiar work, *Purity and Danger: an Analysis of Concepts of Pollution and Taboo* (1966), which highlights the role of conceptual boundaries of order and disorder in cultural notions of pollution. CT is the result of Douglas's lifelong fascination with differentiating categories of social organization. Grid-group was formulated by Douglas in *Natural Symbols* (1970) and *Cultural Bias* (1978) and further elaborated as CT by Aaron Wildavsky (1987; Thompson, Ellis, and Wildavsky, 1990). Together with Wildavsky, Douglas has applied this mode of analysis to environmental risk perception in the United States, in *Risk & Culture: An Essay on the Selection of Technological and Environmental Dangers* (1982). The main difference in my application of CT to environmental risk perception is that I have made inequality in Hamilton explicit. Whereas Douglas and Wildavsky focus on how environmental risks are selected for attention in the United States according to the opposing social organizations in a society, I also discuss how the social organizations in a given society influence the uneven distribution of risks (i.e. environmental inequality).

2.2.1 Grid and Group

Douglas's grid-group diagram is a schema for classifying social relations as they are experienced by the individual. Interpersonal relationships are codified in terms of grid (on the vertical axis) and group (on the horizontal axis); these are categorized on a scale of low-to-high or weak-to-strong (Figure 1). The matrix grid and group constructs describes society as the individual encounters it. By defining both grid and group, the external boundary of the community and its internal regulations are fully specified. Grid is defined as "rules which relate one person to others on an ego-centred basis" (Douglas 1970:iii). It is a network within which the individual is located in a cross-hatching of rules, constrained based on his or her obligations to others and further defined as distinct roles based on sex, age, class, seniority et cetera (Douglas 1970). Group is defined based on the experience of a bounded social unit (Douglas 1970:viii). The group dimension "expresses the possible range from the lowest possible of associations to tightly knit, closed groups...the further we travel along the line from left to right, the more permanent, inescapable and clearly bounded the social groups" (Douglas

1970:57). Group represents the pressure to draw the same boundaries and to consent to the rights and obligations imposed on members. Investment of time and energy is a marker of group strength (Douglas 1978).

Collaborations with American political scientist Aaron Wildavsky (Douglas and Wildavsky 1982) led to the transformation of grid and group into an analytical tool that can be used to address modern issues within societies and inform public policy. The idea that four “exemplary” types of social organization co-exist in different degrees of dominance in every society, and that they are self-defined by opposition to each other, was paramount in advancing grid-group analysis. These developments re-established grid-group analysis as CT.

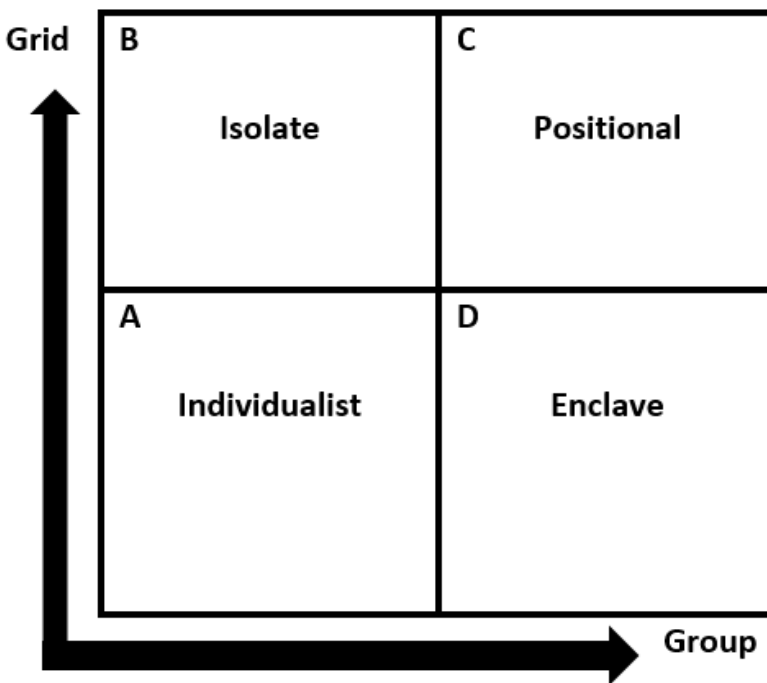


Figure 1: The four quadrants of grid and group (Adapted from Douglas 1978; 2006).

2.2.2 Cultural Theory and Exemplary Types

CT assumes that four relational types of social organization (or “cultures”) are normally present in any collectivity and are in constant conflict with each other. The four exemplary types include: the Individualist, the Isolate, the Positional culture, and the Enclave culture. CT creates a narrative inclusive of the four types of social organization within a bounded context.

Persons are classified within an exemplary type by a combination of characteristics, but each member only needs to show a majority of the features in that class. By identifying the ideal types within a society one can predict the cultural bias of the persons who belong to that culture. However, CT does not imply a stable framework—persons may move around the diagram and are likely to do so throughout their lives. Correspondingly, if a person’s position on the diagram changes, his or her cultural bias may change as well.

Quadrant A represents the Individualist ideal type in a low grid and low group culture. This is an environment in which persons possess homogenous abilities and competition is the main form of social control. It is a market society where personal success is priority and group membership and commitment are unimportant (Douglas 1978). Individualists may be weak, in that they are prone to withdrawal from the competitive world, typically moving toward quadrant B (Fardon 1999). Quadrant B represents the Isolate ideal type in a high grid and low group culture. It contains social isolates—persons who do not belong to a well-defined group and are constantly subjected to coercive regulation that limits their autonomy (Douglas 1978). According to Douglas (2006:6) “prisoners might be located here, or slaves and any strictly supervised servants, soldiers, or the very poor, or the Queen of England, hedged around as she is by protocol.” Persons may also come voluntarily to avoid responsibility and pressure.

Quadrant C represents the Positional ideal type in a high grid and high group culture. Originally called Hierarchical, quadrant C was renamed Positional because the word was criticized by radical ideologists. “Positional” implies a form of society that uses extensive classification for solving problems of co-ordination (Douglas 2006). The Positional culture is bounded externally and all internal roles are ascribed and strictly regulated. Its cultural bias supports tradition, order and obedience (Douglas 1978). Quadrant D represents the Enclave ideal type in a high group and low grid culture. Like the Positional culture, the Enclave community features a strongly bounded group, however without the strong rules for internal differentiation. Membership in the Enclave culture is voluntary and there are typically no ranking or regulatory rules for the relations between its members, thus it tends to be an egalitarian culture.

2.2.3 Method

To define grid-group and CT in a given society Douglas (1978) describes her methodology for placing a person on a grid-group diagram. Time, place, scale, and ethnographic context must first be properly understood. To define group:

The scale for group starts from an environment in which a person finds himself the centre of a network of his own making which has no recognizable boundaries...Moving away from this zero group position, he may belong to several associations which, themselves, are clearly bounded so that they can say who is and who is not a member...Then, for scoring the array of environments for group strength, the investigator needs to consider how much of the individual's life is absorbed in and sustained by group membership. If he spends the morning in one, the evening in another, appears on Sundays in a third, gets his livelihood in a fourth, his group score is not going to be high. The strongest effects of a group are to be found where it incorporates a person with the rest by implicating them together in common residence, shared work, shared resources and recreation, and by exerting control over marriage and kinship. (Douglas 1978:16)

According to Douglas (1978), the grid dimension can be constructed with four components: insulation, autonomy, control, and competition. The first corresponds to strong social classification where the individual experiences social isolation (high grid). With reduced insulation, the other three possibilities are likely, representing different kinds of individual freedom in society. High scores for all three equate with low grid, medium scores represent medium positions, and high scores for one but low for the other two may also equal a medium position. When a person has independence in his or her decision making, he or she is autonomous. This includes how freely a person uses his or her own time and goods. Control measures the individual's power over other people's autonomy, thus a high level of autonomy and control equates to a social environment of independent autocrats, each controlling a servile population further up grid. The last element is competition, which considers individual's interactions and ability to negotiate relationships with others (Douglas 1978). With the parameters of grid and group defined, one may apply grid-group analysis in any social context.

2.3 Background

2.3.1 Study Area

The study area includes wards 2, 3, and 4 in the City of Hamilton, which are located in the northeast end of Hamilton’s lower city (Figure 2). This specific area was chosen due to the proximity of the three wards to Hamilton’s industrial core. They were also selected because they coincide with Environment Hamilton’s (EH) Initiative for Healthy Air and Local Economies (INHALE) recruitment catchment area. All participants of the study reside in wards 2, 3, or 4 in Hamilton, and/or were volunteers for EH’s INHALE initiative.

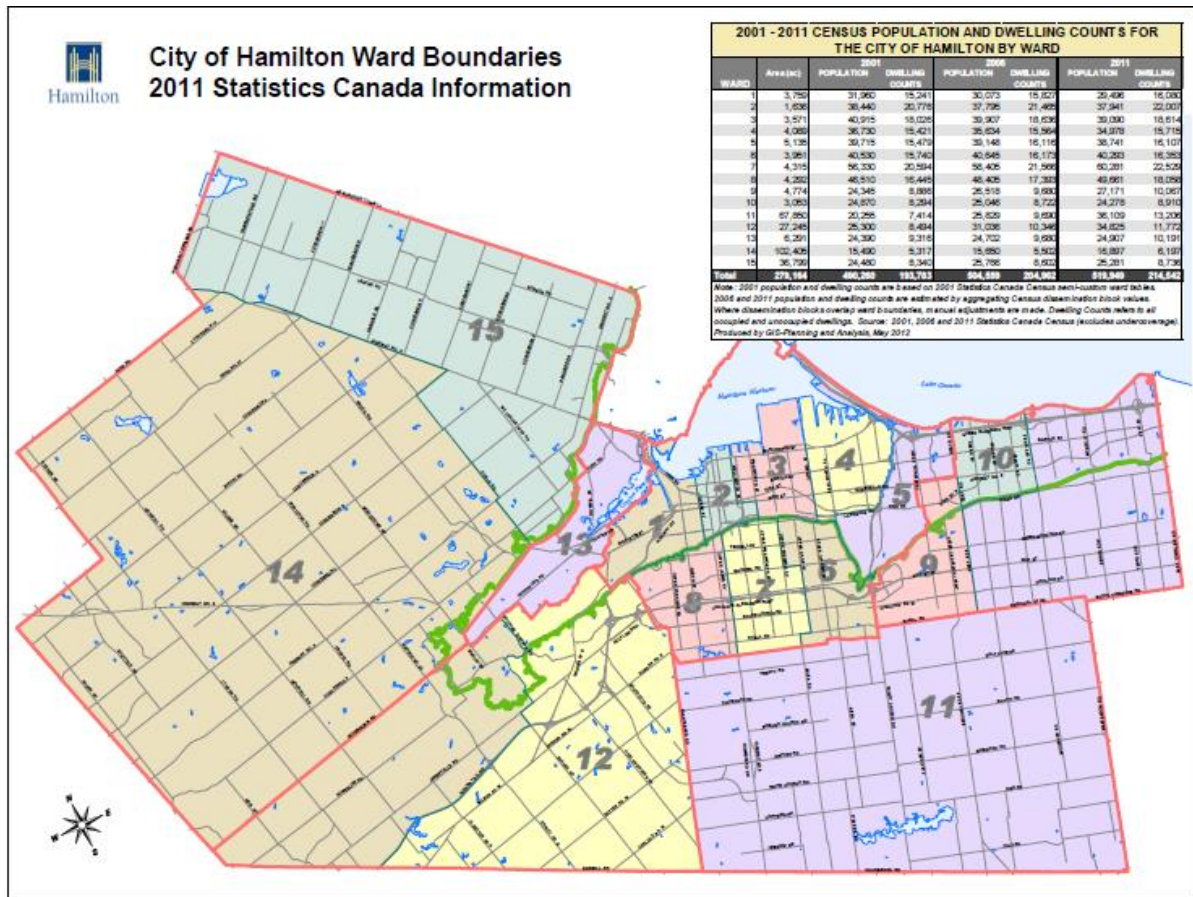


Figure 2: City of Hamilton Ward boundaries. Niagara Escarpment marked in green (Hamilton Maps 2011).

2.3.2 Hamilton: Historical and Geographic Significance

Hamilton, Ontario is an industrial port city located at the western tip of Lake Ontario, about 60 km southwest of Toronto. In 2011, Hamilton's population was just under 520,000 (Statistics Canada 2011). The steel industry has historically formed the backbone of the Hamilton economy and continues to play a significant role in the city (Dear et al. 1987; Eby et al. 2012); however, Hamilton has experienced economic restructuring in recent years with development in the health and education sectors (Harris et al. 2015). Steel manufacturing is concentrated along the south shore of Hamilton Harbour where the two major steel mills, US Steel Canada and ArcelorMittal Dofasco, are located. Dofasco remains Canada's leading steel producer and the city's largest private sector employer (ArcelorMittal 2015).

The physical geography of Hamilton has greatly influenced social patterns in the city. The industrial sector is concentrated on Lake Ontario in the north end³ of the city and the Niagara Escarpment runs east to west through the middle of Hamilton, dividing "Mountain" residents from the lower city (Figure 2). Higher paid workers began moving out of the lower city as early as 1945, with the advent of car ownership and increased roadway access; this socioeconomic divide prevails today (Harris et al. 2015). An east-west divide also exists in the city. As the steel industry developed, the working class tended to congregate in the eastern suburbs, the middle and upper class drifting south onto the Mountain and westward to the foot of the escarpment (Harris et al. 2015). It is worth noting that few residents currently living in the northeast neighbourhoods are actually employed in the steel industry—workers from the mills often earn enough money to move to more affluent neighbourhoods (Wakefield 2005). Research suggests that the Escarpment also influences local air patterns (Clougherty 1999). The Escarpment acts as a catcher's glove, sealing the pollution from the steel mills in the city below (Buzzelli and Jerrett 2004). A combination of industrial emissions, traffic emissions

³ The North End proper is a neighbourhood located in the northernmost part of Hamilton, situated near the city's industrial areas and adjacent to Hamilton Harbour (Figure 4). However, the term "north end" is used in popular conceptions of the city to describe a wider area, typically north of Barton St, which stretches further to the east of the North End proper. The term is often used in reference to the area of the city where SES is low relative to the rest of the city and industrial pollution is most concentrated. In the context of this paper, the North End (capitalized) refers to the city-defined neighbourhood and north end (lowercase) refers more broadly to the northernmost neighbourhoods in Hamilton's lower city.

from major expressways in the lower city, and prevailing westerly winds bring industrial smells and dirt to the east side of town (Buzzelli and Jerrett 2004); research shows that pollution levels and incidences of lung and colorectal cancer are highest in this area of the city (Buist 2010; Luginaah et al. 2001). However, it is worth noting the difficulties of disentangling the effects of emissions from demographic effects on mortality, such as a higher prevalence of smoking among low-income families.

Poverty in Hamilton is unevenly distributed among several neighbourhoods within the lower city and income inequality continues to grow (Harris et al. 2015; Mayo and Pike 2013). Using demographic, income, and health data from the 2006 census, The Social Planning and Research Council of Hamilton (SPRC) completed profiles of 11 of Hamilton's disadvantaged neighbourhoods to evidence the health and income divide in the city (Figure 3) (Mayo et al. 2012). This data was also presented in the Hamilton Spectator's *Code Red* series, a health mapping project completed by geographers and health researchers in the city (Buist 2010). In Beasley neighbourhood, 57 percent of residents live on incomes below the poverty line and the high school non-completion rate is almost three times the rate for the city as a whole. Almost half of young children in Jamesville are living in poverty. The average age at death for Keith residents is almost ten years younger than the average age at death for the city overall (Mayo et al. 2012). Hospital admission rates, emergency room visits, and rates of lower birth weight are significantly higher in the lower city (Harris et al. 2015; Mayo et al. 2012). The segregation of the poor, polarization of Hamilton's neighbourhoods, and high incidences of poverty in the lower city strongly indicate that environmental inequality exists in Hamilton.



Figure 3: Geographic distribution of areas that are part of the Neighbourhood Action Strategy in Hamilton (Mayo et al. 2012). Note the North End has been included as a part of Jamesville on this map. The North End is bounded by Wellington to the east, the CN rail tracks to the south, and Hamilton Bay to the north and west (see Figure 4).

2.3.3 Environment Hamilton: Fighting for Environmental Justice

EH is a not-for-profit environmental organization created by a core group of local environmental activists in 2001. Under the guidance of Executive Director Lynda Lukasik, who holds a PhD in Environmental Planning, EH engages with local and global environmental issues through education, outreach, and advocacy to build a sustainable future for Hamilton. Lynda explains that EH aims to “provide Hamiltonians with the knowledge and skills that they need to enhance and protect the environment around them.” EH has several ongoing air monitoring programs including Stack Watch, bicycle air monitoring (BAM), and INHALE. Stack Watch is a program designed to give the public the opportunity to report visible air

emissions from smoke stacks in Hamilton’s industrial core using a labelled “stacks key”. BAM was introduced in 2013, a program that allows cyclists to learn more about air quality in Hamilton by attaching a mobile air monitor and Global Positioning System (GPS) to the handlebars of their bike to track and map fine particulate matter within the city.

In 2015 INHALE was created as an extension of BAM in partnership with the Toronto Environmental Alliance (TEA). The program is designed to collect particulate air quality data using a mobile air monitor in two urban neighbourhoods in each city. The device measures small particles (0.5 microns or smaller) and larger particles (2.5 microns or larger) using a pump to draw air into the device and then counts the number of particles that pass through a laser in a given period of time. The larger the number displayed on the screen, the poorer the air quality (INHALE 2015). In Hamilton, the neighbourhoods of Jamesville/Beasley and Crown Point were selected for inclusion in INHALE (see Figure 3). Both are transitional urban neighbourhoods located in the lower city. The EH office is located in the Jamesville/Beasley neighbourhood and Lynda describes the area as a place where Hamiltonians “live, work, and play”. Crown Point was selected because it is located on the edge of the industrial core. INHALE engages volunteers as “citizen scientists” to monitor air quality problems at the street level, such as heavy traffic, construction, and industrial activity. Volunteers participate in a neighbourhood “walkabout” to familiarize themselves with the equipment and are then permitted to borrow a monitor and GPS unit for one week. In contrast to the data collected by stationary air monitoring stations, such as those owned by the MOE or local industries (the latter of which is not typically shared with the public), INHALE allows citizens to collect mobile air quality data that may be threatening human health in Hamilton neighbourhoods. By engaging volunteers as citizen scientists and mapping the data with GPS coordinates, EH endeavours to initiate community conversations about what residents can do to improve quality of life in Hamilton and work toward long-term solutions.

2.4 Methodology

In order to differentiate the classificatory worlds of people living in close proximity to the industrial sector of Hamilton, Ontario, I conducted interviews and participant observation in Hamilton between May and September 2015. I received approval to conduct this research from

the University of Waterloo Ethics Review Board. In addition to several informal conversations about the matters discussed throughout this paper, I conducted 14 interviews, totaling 16 interviewees (two of the interviews included a married/common-law couple interviewed together) and participated in two volunteer-based INHALE walkabouts. Participants were not excluded based on gender, culture, language, race, ethnicity, or disability; the only qualifier was that interview participants be over the age of 18. To develop a thorough understanding of Hamilton and the many current issues concerning industry, poverty, and inequality, I also collected past and present newspaper articles, blog posts, and press releases.

2.4.1 Recruitment

A variety of methods were used to recruit participants. This began with recruitment through EH's INHALE project from May through July 2015. I attended two INHALE neighbourhood walkabouts in May to interact with volunteers and explain my research interests and recruit in person. Lynda Lukasik emailed a recruitment letter to all INHALE volunteers on June 11th and again on July 8th. I also recruited for interviews outside of the INHALE project, beginning with the Crown Point neighbourhood, selected due to its proximity to Dofasco and EH's corresponding interests in the neighbourhood. Grenfell Street was targeted as a starting point, due to its proximity to the industrial core (located on the northern edge of Crown Point), and because residents of Grenfell Street were affected by an emissions incident in February 2015 resulting from a "bleeder pop"⁴ in one of the plant's blast furnaces (Rieti 2015a). Forty-one recruitment letters were placed in mailboxes on Grenfell Street on June 8th 2015. On the same day a recruitment poster was posted in the North Hamilton Community Health Centre located in the North End (Figure 4). This location was chosen due to its centrality in the North End and its diversity of multicultural programs attracting various age groups. Recruitment was limited to these three methods in the early months of the summer with the intent to recruit more participants if few responses were received.

⁴ A bleeder pop occurs when a safety valve in a blast furnace is released because the pressure is too high. When the valve is released, there is an emission of fine coal-based particulate. A blast furnace is used to make liquid iron, part of the process of making liquid steel (Rieti 2015a).

Additional recruitment was carried out in early August. Recruitment posters were placed in seven locations along Barton Street between John St N and Kenilworth Ave N, including three grocery stores, one Walmart, one library, and two bus shelters. A posting was also placed on the Crown Point Facebook group page. Previous participants were also asked to inquire with neighbours about participating in my thesis research.

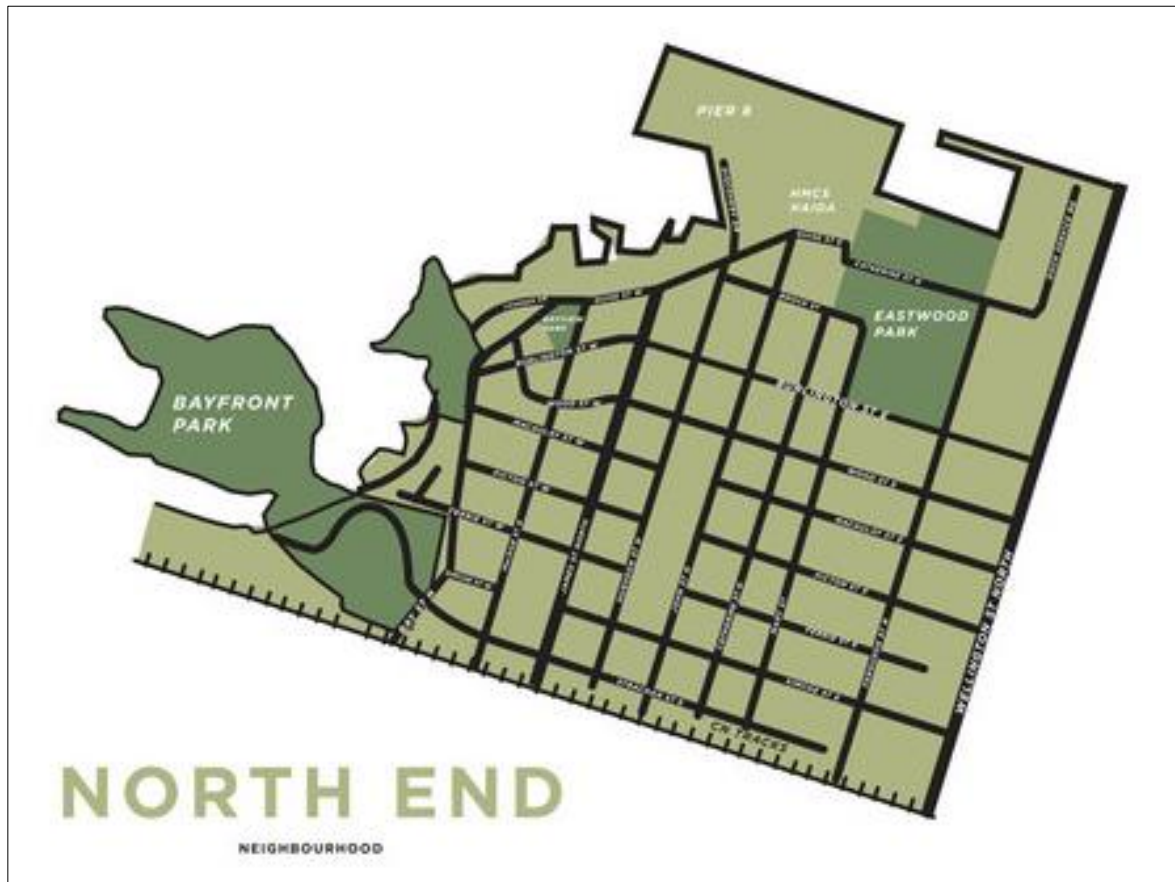


Figure 4: Hamilton's North End neighbourhood (Jelly Brothers 2015).

2.4.2 Interviews and Participant Observation

My research data derives from one-on-one (or one-on-two) semi-structured interviews and participant observation, which included volunteer-based INHALE walkabouts in the neighbourhood of Jamesville/Beasley. Volunteers met at the EH office, which is located in Hamilton's downtown core. The walkabouts included an introduction to the development and aims of INHALE and a lesson on how to use the monitors; this was followed by a walkabout

from the EH office down James St N and back, while discussing air quality issues, and concluded with Lynda showing volunteers a digitized map of their air quality data.

During the walkabouts I observed how volunteers interacted with each other, and how they reacted to and used the equipment. I became familiar with the structure of the walkabout sessions, and observed how different participants and different circumstances (e.g. construction on James St; wind direction) affects the data collected and how volunteers interpret this data. I listened to and took part in the ongoing dialogue and exchange of ideas among Lynda and volunteers, concerning problems and potential solutions to poor air quality.

Conflicting schedules and difficulties recruiting for summer walkabouts prevented me from attending more than two walkabouts. Furthermore, EH recruitment for the INHALE project in Crown Point did not begin until mid-September. However, as a volunteer for the project, I was able to engage with other volunteers, share my research interests, and recruit for interviews during the walkabouts. I used the walkabouts as a way to socialize with volunteers about the project and air quality concerns in general. I got to know members of the EH community, and had access to a plethora of information from Lynda through a formal interview and ongoing correspondence. Additional participant observation was conducted within the neighbourhoods where I interviewed participants, often before and after interviews took place.

Interviews ranged from 20-90 minutes and were audio-recorded and later transcribed. Interviewees included Lynda Lukasik, INHALE volunteers, and residents in lower Hamilton who have not volunteered with EH (Table 1). Interviews were conducted at participants' homes, in public parks, and in local coffee shops, at the choice and convenience of the participant. Home visits often included a tour of the participant's house or garden. Most interviews extended beyond the structured questions and additional topics and concerns were discussed such as disparities between the upper and lower city and the proposed gasification plant at Pier 15. Full interview schedules are provided in Appendix A. All of the interviews yielded many insightful perspectives and covered topics beyond the scope of this thesis. For the purposes of confidentiality, I use pseudonyms below when discussing participants.

It is worth noting that my research design did not include explicitly asking interviewees for their income information to identify low-income persons, nor was recruitment based on

this qualifier. In the context of environmental inequality, my study population therefore cannot be explicitly correlated with a low-income population. However, the topic of income was often mentioned in conversation during interviews, suggesting that several of my interviewees are low-income residents. Low-income was suggested in quotations such as: “I’m living off my line-of-credit until I become a senior next year” [Wendy, Crown Point resident]; “we live in government housing” [Diego, Beasley resident]; “This is a low-income neighbourhood...I can’t afford to live anywhere else” [Deirdre, Crown Point resident]; “I’m on disability” [Allen, Crown Point resident]; “I’m one of the founding members of the Mustard Seed Co-op, but I do not have the money to buy things there” [Isabella, Crown Point resident]. Therefore although my study is limited by a lack of comparative income data, it is still possible to discuss environmental inequality in this context.

It is also important to note that my recruitment methods and limited research period may have resulted in an imperfect representation of Hamilton’s lower city residents. Recruitment letters and postings in English may have excluded the non-English speaking population in lower Hamilton and persons unconcerned with environmental issues in Hamilton may not have been motivated to respond to my postings. Although I spoke with some European, South and Central American immigrants, African and Asian immigrants are underrepresented in my data. In Crown Point and South Sherman the population of residents who immigrated to Canada between 1991 and 2006 is less than three percent; however in Beasley it is much higher, where the immigrant population was 14 percent between 2001 and 2006 (Mayo et al. 2012). My data may therefore not sufficiently represent the attitudes of immigrants in the lower city. A recent study on perceptions of air quality among women in northeast Hamilton (Gallina and Williams 2014) suggests that Canadian-born women may be more concerned about air quality issues than immigrant women; this implies that Canadian-born women may be more inclined to answer postings about environmental issues. Similarly, Lynda shared an experience she had talking about environmental issues with Chinese immigrants in Hamilton:

They say ‘oh my gosh I came from Beijing and the air is so much cleaner here’ ...so it’s this tricky sort of, you know, you can share with them what you’re doing on the air front but they sort of look at your like, ‘oh, give me a break. You think you have a problem?’ ...Because

certainly the Canadian outsiders coming in aren't reacting the same way as that newcomer from China.

This suggests that perceptions of risk may be unique among immigrants who originate from heavily polluted cities.

It is important to position myself in the context of my study area. I was born in Hamilton and lived primarily on the west Mountain for 24 years. As the interviewer, my interactions with research participants and the environment itself likely differ from how an “outsider” might interact and interpret data. I made a point of informing participants that I am from Hamilton, and that I have lived on both the Mountain and in the North End. I found that this was important to establish a neutral relationship. I did not want to assume the role of an outsider, being a student from the University of Waterloo, and I did not want to be falsely perceived as a wealthy Mountain resident. In my introductions I stressed that I have lived in the North End in order to be perceived as an “insider”. Essentially, I wanted participants to feel that they could trust me and that I could relate to the issues we were discussing. Beyond being a Hamiltonian, I found it important to have a knowledge of the city, its neighbourhoods, and their associated issues. An outsider may take a different approach to a similar topic, depending on his or her sources of information about the city. On a related note, anthropologist Charles Briggs (1986:3) reminds us that “the interview encapsulates [the researcher’s] own native theories of communication and of reality” and centres on the metacommunicative routine of the interviewer’s speech community. It is important to have an awareness of the broader social and cultural contexts in which interviews ought to be understood because “potential respondents are drawn from communities where sociolinguistic norms stand in opposition to those embedded in the interview” (Briggs 1986:3).

Table 1: Characteristics of interview participants

Name	EH volunteer (Y/N)	Sex (M/F)	Age	Ward	Neighbourhood	Homeowner (Y/N)	Years Lived in Hamilton
Lynda	n/a*	F	45-49	5	Stoney Creek	Y	30+
Laura	Y	F	55-59	2	North End	Y	25
Robert	Y	M	55-59	2	North End	Y	25
Marie	Y	F	30-34	3	Sherman	Y	1
Melinda	Y	F	40-44	6	Hamilton Mountain	Y	40+
Gabriella	Y	F	35-39	3	Crown Point	Y	3
Nicolas	Y	M	40-44	3	Crown Point	Y	3
Wendy	N	F	60-64	4	Crown Point	Y	9
Margaret	N	F	50-54	4	Crown Point	Y	1
Elizabeth	N	F	60-64	4	Crown Point	Y	1
Diego	N	M	18	2	Beasley	N	18
Deirdre	N	F	65-69	4	Crown Point	Y	25
Michael	N	M	25-29	3	Crown Point	Y	10
Isabella	N	F	60-64	3	Crown Point	Y	5
Ian	N	M	55-59	3	Crown Point	Y	13
Allen	N	M	65-69	4	Crown Point	Y	65+

*Executive Director of EH

2.5 Analysis

2.5.1 Grid-Group in Hamilton: Application

To apply grid-group analysis in the context of environmental inequality in Hamilton I use data from interviews and ethnographic observation to define grid and group according to Douglas's methodology and situate persons on a grid-group diagram. In this section I illustrate grid-group in terms of environmental inequality in Hamilton with three examples. By plotting three interviewees on a grid-group diagram the method of application becomes clear.

Lynda Lukasik was a key informant for this research project and is thus an appropriate person with whom to begin the analysis. To determine group strength Douglas (1978) would ask: what associations does Lynda belong to? One association is Lynda's academic involvement; with three academic degrees, Lynda held membership at three different institutions. However, these memberships are less active over the past 15 years. Second, she is a resident of Hamilton and has been since birth; leaving only to complete her education and to work for the Environmental Commissioner of Ontario for two years. However, she has always returned to live in Hamilton. Her ties to Hamilton are also ties to family. Third, the most

prominent association Lynda belongs to is EH. Lynda is a member and founder since EH's creation in 2001 and is the current Executive Director. Douglas (1978) would then ask: how much of Lynda's life is absorbed and sustained by group membership? Evidenced by the testimony of Lynda as well as her peers, EH is the most prominent group. According to Lynda: "I'm passionate about this stuff [environmental issues]...I become obsessive about it". She stresses her commitment to EH, even during the period she worked for the Environmental Commissioner of Ontario:

I started there in December—I know exactly how long—December of 2004 and I left in March of 2007...And in some ways it's funny because it confirmed for me personally that that's not where I wanted to be. It was interesting and I learned a lot...I spent my two years and three months in there having lots of great conversations about provincial and environmental law...so I felt the whole time as though I was just doing—I was on sabbatical for EH, right—going to go and suck all that information in and bring it back here to the work that we do here. And that's what I did. So I stayed long enough to be able to take my pension with me. Um, and I came back cause I realized this is, and that was just on the personal level that this is where I knew I wanted to be and I felt like I needed to be.

Lynda's shared work, resources, recreation, and values of EH's members suggests a high group membership. Scaling grid for Lynda, as an Executive Director, she has a good degree of independence in her decision making. One can also say that Lynda has a good degree of control, measured by her authority over EH volunteers. Autonomy and power indicate a move toward low grid on the scale. Based on these characteristics I place Lynda in quadrant D, a high group and low grid culture.

Likewise, we can determine group strength for Laura, an INHALE volunteer. She admits: "I never really had a career, I only had odd jobs here and there when I was in my younger years. I worked in offices". Laura's profession is thus not a clearly bounded group to which she is a member. Laura is committed to environmentalism: "I've always been an environmental activist". She describes herself as a passionate volunteer for EH. She is active among the neighbourhood committees, she goes to environmental conferences, and she writes letters of protest. One of the reasons for moving to the North End with her partner Robert is because their previous home did not have a large enough yard to grow their own food:

The reason we bought this house and that ended up being in this neighbourhood was because it has a huge lot, it had fruit trees and raspberry bushes and a large garden, and I was having a problem figuring out how to [grow food]. It was just at the beginning of the Eat Local movement.

Laura's shared resources, recreation, and values of environmental activists in Hamilton suggests a strong group bond with the activist community. Scaling grid, Laura has a good degree of autonomy and freedom of decision making. For instance, Laura practices autonomy in deciding where she wants to live. Likewise, membership in the activist community is voluntary thus her activist roles are not strictly regulated. Based on these characteristics I place Laura in quadrant D, a high group and low grid culture.

As an example of an interviewee not involved with the INHALE initiative, I situate Diego on a grid-group diagram. Diego is an 18 year old boy who lives in government housing in Hamilton's Beasley neighbourhood. His parents are immigrants from El Salvador. In regards to group membership, he is a volunteer at the John Howard Society, a student at Mohawk College, and a volunteer for the Ontario Youth Liberals. However, Diego explains that these groups do not absorb and sustain his life. According to Douglas (1978), medium investment in multiple groups equates to weak group membership. Scaling grid for Diego, his age and lack of financial mobility leave him with little autonomy. His parents have moved within Hamilton at least four times since he was born, and he expresses concern about crime in his neighbourhoods: "It's dangerous, I don't like that". He is passionate about the environment, but he does not have the means to pursue this passion:

Interviewer: Have you studied environmentalism in school at all? Is this something you're interested in?

D: I am interested in it but more the global warming aspect...Not really just the city...I wanna like, change the world. I'm more interested in the global aspect though. Like global warming and ya like, wildlife and stuff.

I: So are you interested in going to school for that?

D: It's something I'd like to learn, but I don't think its priority for me.

This suggests that Diego has limited control over his own life and limited decision making power. Based on these characteristics I place Diego in quadrant B, a low group and high grid culture.

2.5.2 Expanding Quadrant D

With this information it is possible to elaborate on Lynda's position in quadrant D by modifying Douglas's grid-group diagram. As mentioned above, Lynda has authority over EH volunteers. She also possesses autonomy in decision making, and faces a significant level of competition in her daily life, for example, competing for program funding and competing with the other social forces that may be turning potential volunteers against her cause. These three factors—autonomy, control, and competition—suggest a particularly low grid position, one that is perhaps lower on the grid scale than other environmental activists and EH volunteers. I suggest that Lynda's relatively low grid position and high group position merits a unique classification. If one takes the grid-group diagram and divides quadrant D again into two parts, Lynda is placed into a separate category from the other activists (Figure 5). It is then possible to discuss the social organization of quadrant D itself, where Lynda represents the leader of a sect. EH volunteers confirm this division with their reliance on Lynda for guidance:

I tend to put a lot of my trust in Lynda to lead us into where we should be going. [*Laura*]

It's really—I think that Hamilton is very lucky a few people came together and have made [EH] and are able to, you know provide this type of service, which is tremendous. So it's really great. So I'm happy to help them with anything I can offer to spread the message. [*Gabriella, Crown Point resident*]

Activists also reveal Lynda's level of control over the community:

Well and it never comes across as sort of anger, or negativity. It always—she's got a very good viewpoint of it. You know, 'this is a problem and this is the way we're going to solve it.' And she even sometimes comes on the Crown Point [Facebook] hub...and says 'look, you want to have—you know you can rant on Facebook all you want, but it has no effect. None at all.' So, she's good about that. Keeps us in control. [*Ian, Crown Point resident*]

I support anything that [EH] want[s] to do. [*Laura*]

By Douglas's definition a sect (or enclave) is small in size, egalitarian, and has voluntary membership. The leader of the sect concerns him or herself with enlisting members and avoiding defection while maintaining an unglamorous reputation. A sect “contrasts

systematically with collectivism and individualism” (Douglas and Wildavsky 1982:104). It is thus reasonable to divide quadrant D between the leader and the followers of environmental initiatives in Hamilton. While Douglas (2006) states that she and her collaborators typically settled on three, four, or five exemplary types within a society (because it is comprehensive and the four types are enough to generate four types of cultural bias), she suggests that hundreds or millions of cultural biases may exist in any given context. Hence, the division of quadrant D is just one way in which one can further describe the society under investigation and modify Douglas’s grid-group diagram.

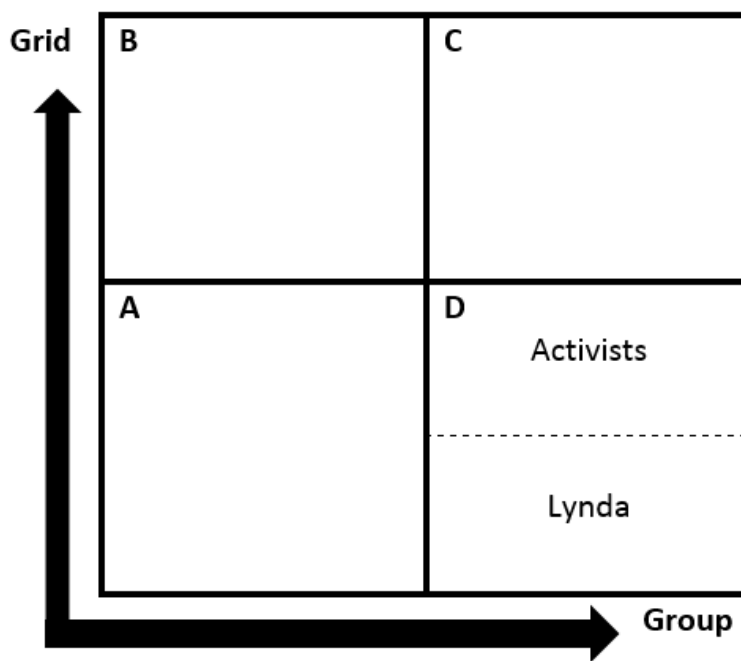


Figure 5: Quadrant D divided between the leader (Lynda) and followers (EH volunteers and activists) of Hamilton’s Enclave culture.

2.5.3 Social Context

In this section I discuss the people I interviewed and encountered conducting participant observation in Hamilton, in order to establish the social context of environmental risk perception in the city and make it possible to discuss Hamilton’s exemplary types in the following section. As a volunteer for EH’s INHALE project, I met a diversity of participants including people born in Hamilton, people recently moved from Toronto, parents of young children, retirees, City of Hamilton employees, and students. INHALE volunteers expressed a

variety of air quality concerns that motivated them to participate in mobile air monitoring. Laura is concerned about open air burning in the North End; Melinda is concerned about the road construction near her children's school on Concession Street; Brooke and Charlie worry about the traffic pollution in Jamesville/Beasley and its effects on their toddler's health; and Marie, Gabriella, and Nicolas are concerned about the industrial pollution in Sherman and Crown Point. Marie is an INHALE volunteer who moved from Toronto to Hamilton's Sherman neighbourhood in December 2014. She describes moving into the neighbourhood and her first encounter with a neighbour who told her "you might regret this". She describes experiencing the emissions event in February 2015 (Rieti 2015a; 2015b), when a black soot coated the front of her house. Panicked, she questioned her neighbours about the soot, but "they've just resigned themselves to the fact that is the way it is...people here don't have a lot of money and the city doesn't care". With the INHALE project, Marie explains "I want to bring attention to my neighbourhood, because I want the people in my neighbourhood to get help".

Many of my research participants who are actively engaged with environmental issues were not born in Hamilton. Like Marie, several activists have moved from Toronto; Isabella, Gabriella and Nicolas moved from Toronto to Hamilton within the last five years, and Ian has been living in Hamilton since 2003. These volunteers share an admiration for the community-oriented character of the Crown Point neighbourhood and Hamilton's slow-paced, affordable lifestyle compared to living in Toronto:

G: The neighbours are great in our area. They're very community based. We help each other out all the time. They're very aware of what's going on.

N: It's a little bit like a family you know, extended family.

G: Exactly, ya.

N: It's very personal [*Gabriella and Nicolas*]

I'm quite actively involved in the hub from my neighbourhood. And so you connect to people in such a different manner very quickly. Very quickly you know everybody...and I think that everybody wants to just create something exciting and good for everybody, you know? Like, communally. While in Toronto it's more like, 'oh, do I look cool here?' [*Isabella*]

I lived in Toronto for 22 years, and then I was ready to buy a house, and, uh, house prices in Toronto are ridiculous...So I came looking

here and found something I really liked for a good price...I kind of don't like Toronto in a way. Toronto's too fast-paced. And, you know, it makes me stressed out now when I go there. I don't really like to be there much. [*Ian*]

For some activists, particularly activists concerned with industrial emissions, environmental action goes beyond INHALE's mobile air monitoring project and occupies many aspects of their lives:

I thought well, I need to get involved, I need to learn about [Hamilton], and for me my issues are always environment, the arts, and local politics. I mean those things interest me no matter where I go. So I just started looking for volunteer opportunities, and this one with INHALE was a bit different in the sense where it wasn't something where you know, you're expected to go and sit in an office for three hours a week and like, stuff envelopes—not that I, I mean I do that all the time, but, it was something a little bit more active and involved. [*Marie*]

I'm part of the community newspaper and Crown Point hub, so I do the graphic design. And we meet on a regular basis to talk about issues, and there is a Facebook page which you posted on. That has a lot of conversations happening on there, as well as, you know, I also volunteer with EH about these issues. So this is something you know, that is really important to me. [*Gabriella*]

Gabriella and Nicolas own a home in Crown Point and are active environmentalists in the Hamilton community, volunteering for numerous EH initiatives and advocating against the proposed gasification plant (Stepan 2015). Gabriella was active in designing and distributing a fridge magnet displaying the MOE contact information to Crown Point residents. In an interview, Gabriella and Nicolas discussed the importance of reporting emissions to the MOE to create awareness of industrial pollution in the Hamilton area; they explain that it is a long but necessary process to improve air quality in Hamilton:

What we are hoping for is just, you know, that there will be a spike in [reporting emissions to the MOE] in our area. You know, way more reports than anywhere in the province...So somebody statistically, will have to look at this area, even if they don't look at facts or whatever, even this dot will just stick out so much statistically that hopefully somebody will say okay what's happening here, right? You know, last 20 years we've got like a flat line of complaints, and now we've got like 1,000 a year, what's happened here, right. And then another year, you know maybe 5,000. So then we're hoping, okay, it's

something that cannot be neglected forever. It will be a very slow progress I would think. [*Nicolas*]

Participants also described the obstacles they encounter advocating for clean air in Hamilton. Elizabeth moved from Regina to the eastern edge of Crown Point in November 2014 and often calls the MOE twice a week to report emissions. Elizabeth worries that her reports to the MOE are not making an impact: “I continue to ask the Ministry to report back to me on what’s being done. And the people on the other end of the phone are very sympathetic, and very understanding, and very cooperative, but I never hear back from them”. Laura expressed that the municipal government does not prioritize the North End community where she lives: “how the heck can we get City Hall to pay attention to the fact that there’s an existing population here?” Several participants also expressed disappointment in the provincial government for the decision to give Dofasco a five year extension on improving environmental performance after the company was fined in May 2014 for several pollution infractions.

Recruiting outside of EH, I met with residents of lower Hamilton who are concerned with air quality in the city but not actively involved in environmental initiatives. Allen lives in Crown Point east and has lived in Hamilton his entire life. Because of a disability he does not work regularly. He says the industrial emissions have scarcely improved as long as he has been living in Hamilton, and that the provincial government has failed to monitor and regulate Hamilton’s industry:

Thirty years ago it was really bad, but it’s not gotten any—well, much cleaner. Um, possibly a little bit. I don’t think they monitor enough. And when they do monitor it, they don’t enforce the rules. And I think it’s Stelco, or no Dofasco, that just got an extension by the province to pollute more. Ya, so I mean, crazy that they have the rules and then don’t enforce it. And I don’t know what can be done about that. Um, Environment Hamilton is fairly good at stuff like that, but the province doesn’t do anything.

In terms of personal action, Allen says that volunteering for environmental initiatives or calling the MOE to report infractions will not effect change:

Interviewer: Have you ever called the MOE or anyone when you smell or see emissions?

A: No, no.

I: Cause there is a number that you can call—

A: —But they won't do anything.

Allen states that even a published report or Master's thesis is likely to be neglected by the city:

I: I'm hoping to get it published in a journal and that'll be a way for me to put some pressure on somebody.

A: On somebody—that's the thing. The city will go 'oh ya that's great, but we can't do anything,' right.

I: I figure if enough people are sending these kinds of things, you know, calling the [MOE] number to report emissions, eventually they're going to have to pay attention.

A: See I used to believe that but not anymore. They'll put [your publication] on a shelf with all the other stuff.

Margaret moved to Hamilton from Barrie in January 2015 for a job opportunity. Margaret owns a home on the northern edge of Crown Point and states that she chose to live in Crown Point primarily based on affordability. She can see the industrial smoke stacks from her front porch. Margaret's attitude toward Hamilton's industrial sector is resigned:

It would be nice to have [the industry] all cleared up so you don't have the smell, obviously, but I'm one of those type of persons that, it is what it is. And, economically for myself, for moneywise, this was the better area for me to move.

Wendy also owns a house on the northern edge of Crown Point. Gardening and growing her own food is a priority: "every time I've bought a house, there's two characteristics: has to have a garden, back[yard] has to face [south]". Wendy dismissed my inquiries about concerns such as contaminated soil ("it'll never be worse than it used to be") and industrial soot ("the raspberries come and go fast enough, I figure they don't have that much time to collect [soot]. I'm not going to wash them, they're too fragile"). Wendy does not actively participate in environmental initiatives: "I don't have time to volunteer, other than the urban farm, because it's just not in my best interest"; however, she does express environmental concern. Wendy acknowledges that her involvement in environmental activism is constrained by a lack of resources and income:

I have been thinking a lot about environmental choices as my pickup truck took an electrical tantrum about running and then, once on the road again, lost its muffler on pot-holed Beach Road. The experiment to bicycle to meetings proved to be too hard for me—can't handle the

heat of exercise or summer temps. Destinations are too far to survive walking both ways and bus routes are mysterious for non-commuters. How to carry the weight of groceries or wet laundry ready for the clothesline? Do I repair a rusty truck or buy a small used car? I investigated ebikes—difficulties remain. A vehicle is an older person's first wheelchair! Fixing the muffler was the least cost alternative. [*Email correspondence*]

Deirdre is a senior citizen who lives north of Barton Street in Crown Point, what she describes as a low-income neighbourhood. “I’m not very thrilled with the air quality but it is the only place I could afford to buy a house”. She has trouble breathing when she wakes up in the morning and is afraid to grow vegetables in her backyard because of industrial contaminants in the soil. Deirdre expressed dissatisfaction with a local politician’s engagement with environmental issues. However, when I inquired about her democratic right to vote for a different politician, she replied: “my one little vote doesn’t matter”. She does not attend community meetings and states that accessibility issues prevent her from volunteering.

Conducting environmental outreach in Hamilton’s industrial core five years ago, Lynda spoke with residents who became angry at her for criticising the steel industry: “it was like we were meddling troublemakers because we were even going in and saying to people ‘are you being effected, are you concerned?’” Lynda also encountered residents living in industrial neighbourhoods who were frustrated with government inaction and unconvinced that the conditions will ever change:

Five years ago doing work in those [industrial] neighbourhoods it was really a challenge to find anybody who was eager enough to do anything. And we encountered a lot of people—and I totally get it—people would say to us ‘good luck; you can’t fight city hall. The companies are never going to listen. They’re too powerful. We tried before, we couldn’t get anything to change’.

Lynda reiterates a common sentiment among north end residents: “Look around you. Look at where I live. I don’t have a right to demand anything better”.

2.5.4 Exemplary Types in Hamilton

In this section I identify Hamilton’s exemplary types according to CT. I use CT as a tool for classifying individual attitudes toward environmental risk in Hamilton and characterizing

the individual's experience of social control. By defining the four exemplary types in Hamilton it becomes possible to discuss the relationship between each exemplary type in the context of environmental inequality within the city.

Hamilton's environmental activists, Lynda, and EH volunteers represent the Enclave exemplary type according to CT. The Enclave culture is defined on the basis of a strongly bounded group where the rules for internal differentiation are weak (Douglas 1978). EH volunteers and activists in Hamilton possess strong community values, exemplified in the quotations by Gabriella, Nicolas, Isabella, and Ian in the previous section. The Enclave tends to be egalitarian because it does not accept the inequalities of the rejected outside world; likewise, institutions that distribute unevenly are distrusted by the Enclave culture (Douglas and Wildavsky 1982; Thompson 2006). In the context of Hamilton, this includes the uneven distribution of health, income, education, and poverty that separates the upper and lower city (Buist 2010; Mayo et al. 2012). Membership in the Enclave culture is voluntary and tends to attract active volunteers. In Hamilton, members of the Enclave culture are engaged in more than just air monitoring with INHALE, but also with the community newspaper, community associations, and environmental protests. According to the Enclave culture, humankind is responsible for sharing and preserving nature's fragility (Thompson 2006).

The Isolate exemplary type in Hamilton is composed of non-activists or "non-actors" (Thompson 2006). These are often persons who lack wealth, resources, and mobility, and tend toward social isolation: "living and getting food on your plate and keeping a roof over your head are you know, what matters [to that community]" [Ian]. According to Douglas (1978:21), "by definition, the individual [in quadrant B] may belong to the largest category of the population in a given society". Isolates' opinions are habitually neglected by the Individualist and Positional culture. As a result, Isolates tend to possess a fatalist attitude. This attitude persists among Hamilton's Isolate community, evidenced by the resigned attitude Marie's neighbours have toward improving air quality; Allen's opinion that the government is unresponsive and air quality has not improved in decades; and Deirdre's attitude that "my one little vote doesn't count".

The Positional exemplary type in Hamilton is represented by political hierarchies such as Hamilton's municipal government, the provincial government (including the MOE), and industrial corporations like Dofasco. According to the Positional culture, nature is stable and tolerant. The Positional culture is defined as the centre of society whereas the Enclave culture is defined as the border of society (Douglas and Wildavsky 1982). The Positional culture is bounded externally and regulated internally. Its cultural bias supports tradition and obedience; in Hamilton this is evidenced by residents in the industrial core who expressed anger at Lynda for questioning the legitimacy of a corporation that has provided a livelihood to many employees for generations. Members of the Positional culture are under pressure to consent to group regulations and are compelled to remain loyal to the group: "my late father-in-law was one of the higher up engineers at Dofasco, so there's kind of like a family tie to that, right, so we don't necessarily view it as negatively as maybe some people would who don't have a tie to it" [Michael, Crown Point resident]. The Positional culture exerts power over its own members as well as members of other social organizations, particularly the Isolate culture:

[The factories] are using [our ignorance] to their benefit. They want to keep producing because then they keep making money. Public health isn't really the biggest thing, the biggest concern when you're making millions. [Diego]

Both Isolate and Enclave members express distrust of the Positional culture: Elizabeth is skeptical of the provincial government's willingness to regulate emissions because they do not follow-up on her reports; Laura feels that the city cannot be depended on to contribute resources to the North End community; Marie believes that the city does not care about the people in her neighbourhood; and several persons expressed displeasure with the provincial government for granting a five year extension to Dofasco.

The Individualist culture is a competitive environment in which persons withdraw from group membership and commitment. Dominant positions are open to merit and personal success is priority (Douglas and Wildavsky 1982). In Hamilton, the Individualist exemplary type is represented by self-serving politicians and businessmen, and the individualist attitude many Enclavists left Toronto to get away from. Isabella, Ian, Gabriella and Nicolas expressed their preference for the collective character of their current neighbourhoods in Crown Point

with the Individualist attitude (fast-paced, competitive, materialistic) they experienced living in Toronto. These residents suggest they departed Toronto to get away from the market driven lifestyle: “I bought my house [in Hamilton] for an incredible like \$140,000. I think that is—in Toronto you cannot buy a parking spot for that” [Isabella]. According to the Individualist culture, nature is benign and resilient (Douglas 1978).

The four exemplary types of CT maintain different values and ideals, but as they are relational, interactions between cultures exist. Based on their shared ideals, a co-operative relationship exists between the Individualist and Positional culture. For example, both cultures have imperialist tendencies, since both can solve their organizational problems by expanding into bigger markets or larger collectives (Douglas 1996; Douglas and Wildavsky 1982). The bureaucratic Positional culture sustains the market Individualist culture and vice versa. In Hamilton, Bernard has been a member of the municipal government for over 15 years. He maintains a financial relationship with Hamilton’s steel industry:

He gets campaign funding from the industry. He had signs up during the election all over the place, even in the windows of closed up buildings. My friend ran against him and did alright considering but he still has a monopoly on the area. She had her tiny little signs up but his are so big and everywhere. [*Deirdre*]

Bernard possesses autonomy and has control over his constituents; as an Individualist, he has a tendency to dismiss Isolates’ questions and opinions:

A: I just called and said you know, where can I get some documentation on you know what the soil’s like [in the community garden]

I: And no response?

A: Oh ya he responded. He said “don’t worry about it, its fine”. [*Allen*]

The Enclave and Positional culture are defined in opposition to each other (e.g. EH and Dofasco), however, each social organization could not exist in the absence of the other. EH often relies on Positional organizations and even Individualists for project funding. The Ontario Trillium Foundation, Public Health Hamilton, and local city councillors are some of EH’s past funders. Likewise, Dofasco donates to local Enclave groups such as theatres and bicycle repair shops: “they just gave us a \$2,000 dollar grant, so we can’t hate on them too

much, right?” [Michael, Crown Point resident]. The relationship between Dofasco and EH is the most noteworthy. For Lynda, the steel mills played a vital role in providing her and her family with financial security; for this reason she feels indebted to Hamilton’s steel industry:

I have this funny love/hate relationship with steel because it’s part of who I am, you know...I’ll say to the steel industry people, when I was a kid, we were a one income family, my dad was it. My mum stayed at home with me and my siblings when we were small. And he worked at the steel mill, so if it wasn’t for you guys I wouldn’t have had food on the table when I was a kid. You know, you helped me to get through university because I worked there one summer. So there’s this love/hate relationship because part of me feels a certain level of obligation.

However, Lynda feels that her relationship with Hamilton’s industry has not been one of equality. The impact on human and environmental health in Hamilton has been far too great a cost and the corporations ought now to take responsibility for the damage they have caused:

But probably a bigger part of me feels angry that those industries haven’t done more for us given how much—you know and I think I feel a lot of personal links too because I look at my dad and my grandfather, spent so many years of their lives working, slogging away inside the plants down there, and you think, you know they did it for an income but they helped that industry. So I feel this strong sense of “bloody hell! You owe them. And me and future generations, because we paid far too dear a price in the past with what was happening.” So I feel like it’s no excuses now.

2.6 Discussion and Conclusions

According to Mary Douglas the application of CT constructs a narrative inclusive of the four types of social organization within a bounded context. Interviews and ethnographic study provide the data to situate the narrative in a particular context with a unique set of social actors and their associated thoughts and behaviours. In this narrative, I use CT as one way to identify the structures that sustain environmental inequality in Hamilton and explore how different social groups perceive environmental risk.

2.6.1 Making Visible

Assessing the effectiveness of CT, it is important to acknowledge what it can and cannot make visible in the context of environmental risk in Hamilton. Making the Isolate population

visible presents the greatest difficulty—if the Isolate population was meant to be easily reached it would not be defined as such. Isolates are by definition “non-actors”, untrustworthy, and fatalistic about their ability to effect change for the better. They are characterised as lacking a voice in policy debate (Douglas 2006; Thompson 2006), hence why it is challenging to locate Isolate voices in a given society. As mentioned, my study sample may suffer from an unequal representation of the immigrant population in lower Hamilton. It may also underrepresent Hamilton’s poorest citizens who are likely more concerned with basic needs than with environmental risk. It is worth noting that in *Risk & Culture* Douglas and Wildavsky (1982) also struggle with defining the Isolate population. In fact, only three exemplary types (Individualist, Hierarchy, and Sect) are made explicit, where the Individualist and Hierarchy cultures are defined as the centre and the Sect is defined as the border of society. The Isolate culture is not made prominent until later publications, which speaks to the difficulties of giving a voice to this community.

Another drawback of CT is its inability to differentiate culturally variable personhood. In the use of grid-group and CT Douglas tends to refer to the “individual” rather than the “person”. The Western convention of individualism may not translate properly when applying CT to populations that may conceive personhood differently and this may be an obstacle to using CT as a policy-making tool. Likewise, the CT typology can also be limiting if it is used to generalise a population too broadly; grouping all persons with similar characteristics into one exemplary type and suggesting that everyone in that group supports the same cultural bias may be problematic. All immigrants and low-income persons are not Isolates, and all government employees are not Positionalists; thus, the danger of overgeneralizing exemplary types does exist.

Despite these drawbacks, I suggest that CT is a useful tool nonetheless. CT has made visible the dominant social organizations that influence environmental risk perception in Hamilton. CT has also made visible some of the relationships between Hamilton’s exemplary types and illustrates how the members of a social organization may make certain choices about risks according to the cultural bias of the social organization in which they are a member. By illuminating the exemplary types in the context of Hamilton, the imbalances in society that

lend to environmental inequality are made visible. My application of CT has revealed the Positional and Individualist culture in Hamilton to be oppressive of the Isolate and Enclave cultures. CT has made visible the Enclave culture's efforts and successes in pushing back against the Positional culture, and the Isolates resignation toward any effort to enact change. It has also revealed the multifaceted relationships between each culture and the complexities in navigating these relationships (e.g. Lynda's conflicted relationship with industry). Furthermore, although a grid-group diagram is static once it has been defined, my interviews and ethnographic data make visible the changing landscape of environmental risk perceptions in Hamilton. For example, many EH volunteers have moved from Toronto to Hamilton and represent an addition to Hamilton's Enclave population. These EH volunteers are Enclavists who may have migrated from an Individualist position; likewise, their new position in Hamilton may influence persons from the Isolate culture to migrate to the Enclave culture. Marie's attitude toward influencing the Isolate culture was made evident when she said: "I want to bring attention to my neighbourhood, because I want the people in my neighbourhood to get help". Similarly, many Enclavists discussed the desire to motivate and engage the community in lower Hamilton that has become resigned to environmental issues in the city. This could represent another shift in membership of Hamilton's exemplary types.

2.6.2 Informing Policy

According to Douglas (2006), "as far as public policy is concerned, Isolates attract no attention, no one asks for their opinion or takes them seriously in argument. Hence their reputation for apathy". I have identified the Isolate community in Hamilton as one that experiences high exposures to air pollution and high levels of poverty and ill-health (Buist 2010; Buzzelli and Jerrett 2004; Mayo et al. 2012). CT is thus productive because it identifies a culture in Hamilton that tends toward attitudes such as denial, avoidance, and apathy, illustrating the need to focus community engagement and policy intervention in Hamilton's Isolate culture. By recognizing cultural biases and investigating the relationships between different cultures, public communication and community engagement can be improved. In the following quotation a Crown Point interviewee highlights some of the major problems with current community engagement initiatives:

This is what is interesting about the community hubs. They usually teach you how to be active in some stuff. It can be sometimes a petition...sometimes we're just like in a campaign to write a letter or call an MP or something, so there is a bit more of a collective effort...What I think is complicated is that, exactly, the type of engagement that usually happens, for almost everything, is the same. Right, so it's very formal, very boring. Or like sometimes for example, oh yes, even the letter for example there was a template for a letter for us to send. So it's already in that language, you know? [Isabella]

In addition, environmental initiatives often target the 'wrong' populations—that is, there is a tendency to pursue persons who are already eager and willing to volunteer their time and participate in an initiative, rather than attempting to engage persons who are at the greatest risk of exposure. Admittedly, the most disadvantaged populations are the most difficult to engage because activism is typically not the priority of Isolates. Research suggests that political and economic marginalization intensifies feelings of powerlessness and distrust of other actors, particularly the government (Bickerstaff 2004). Policy-makers, community organizations, and environmental organizations therefore ought to cater more outreach to the Isolate culture in Hamilton to diminish marginalization in the city. This includes the consideration of language and literacy skills when designing outreach initiatives and targeting a lower SES population; as Isabella suggests: “is anyone going to be at the front door of Walmart? Because those are where these people are. Right, not sitting to have a drink that costs \$8.00”.

Traditional activism techniques of the Enclave culture, such as writing letters to the government, protesting, and publicly speaking out against authority figures, are not familiar or comfortable practices for some immigrant populations. Isabella immigrated to Canada from Brazil and in the following quotation she highlights the importance of appropriately engaging with immigrant populations:

I grew up in a dictatorship. So like to write to an MP is kind of, you know—I'm not going to go there. And, when you look at the profile of this area for example, you have a lot of Polish immigrants for example, that don't have this tradition, the democratic tradition. You understand what I mean?

The Isolate culture also characterises much of Hamilton's youth whose opinions regularly go unheard. Diego, an 18-year-old living in Beasley, describes the value of engaging the youth:

I think the best tactic for any organization that wants to make an impact on the city or on this region is to engage the youth, and that's because the youth are still like, they're still lively, they still like, act up and stuff, they're still kids. So when they're all together it's a bigger impact. Because if I was in [INHALE] in grade 10, and I found it cool, I'd go to school and tell my friends, they'd tell their friends, and like it's surprising how it would spread like wildfire...because if the kids don't know, if they're not engaged with all the environmental issues, then we're just going to have a repetition of what we have now...Unless we inform them which breaks the cycle. We might not change—the person who is going to change the world might not be [here] now, but we might spark the person—the mind that will change the world.

Westra and Lawson (2001) suggest that environmental risk assessment suffers from exclusionary and undemocratic practices such as holding public hearings in remote locations, at inconvenient times, and only in English. Marie described an encounter on her way to a public forum at City Hall, where a woman on the bus asked her, “why is everything like that always at City Hall?” and “why do these meetings never come to our neighbourhoods?” Marie suggests that meetings and presentations ought to be held in areas that are accessible to residents who are impacted the most, “because not everybody drives, and not everybody can get on a bus and come...There would be a lot of people in my neighbourhood that would be extremely intimidated to go to City Hall. They'll think, ‘that's where I go when I've got a problem’”. Marie also highlighted the difference in turnout at a meeting intended to prepare residents for the Pan American Games, for which events were held near Sherman in the summer of 2015:

I could see just by looking around the room at the other people that were sitting there, these were—like people came in their slippers. That's how close they lived, right? And one guy came and I'm pretty sure he was wearing his pyjamas. And you could tell people walked there, you know this was something that people didn't have to get in a car or make a special trip to get to, these were people who lived in the hood, so to speak. And that's how it would have to be.

Increasing accessibility is thus likely to ensure greater success in reaching Isolate communities.

Identifying cultural bias can also aid in mediating adverse opinions. For example, a pervasive attitude exists among Hamiltonians that depicts the north end as an unappealing place to live. Part of this cultural bias is the notion that resources ought to be allocated

elsewhere, because Hamilton's north end neighbourhoods are beyond help. Marie expresses her distress at this dismissive attitude toward her neighbourhood:

Somebody had basically said 'that neighbourhood is full of drug dealers and prostitutes so who cares.' And I see that and I hear that over and over again about certain neighbourhoods. I hear that about this North End neighbourhood...and I hear people say that about, you know, why spend the money on it, it's just a dump. Full of low-income people. So who cares if air quality is poor, who cares if, you know, there's noise pollution. I mean I don't understand this attitude about giving up on certain neighbourhoods because those are either the lower income people or just because you've decided that—and this is the thing about the whole Mountain thing that I find amazing in conversations I have with people, it seems like there's a whole different lifestyle that's lived on the Mountain, you know?

CT cannot change this dismissive attitude toward Hamilton's Isolate community; however, making visible the various attitudes and perceptions that exist in Hamilton is the first step to mediating multiple voices.

In order to affect change a society must be able to accommodate a diversity of opinions. There is no progress toward equality if the social organizations in a community are so diametrically opposed they cannot adjust to each other's needs. All four social organizations are in constant conflict and depend on each other to exist, but each culture must be properly recognized and permitted to voice an opinion. Douglas (Douglas and Wildavsky 1982) suggests that although one culture may be dominant, it must avoid excluding the other three from public forum. Douglas (2006) states that an Enclave culture constantly denied the ability to express its dissident view may make itself heard by attacks on its enemies. Likewise, if the Positional culture is unconstrained, it will oppress the lower levels of society. If the Individualist culture is unimpeded, ruthless competition will throw society into disorder through the problems of poverty it creates.

One can make similar assumptions in the context of environmental risk in Hamilton. Devoid of the activist groups of the Enclave culture in Hamilton, the city would lack a strong voice in favour of environmental assessments, industrial monitoring, and community outreach; the industries, bureaucracies, and government groups that make up the Positional culture in Hamilton would go unchecked. Without the Positional and Individualist culture in Hamilton,

the Enclave culture would have few resources to rely on for program funding and may fail to endure. Without the Isolate and Individualist culture, the Enclave culture would lack a population from which to recruit volunteers. The Individualist culture could not exist without the support of the Positional culture and the Positional culture could not exist without collaboration from the Individualist culture. Each culture therefore exists only in the company of the other three.

As described throughout this paper CT is an analytical tool through which Douglas suggests one can differentiate the classificatory worlds of environmental risk perception in a given society. In the context of environmental risk in Hamilton, CT is an effective means through which one can identify obstacles to successful community engagement as well as the causes of ineffective risk communication. When recognized, these barriers can be mitigated so that successful policy interventions may be implemented. In regards to Hamilton's Isolate community, I have highlighted physical barriers such as accessibility to venues of public forums; political barriers such as immigrant populations that are unfamiliar with the democratic tradition; economic barriers including housing, income, and transportation; and social barriers including isolation or exclusion due to age, language, or prejudice. These barriers must be removed if we are to properly engage Hamilton's Isolate community.

As a final note it must not be forgotten that CT does not imply a stable framework; rather, CT represents culture as dynamic. In other words, the social structures I have made visible in this paper characterise one of many narratives on environmental risk in Hamilton. Although Douglas's exemplary types represent four unique cultures with associated cultural biases, the actors occupying the four quadrants on a grid-group diagram will not necessarily remain in the same position for life. For example, we may see Isolates migrating to the Enclave culture or Individualists and Enclavists withdrawing to the Isolate culture. When a person's position on the diagram changes, his or her cultural bias is likely to change as well. Therefore, the persistence of Douglas's exemplary types does not mean eternal oppression against a single population—the social actors within each culture are prone to movement throughout their lives.

Appendix A

Interview Schedule (Lynda Lukasik)

1. Can you please tell me about Environment Hamilton?
 - a. What does Environment Hamilton do?
 - b. Who does Environment Hamilton employ?
 - c. History of Environment Hamilton
2. How long have you been with Environment Hamilton?
 - a. Can you tell me a bit about how you came to hold this position?
3. Let's talk about the INHALE initiative. How was this project conceived?
4. When was the project officially launched?
5. How are you recruiting participants?
6. What is the timeline for this project?
7. Can you tell me about the information the air monitor produces?
 - a. Calibration, standardization, scale etc.
8. Which areas of the City does the INHALE project focus on?
 - a. Why were these areas chosen?
 - b. What if a volunteer wants to monitor air quality in a different neighbourhood?
 - c. Is there a possibility of expanding the project in the future?
9. What is the ideal outcome of INHALE?
10. How do you think the City of Hamilton will respond to this project?
11. How is the City of Hamilton and Toronto collaborating on this project?
 - a. Are there benefits to this relationship?
12. What does this project mean to you personally?
13. How do you cope with environmental risks?
14. What does your ideal City of Hamilton look like?

Interview Schedule (INHALE participants)

1. Tell me about yourself...
 - a. How long have you lived in Hamilton?
 - b. What area of the city do you live/ work in?
 - c. Age, occupation, family etc.
2. Did air quality concern you before you heard about the INHALE project?
 - a. In what way?
 - b. Do your neighbours/other community members share these concerns?
 - c. Who do you talk to about these concerns?
 - d. What do you do about it?
3. How did you hear about the INHALE project?
4. What motivated you to join the initiative?
5. Have you participated in other initiatives like this?
6. Can you explain what the air monitor is measuring?
 - a. Level of detail, awareness of standardization, calibration?
7. Where did you spend your week with the air quality monitor?

8. Are you more or less concerned about air quality in Hamilton since participating in the initiative?
9. What are your thoughts on the role of citizen scientists in monitoring air quality?
 - a. E.g. accuracy vs. government monitoring
10. Has the initiative influenced your actions? Such as the route you take to work or other aspects of daily life?
11. Where will you go from here?
12. Extra questions: Have you ever experienced an emissions event?

If yes...

13. Have you seen an incident (“fallout”) like this before?
 - a. How was it the same or different? (probe: when, where, how)
 - b. How did local politicians respond? The Ministry of the Environment?
 - c. Were you concerned about your health?
14. What was your initial reaction when you saw the black grit on the snow?
 - a. How do you feel about it now? (probe: level of public information available; “test results” of black grit)
 - b. Do you have health and safety concerns? (probe: children, elderly, respiratory illness; growing vegetable gardens)
15. Do you feel that you can trust the steel mill when they say the emissions are harmless?
 - a. Do you feel that you have been fully informed?
 - b. Do you feel that you are able to voice your concerns?
 - i. Who can you voice concerns to?
 - ii. Do they listen? Answer your questions? Take action?

Interview Schedule (other participants)

1. Tell me about yourself...
 - a. How long have you lived in Hamilton?
 - b. What area of the city do you live/ work in?
 - c. Age, occupation, family etc.
2. How do you perceive Hamilton/do you think there are many misperceptions about the city?
3. Can you tell me a bit about the neighbourhood you are currently living in?
 - a. Likes/dislikes
 - b. Do you rent or own?
4. What were some of the reasons for choosing to live in this location?
5. How does your current address compare to where you have lived previously?
6. Are you planning to move within the next few years?
 - a. Why / why not? Where?
7. How good or bad do you feel about the air quality in the neighbourhood where you live?
8. Do you have concerns about the industrial sector? (probes: environmental standards, monitoring, safety, accountability, penalties for emission events, secrecy)

- a. Have you noticed changes in the environment over the last several years as the steel mills have slowed operation? (Probe: more/less pollution? Changes in smells, sights, sounds)
- 9. Have you ever called to complain about smells or poor air quality?
- 10. What sources do you rely on for information about air quality/pollution?
- 11. Do you talk to your neighbours about these issues? What is the general attitude?
 - a. Are you part of any community groups/associations?
- 12. Did you experience the emissions event in February? Or other similar events...

If yes...

- 13. Have you seen an incident (“fallout”) like this before?
 - a. How was it the same or different? (probe: when, where, how)
 - b. How did local politicians respond? The Ministry of the Environment?
 - c. Were you concerned about your health?
- 14. What was your initial reaction when you saw the black grit on the snow?
 - a. How do you feel about it now? (probe: level of public information available; “test results” of black grit)
 - b. Do you have health and safety concerns? (probe: children, elderly, respiratory illness; growing vegetable gardens)
- 15. Do you feel that you can trust the steel mill when they say the emissions are harmless?
 - a. Do you feel that you have been fully informed?
 - b. Do you feel that you are able to voice your concerns?
 - i. Who can you voice concerns to?
 - ii. Do they listen? Answer your questions? Take action?
- 16. Have you heard of Environment Hamilton? (Stack Watch, INHALE, BAM)

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