Indexing Behaviours Indicative of Ecological Citizenship in Canada

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ABSTRACT

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The concept of ecological citizenship, a transformative ideology of citizenship whereby citizens are connected through their moral environmental obligations, has been mainly theoretical in nature within contemporary literature. In addition, the literature on pro-environmental behaviours presupposes that individuals face barriers both externally and internally, preventing their participation in these activities. A lack of nationally representative data exists that quantifies the impacts on pro-environmental behaviour participation. This thesis aims to address these three components by applying the theoretical foundation of ecological citizenship to a dataset covering the environmental household behaviours of a sample of Canadian households (N = 22,363) representative of the majority of the Canadian population. The creation of an index of behaviours that could be theoretically associated with ecological citizenship is the primary goal of this thesis. The analysis then examines the index alongside variables that situate both the geographic, socio-economic, and demographic characteristics of these households. Using a combination of multivariate linear and logistic regressions, the impact of these variables will be analyzed to identify the strength and direction of these variables, taking into consideration the effect of all variables at once. Findings suggest that certain variables have a greater impact on the number of behaviours a household can participate in. From these findings, a discussion of how best to address these impacts is explored within the context of our foundation on ecological citizenship and how best to bring this theoretical concept into an applied sphere of thinking.

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Chapter 1: Introduction

1.1 Motivation

Working within the field of environmental sociology and quantitative methodology, this thesis offers a cross-sectional analysis of household behaviours of Canadians such as waste management practices, sustainable housing development, and their connection to nature. It is based on data from Statistics Canada's Households and Environment Survey (HES), 2013 cycle, and provides insight into the number of sustainable practices that Canadian households may or may not be engaging in. It also situates these behaviours vis-a-vis the demographic context these households are in.

This thesis emerges out of previous research accomplished by the author (see Perks 2015) that investigated composting program participation and accessibility across Canada. This research revealed that an asymmetrical distribution of these programs was seen across geographies and socio-economic sub-populations. In addition, it inspired an interest in the application of national, aggregate level data to be used in the field of environmental sociology. The goal of this work then evolved out of a desire to understand the limits of the information that could be investigated through this dataset and how it could be linked to theoretical conceptions within the field. Broadly, an inherent desire to conceive of new ways to use existing and comprehensive data led to this thesis and it's methodology.

This thesis is also motivated by the swell of interest and research into environmental behaviours. This is fueled mainly by the factual concern over the damages and impacts of climate change and the question of what role the average citizen "should" play in this movement. Both attitudes and behaviours are crucial when investigating conceptions of climate change, pro-environmentalism, and civic environmentalism. Attitudes and beliefs in this study refer to an individual's judgements towards certain behaviours – whether they conceive a specific activity to be pro-environmental or part of a sustainable lifestyle and one they would engage in. Behaviours refer to specific actions that individuals engage in that contribute to a sustainable environment. These behaviours can be motivated by their environmental attitudes, or not.

It is commonly assumed that to address the issue of climate change on a global scale, we would need to enact change in the attitudes and behaviours of citizens all over the world (Owens and Driffill 2008). How a global society is to enact this change is widely debated as we take into consideration the different physical, social, and cultural contexts that vary across the globe – and

even within countries such as Canada (Owens and Driffill 2008). Work to alter citizens' attitudes and behaviours and engage them in this goal has many perceived barriers with wide, sweeping economic and policy implications alongside the issue of individually engaging citizens (Lorenzoni, Nicholson-Cole, and Whitmarsh, 2007).

It is also critical to be mindful of the role of data custodians – such as Statistics Canada – in collecting and disseminating the data used in creating instruments such as the one created in this thesis. Whether these instruments are adequate at measuring the environmental behaviours of Canadians is the difference between having the necessary information to make critical policy decisions. In addition, it is critical to engage in novel ways of understanding our data and the potential applications to theoretical concepts in an effort to apply these theories.

Many sustainable waste management programs – such as local compost collection – and other practices that contribute to a sustainable lifestyle emerge out of civic environmentalism. Civic environmentalism was the conception of environmental governance emerging in the 1980s through cuts in federal funding to environmental protection and skepticism at state and local levels in the ability of the federal government to properly handle environmental problems (John 1994). It was defined as an innovative effort to remove policy control from federal government levels in regard to environmental policy and move control towards state or local levels (John 1994). It relies heavily on a bottom-up approach – contrary to a top-down approach and necessary due to the lack of financial support from federal levels – and instead relies on the cumulative actions and decisions of local communities and organizations (John 1994).

This has been critiqued as a form of neoliberal responsibilization, rather than a bottom-up approach to environmental governance, where the responsibility is placed on citizens and communities to operate freely (or rather through disorder) to overcome environmental issues (Pellizzoni 2011). In addition, civic environmentalism has resulted in non-inclusive and non-representative governance of local communities due to local systemic barriers to participation (Abel & Stephen 2000). However, we should question if civic organized waste management and other programs aimed at living sustainably within the household are an effective way to mitigate the problem of climate change or if they are effecting real change at aggregate levels.

To this degree, what exactly is the proportion of households engaging in these household sustainable practices and under what context are they doing so? The fields of literature surrounding sustainable practices, civic engagement, and environmental attitudes and behaviours

are ever-expanding. This includes discourse surrounding the efficacy of certain programs or the legitimacy of one paradigm of thought regarding effective programs to another. Overall, a disconnect exists between our high, federal-level commitments and interest in the environment and the quantified knowledge available to researchers and policymakers on the state of pro-environmental behaviours in Canada.

The Canadian government has been mixed in its commitment to the environment – pulling out of Kyoto Protocol in 2011 and then subsequently agreeing to the 2015 Paris Agreement, albeit under a different party leadership – and mainly focused on reductions in CO_2 emissions and the energy sector. While the recent international agreements have been criticized for their lack of binding enforcements, there has been much debate into their efficacy in making positive change. When examining international agreements, researchers often make comparisons on the efficacy of these agreements based on measurable results from when the agreement was enacted (Mitchell 2003). While doing so can seem to make clear indications on whether an agreement was effective, it leaves out many factors that can contribute to the successful implementation of an agreement (Mitchell 2003). Rather, policy makers should be examining the differences between these agreements to better understand why one may be more effective than another (Mitchell 2003).

Further research into these agreements shows that there is variance in how we monitor the environmental variables – some require measurement by professional scientists while others rely on community members and community-based measurement and assessment (Danielsen, et al. 2014). The concept of introducing citizens and communities into environmental monitoring is in line with the bottom-up approach of civic environmentalism, in part to pick up where federal agencies often do not meet local standards. However, as previously mentioned, this is simply placing the responsibility of governance on the citizens and introducing an element of disorder into environmental policy. In doing so, this removes economic and political barriers to the market – which can have unfortunate consequences for the environmental sustainability in favour of the private property and growth (Centeno & Cohen 2012).

While it is easy to measure the de- or re-generation of the ozone layer after the implementation of these agreements, it can be much more difficult to examine whether a pro-environmental sentiment has grown in a population, with available data – making it impossible to analyse the efficacy of some agreements (Mitchell 2003). Overall, these agreements have

resulted in uneven environmental progress due to the complicated processes and institutions involved (Hsu, Lloyd, & Emerson 2013). Climate change meetings such as Copenhagen 2009, Cancun 2010, and Durban 2011 – which objectively failed in creating meaningful plans for sustainability – have highlighted the stark differences between the priorities and abilities of participating nation states and institutions (Kurian, Munshi, & Bartlett 2014). In addition, many of these agreements do not necessarily focus on the individual actions and the part that citizens and communities can play in affecting their environment in a positive way.

This thesis emerges out of a gap in the scholarly and political discourse surrounding data that is as nationally-representative as possible based on currently available sources on pro-environmental behaviours – or those behaviours which have the intent and goal of benefitting the environment or a sustainable lifestyle – in the Canadian population. By analysing this available data, this thesis intends to provide novel interpretations and instruments contributing to pro-environmental behaviour debates. This thesis aims to have implications for both present analyses into pro-environmental behaviours in Canada and future implications into trend analysis of pro-environmental behaviours. To do so, this thesis will explore several theories and concepts that negotiate citizenship, the environment, and individuals to explore the potential for combining data with new understandings of the relationship between society and the environment.

1.2 Rationale for Study

As discussed, we are at a critical point in history in terms of the impacts of climate change. As a society, we must come up against the damages that have been done to the environment and subsequently the lives of those impacted negatively from these damages. As governments around the world negotiate how best to shift our course in a more positive direction, individual citizens must understand in what ways they may or may not have to change their behaviours. Ecological citizenship, a concept developed largely by Andrew Dobson, proposes a transformative ideology that reshapes the way in which individual citizens comprehend their relationship to other citizens of the world and to non-humans. This concept will make up the foundation of this thesis. As such, Dobson's conception of ecological citizenship will be fully explored through the literature review. To further expand on this concept, notions of civic environmentalism and environmental education must be examined in conjunction with ecological citizenship to begin to theorize the best practices for engaging and educating citizens.

Research to-date has examined what impacts exist on participation in pro-environmental behaviours (Poortinga et al. 2004; Dietz et al. 2007; Kennedy et al. 2009). This includes differences between rural and urban sub-populations (Huddart 2005) and the fact that pro-environmental behaviours have multiple subcategories (Stern 2000). In addition, research has examined ecological footprints – a broad measure of what individuals demand of their ecosystem based on their behaviours (Guzman et al. 2011) – in the context of households (Sovacool and Brown 2010; Jones and Kammen 2011). However, a gap exists in examining the quantity of pro-environmental behaviours that members of a household may be engaging in while tying this information to the household's intersectional context (concerning socio-economic status, geography, and demography). To address this gap, this thesis aims to analyse available data to answer a multitude of questions related to the behaviours and contexts of households in Canada. For example, in the context of sustainable behaviours that could be associated with ecological citizenship, how many Canadians are already acting positively? What are the different dimensions of behaviour that could be associated with ecological citizenship? In what contexts are Canadians able to engage (or not engage) in these associated behaviours? These questions and the presence of an environmental values-beliefs gap will be explored through the literature review, to better explain why a study like this is necessary and what it aims to try and answer.

By operationalizing the concept of ecological citizenship and applying it to a set of behaviours that could be associated with this concept, a new foundation of knowledge would be generated. The results of this analysis have the potential to be mobilized and targeted towards citizens, politicians, and governmental bodies. The analysis resulting from this thesis aims to provide suggestions for future action regarding pro-environmental behaviours and citizen engagement. Overall, this project aims to use the concept of ecological citizenship outside of the theoretical realm by analysing aggregate citizen data in a novel format while attempting to analyse the contexts under which households can perform at specific levels of behaviour. In addition, to then discuss the potential for this data in educating and engaging citizens on their behaviours as potential ecological citizens.

1.3 Thesis Statement

Using the Households and Environment Survey, this project seeks to index household behaviours that could be associated with ecological citizenship. In doing so, the objective is to quantify the prevalence of households performing at theoretical levels of ecological citizenship

behaviour across Canada. Furthermore, to contextualize what conditions they are able or unable to participate in these behaviours to theorize on issues of accessibility, engagement, and participation.

1.4 Thesis Roadmap

Chapter 2 of this thesis will cover a theoretical overview of Andrew Dobson's conception of ecological citizenship, contemporary literature regarding this concept, and criticisms. Chapter 3 will provide a methodological overview of this thesis with specific attention to the operationalization of ecological citizenship, the dataset to be used, and the creation of the indexes to be analyzed. Chapter 4 will present the results of these analyses in order of univariate, bivariate, and multivariate results. Chapter 5 will examine the main findings of this thesis in relation to their impacts and interpretations. Finally, Chapter 6 will conclude the thesis with a brief overview of the contributions of this thesis, a discussion regarding how to mobilize this data, and future directions for this research.

Chapter 2: Theoretical Overview

The goal of this theoretical overview is to provide an outline of the work by Andrew Dobson on ecological citizenship. This will be supported by literature on citizen engagement and pro-environmental behaviours in following sections. The first section will comprise of a description of ecological citizenship that Dobson articulates in his book *Citizenship and the Environment*. This concept will be critically assessed using contemporary and critical literature that has focused on Dobson's conception of ecological citizenship. This will be followed by a section on engaging citizens, individuals, and communities. Finally, literature on pro-environmental behaviours will be explored. In doing so, this theoretical overview should create a foundation of knowledge with which to move forward towards the goals of this thesis.

2.1 Ecological Citizenship

In arguing for ecological citizenship, Dobson first asserts that it cannot be expressed within traditional forms of citizenship, and so devotes time in developing what he refers to as new form of citizenship: post-cosmopolitan citizenship (Dobson 2003). Citizenship, according to Dobson (2003), has evolved past its traditional conception as a relationship between a citizen and a state. This is due, in part, to the increasingly globalized world (Dobson 2003). Globalization, to Dobson (2003), is the process by which the interconnectedness and interdependence of political agents have resulted in asymmetrical power and effect distributions on a global scale. These asymmetries give rise to obligations that exist outside the notion of nation state borders, whereby harm is predominantly inflicted in one direction towards those least politically positioned (Dobson 2003). Due to this, citizens could be conceived to be no longer bound by their membership with one nation state, as we typically see in traditional conceptions of citizenship (Dobson 2003). The potential then exists for citizens to be bound by their relationship to one another, as members of the same earth, and obligated out of compassion, responsibility, and a need for justice (Dobson 2003). In this way, Dobson (2003) proposes post-cosmopolitan citizenship as a new conception of citizenship, with globalization being one of the main factors in its emergence. This new conception of citizenship proposed by Dobson has several principal characteristics, to be discussed briefly: the non-reciprocal nature of obligations; a non-territorial conception of space; an understanding of the political nature of behaviours within the private sphere; and the introduction of 'feminine' virtues into post-cosmopolitan citizenship (Dobson 2003).

Dobson (2003) argues that his third conception of citizenship, post-cosmopolitanism, is non-reciprocal in nature and goes against traditional conceptions of citizenship of a contractual relationship between an individual and a state. However, he is careful to distinguish that these obligations are not humanitarian or charitable in nature (Dobson 2003). Instead, he argues that considering the nature of the obligation, the object of the obligation, and the source of the obligation distinguishes it from these notions (Dobson 2003). Dobson argues that antecedent actions should no longer be considered as such due to the fact that individuals are "always already acting on others" due to the effects of globalization (Dobson 2003:49). The idea that our actions are having almost immediate effects on other individuals in the world, and the recognition of this fact, is meant to create obligation between individuals (Dobson 2003). An obligation, he says, that would be ethically and morally wrong not to fulfil rather than being humanitarian or charitable in nature (Dobson 2003). Dobson draws on Vandana Shiva to note how these obligations are asymmetrically distributed: "through [the global North's] reach, the North exists in the South, but the South exists only within itself, since it has no global reach. Thus, the South can *only* exist locally, while only the North exists globally' (Shiva 1998:233 cited in Dobson 2003:50). In doing so, Dobson (2003) begins to argue the non-territoriality of this form of citizenship.

Dobson's (2003) second principal component of post-cosmopolitan citizenship is that it is non-territorial in nature. Traditional conceptions of citizenship define their membership by a 'political space' (Dobson 2003). By basing membership on a territorial political space, traditional forms of citizenship are argued by Dobson (2003) as discriminatory in nature, requiring a fulfillment of certain duties or responsibilities before having rights distributed to you (Dobson 2003). While Dobson (2003) agrees with many citizenship theorists, he argues that just as our notion of citizenship evolved past the borders of the cities into the nation states that we see today, they can continue to evolve to encompass much more. Dobson (2003) tries to assert post-cosmopolitan citizenship as non-territorial by arguing that it is based, again, on the connection *between* citizens rather than between citizen and state. Under this conception, citizens would not be bound by nation state borders, but by obligations to one another, regardless of geography (Dobson 2003).

The third principal component of post-cosmopolitan citizenship for Dobson (2003) is the politicization of the private sphere. Traditional conceptions of citizenship have been mainly

focused on the public sphere as the site of political action (Dobson 2003). However, these often-created conditions where those who mainly occupied the private sphere (such as women) were often excluded from the political arena (Dobson 2003). Dobson's (2003) argument is that actions that take place in the private sphere should be considered as inherently practices of citizenship and political in nature. In doing so, this renders the private sphere as a site where we exercise our political power (Dobson 2003). Dobson (2003) is careful to note that this conception of the private sphere as a political arena does not mean that *all* action in the private sphere is political – a notion that may be considered invasive – but that we should recognize that some actions we take in this sphere have characteristics of citizenship. Dobson's (2003) post-cosmopolitan citizenship would assert that actions within the home, that may seem apolitical at first, are in fact based on, in response to, or relying on public policy that impact our personal lifestyle decisions such as the discourse and (in)action around the reduce, reuse and recycle movement. In regard to environmental impacts, many of our behaviours that occur within the private sphere have global impacts such as our waste management and consumption practices.

Dobson's (2003) final distinction for post-cosmopolitan citizenship is that the virtues are inherently feminine in nature. Dobson (2003) points to how traditional conceptions of citizenship traditionally rely on masculine virtues of duty to one's community, leadership, and courage. The relationship created from these virtues is inherently between the citizen and the state, however, Dobson (2003) is arguing that post-cosmopolitan citizenship emphasizes relations between citizens. It is in this way Dobson (2003) aims to incorporate 'feminine' virtues into post-cosmopolitan citizenship by introducing notions of "care, compassion, and responsibility for the vulnerable" (63). While there has been criticism that this falls into the problem of essentialism, it has been argued that this is simply a focus on virtues that, while often associated with women, are only prescribed due to their *role* as carers and not with women *as women* (Werbner and Davis 1999:226, as cited in Dobson 2003). The goal of post-cosmopolitan citizenship then is to take these roles into the public sphere for both men and women – politicizing a traditionally gendered virtue by both degendering it and reclaiming it as citizenly (Dobson 2003). Dobson (2003) argues that if compassion can be used to fulfill the political obligations we have between citizens then we find that compassion can be politicized and brought under the umbrella of citizenship language. As post-cosmopolitan citizenship is based on obligations, presupposed by

antecedent actions, virtues such as these are better suited to meeting these obligations (Dobson 2003).

Regarding Dobson's conception of post-cosmopolitan citizenship, we should always be wary to question who is creating such a system of obligations, what mechanisms are used to politicize the private sphere, and to whom this system appears non-discriminatory to. It is important to be mindful that when proposing a new conception of citizenship, or of how to direct citizen's lives, that there may be pushback in a way that can lead to exploitive relationships between citizen and state, or citizen and citizen.

For example, by politicizing the private sphere, little attention has been paid to the role of larger institutions and the role they play in negative environmental impacts (Mannion et al., 2014). Furthermore, when the conversation is centered on private behaviours, there is massive obstacle in having individuals come to a reasonable agreement in who, what, and how best to live sustainably (Mannion et al., 2014). To then take these issues into a classroom, as Dobson proposes many times as the way to spread this conception of citizenship, brings with it too many competing perspectives to potentially navigate successfully (Mannion et al., 2014). In addition, Dobson is proposing a conception of citizenship whereby horizontal obligations between citizens are formed, requiring a change in behaviours for these citizens (Machin 2012). However, this has been argued to still be exclusionary in nature: obligation and duty, originally a collective act, is transformed into an individualistic and potentially elitist exercise in a multitude of individual relations (Gabrielson 2008). Post-cosmopolitan citizenship has been further critiqued for focusing too heavily on the material aspects of responsibility, leaving behind the details on the communicative relations and how this shared knowledge of responsibility would form (Machin 2012). Much of post-cosmopolitan citizenship relies heavily on the idea that society will come together as a whole and agree on any responsibilities at all, with little to no suggestions from Dobson on what this transformation might look like (Machin 2012).

Dobson (2003), however, sees ecological citizenship as an apt interpretation of post-cosmopolitan citizenship due to what he perceives as limitations in traditional conceptions of citizenship. Dobson (2003) proposes that environmental concerns are aptly positioned for the type of obligations that he has proposed through post-cosmopolitan citizenship. This raises questions as to the form, function, and relations that surround these environmental obligations. Dobson (2003) argues that these are questions of citizenship and to adequately answer them he

would need to develop a non-traditional form of citizenship that focuses on environmental obligations. Based primarily on the four principal components of post-cosmopolitan citizenship, Dobson (2003) develops the notion of ecological citizenship.

Traditional conceptions of citizenship place an emphasis on rights, and within ecological citizenship rights are still important in an environmental context (Dobson 2003). For instance, rights to life, security, health, and food are all intrinsically linked to environmental protection, almost as a pre-existing condition to these rights (Dobson 2003). The current understanding of rights could be extended to include the right to liveable and sustainable environments or, potentially, a right *of* the environment could be conceived (Dobson 2003). While there are noted complications with this, primarily with rights as "binding the future" as argued by Tim Hayward (2002:238-41), but also that environmental problems cannot always be traced to a specific cause with a degree of accuracy to support legal actions (Hayward 2000:564). The notion of bringing environmental rights into the fold of citizenship, however, does allow space for obligations based on these rights to be formed (Dobson 2003).

However, as environmental issues are global issues, Dobson (2003) suggests that traditional forms of citizenship that focus on a nation state context would be limited when trying to conceive of these environmental obligations. Environmental catastrophes, concerns, and phenomena do not take into consideration the national boundaries that separate our globe (Dobson 2003). In this regard, ecological citizenship must exist and operate outside of any pre-conceived or established notions of citizenship within nation state contexts (Dobson 2003). Ecological citizenship goes beyond borders and pushes forward a novel conception for obligations between individuals – one that takes into consideration the non-territorial nature of a globalized world (Dobson 2003). In this way, ecological citizens are not international citizens or global citizens, but simply citizens with obligations to one another (Dobson 2003).

However, it is important to remember that despite these propositions by Dobson, we occupy a heavily nation state centric context. Even if our world is as globalized as Dobson suggests, citizens will still have to navigate their responsibilities and be limited in their actions by these nation states. This careful navigation of traditional and ecological citizenship would be further contingent on the level of awareness that individuals have of their global obligations to one another outside of their own citizenly obligations. The question remains on how individuals

are meant to measure and understand their own obligations in contrast to other ecological citizens.

Dobson (2003) relies heavily on the concept of ecological space to discuss how these obligations might be conceived and formed by citizens. However, Dobson (2003) is unable to suggest any specifics in how this space would be divided up or even defined amongst individuals. Dobson (2003) does however note that it is not a geographical 'space' but rather the obligation and duty that emerges out of actions past, present, and future. He proposes it instead as a theoretical understanding of how much an individual's actions, past or present, impact the ecological well-being of others (Dobson 2003). Individuals who live in a sustainable way, with no actions that negatively encroach on another's ecological space, live without obligation or duty whereas those who negatively impact the lives of others must alter their behaviours in a way that meets these obligations (Dobson 2003).

However, the question remains in how to quantify and regulate such a system of obligations to understand who owes and who is owed. While this may seem ambiguous at best, Dobson (2003) argues that concepts commonly associated with citizenship such as 'justice' and 'freedom' are just as nebulous and this does not presuppose ecological citizenship from being considered. Dobson (2003) acknowledges that a debate around the CO_2 goals for both states and individuals would be an endless debate to try and regulate this within the context of ecological space. However, he argues that the understanding that certain individuals contribute more to climate change impacts than others is a concrete fact (Dobson 2003).

Ecological citizenship then aims to make this an acknowledged fact, in doing so, the issue of ecological space arises and directs the discussion towards obligations and duties related to this asymmetrical distribution of space (Dobson 2003). Ecological citizens are argued to be produced through knowledge translation and mobilization under this conception (Dobson 2003), with relations of citizenship being horizontal in nature (even if between a state and a citizen) rather than between the citizen and a higher state-like authority based in reciprocity (rights for 'Good Citizen' actions) (Dobson 2003).

Dobson's concept of ecological citizenship has been summarized as a transformative way to reshape the relationship between humans, non-humans, and other humans (Jagers, Martinsson and Matti 2014). Ecological citizenship entails individuals who, regardless of their political orientation but within the ideology of post-cosmopolitan citizenship, take on environmental

responsibilities and obligations towards humans and nonhumans in the name of justice (Dobson 2003; Henderson and Ikeda 2004). While there have been attempts to apply this concept in a more practical way, leading to ecological citizenship being conceived as a possible motivating force for sustainable lifestyles (Seyfang 2006), ecological citizenship is more contemporarily understood as a mechanism of inclusion and political participation, one in which rights of access to information and participation are stressed, with projects to strengthen these rights and obligations a mainstay of ecological citizenship (Melo-Escrihuela 2008). However, as has already been mentioned, ecological citizenship under Dobson's (2003) conception raises many questions that he does not or is unable to address.

Criticisms of ecological citizenship have been focused on the fact that the concept relies heavily on democracy and citizens in contemporary western societies may democratically decide to keep in place unsustainable practices (Melo-Escrihuela 2008). Dobson's arguments also fail to acknowledge and contend with the notion that if justice, equity, and sustainability are goals of ecological citizenship then it must reconcile these goals within the contradictory relationship between democracy and capitalism (Kurian, Munshi, & Bartlett 2014). Within traditional forms of citizenship, the idea of a 'common good' overrides individual preferences and values (Machin 2012). Ecological citizenship then becomes a contentious conception of citizenship likely to experience a strong pushback due to this emphasis on the 'common good' (Machin 2012). However, deliberative democracy such as this typically forgets that there are many who are already excluded from these types of deliberative discussions (Latta 2007).

In addition, it raises the question of who gets to decide citizenship and practices for an entire globe – let alone an entire country – and what aspects of citizenship do we leave behind in place of ecological citizenship (Melo-Escrihuela 2008). Dobson (2003) seems to rely only on the fact that by educating individuals that their actions harm others, and continuously do so in an antecedent fashion, will encourage a transformation in values and behaviours. A more applied way to critically engage in how values of ecological citizenship would be spread is through methods of 'social learning.' Or that instead of relying on a populace's internalization of a 'common good' to rather rely on 'pedagogic effects of deliberative democracy' (Machin 2012). In this regard, a more communitarian ecological citizenship promotes the 'common good' to form through open dialogue, agreed by all inhabitants within specific localities (Kenis 2015). In this way, it takes into consideration the needs and differences of each locality (Kenis 2015). This

could potentially be combined with Gabrielson and Parady's (2010) more embodied approach to citizenship, one that emphasizes the centrality of individuals within the environment, thereby tying it inherently into issues of citizenship and a 'good life' to the 'common good.'

Dobson's concept of ecological space has also been critiqued for not allowing individuals to have political reactions, therefore limiting the ability to challenge traditional political obligations (Hayward 2006). Dobson (2007) has responded to critiques that focus on what ecological citizenship leaves behind from traditional political duty and responsibility by arguing that his conception of post-cosmopolitan citizenship, and by extension ecological citizenship, is not concerned with traditional forms of citizenship as it is more important to expand our understanding of political obligations as a core of citizenship. However, Barry (2012) has attempted to clarify how ecological citizens might respond to these ecological injustices within a political context. An approach that works to identify ecological injustices, produced by modern industrial capitalist societies, would also then identify political actors who could work or are working to establish justice within the context of these negative environmental impacts (Barry 2012)

Hayward (2006) also raises the critique that ecological citizenship and Dobson's work lacks specifics in regard to membership and inclusion in determining who is an ecological citizen or not. Dobson (2007) argues that ecological citizenship is unconcerned with status or membership as it is based on antecedent actions that bind individuals together in obligation and justice rather than in traditional ways of citizenship. In addition, ecological citizenship is instead a global ideology, meant to shape our duties and responsibilities based on our impacts on citizens within or outside the same country (Wolf et al. 2009).

More practically, Dobson's argument may be strengthened by making distinction between civic freedom and civil liberty. Scoville (2016) argues that, under Dobson's (2003) definition, that ecological citizenship is a negotiated practice as currently defined. As such, it may benefit Dobson's argument to make this distinction, as civic freedom refers to citizen membership that is legitimated through "ongoing practices of self-government" (Scoville 2016). This is opposed to civil liberty whereby citizenship is a legal designation as a member of a nation state or other body (Scoville 2016). Dobson's inability to contend with this fact, as shown in conversation with Hayward, has been a contentious point of criticism from many other scholars.

Dobson's (2003) argument also openly lacks any direction in terms of how citizens are expected to meet these obligations of justice. At present, many individuals already engage in activities that might be considered cases of local governance such as carbon trading and climate change programs (Rutland and Aylett 2008; Paterson and Stripple 2010). In addition, these actions are individualistic in nature, even if they are for the common good, and Dobson (2003) seems to rely on the notion that all individuals will choose to meet their obligations in the same way without contradiction (Machin 2012).

While these activities appear apolitical at first, or at least so far removed from what might be considered activism for ecological justice, they seem far removed the large-scale obligations (Hobson 2013). Ecological citizens' efforts may also be for nothing as a green ideology and political participation does not guarantee that ecological objectives can or will be achieved with enough impact (Smith 2003; Smith 2005). However, these activities represent real behaviours that are being carried out by citizens, typically in an effort to do 'their part,' even if it represents a small personal behaviour change and impact (Hobson 2013). Overall, Dobson's (2003) lack of critical engagement in practical applications of many components of ecological citizenship is troubling when arguing for it's endorsement (Melo-Escrihuela 2015).

This project is meant to engage with the concept of ecological citizenship in a way that looks at how individuals are leading (un)sustainable lifestyles, where gaps exist, and to theorize how best to engage them within the theoretical framework of ecological citizenship. Specifically, by examining the prevalence of household participation (or non-participation) in certain activities that could be conceptually associated with ecological citizenship. In doing so, and cross-tabulating these results with demographic characteristics of households, the factors which have a greater effect on this participation/non-participation will become clearer.

However, ecological citizenship has many problems, as the literature previously cited has identified. A lack of concrete suggestion into how citizens could be regulated or informed to their obligations places an incredible amount of responsibility on individuals. This is despite ecological citizenship being declared as a global ideology that relies on the foundation of individuals recognizing their relations to individuals across the globe. In addition, ecological citizenship seems to be proposed within a world where nation states are not as ingrained in the lives of their citizens as they are now – either restricting or occupying behaviours and attitudes with overarching ideals specific to each nation state. This is again an area that ecological

citizenship seems to gloss over – suggesting only reform in education as a solution to this problem, one which has innumerable structural and institutional barriers, not to mention the many critiques of this approach to environmental education.

While this thesis bases its theoretical overview on this concept of ecological citizenship, it should be emphasized that the goal is not to verify ecological citizenship as a transformative ideology. Rather, that this work is meant to provide data about the behaviours of Canadians, within their municipal, provincial, and federal contexts, to provide applied research to a concept that sorely lacks it. With the knowledge of what behaviours citizens participate (or do not participate), how do we then proceed both at present and moving forward, taking into consideration the multiplicity of civil societies and the nation-state context that these citizens live in? What ways have we used data to analyze these issues at both macro- and micro-levels in addition to examining the efficacy of these different methods? In other words, what previous research has used data at both national and local levels to engage or educate citizens on environmental matters and how have these methods succeeded (or not).

In this regard, we move to understanding other conceptions of environmental politics in civil societies and the efforts that have been made to engage citizens and communities. While ecological citizenship provides a theoretical foundation to this project, more applied theories must be looked at to better understand how individuals can be engaged in regard to environmental behaviours.

2.2 Engaging Citizens, Individuals, and Communities

In addition to government policy actions and program implementations, there has been an increase in privatized programs and incentives over the years. While some corporations are motivated by the green values they advertise, others are simply motivated to benefit from the rewards offered. These programs have mainly been to increase participation in pro-environmental programs (such as recycling, green waste management, making green purchasing choices) but have also included industrial programs for corporations to lower their negative environmental impacts in exchange for tax breaks and other financial incentives. Alongside both forms of initiatives, there have been local, community, and grass-roots led programs and movements that focus on engaging citizens in everyday green behaviours.

Each of these initiatives are meant to engage citizens (or workers) within different scopes – and in the case of corporate programs, potentially different motivations – with different

outcomes. Programs are typically voluntary in nature, with mandatory programs often seeing high resistance from participants, and have been emerging as an alternative to mandatory regulations (Borck and Coglianese 2009). Literature has examined the impacts of environmental programs, while bearing in mind participation and environmental impacts, but has lacked further research into the effects of these programs on attitudes and behaviours (Borck and Coglianese 2009). In addition, the impact of these programs is inherently tied to the number of participants and the average effect per participant, which has led to a major focus on how to increase participation in voluntary environmental programs (Prakash and Potoski 2006). While these programs can be effective, this is not always the case, but they are typically preferred over mandatory regulations and programs which often come up against industry and public resistance (Lyon and Maxwell 2004).

This resistance indicates that even with numerous programs in place that encourage sustainable behaviours attitudes and beliefs of individuals are not changing and they will only continue to participate in these programs when it conveniences, benefits, or is easily accessible to them at no cost. It is in this way that when major changes in behaviour are desired, mandatory programs and regulations may be more effective, even if costlier (Morgenstern and Pizer 2007). With this understanding of environmental programs, the focus of this project shifts to looking at how to best engage citizens in programs that can benefit the environment.

Emerging in the 1980s was the concept of civic environmentalism, a new regulatory model emerging from the Reagan government's budget cutbacks and Congress gridlock, leading to state level government action in developing their own programs in light of limited financial resources (Morris 2008). Civic environmentalism was a critical response to the political and economical context at the federal level regarding environmental issues, action and policy at the time (John 1994). While this did not signify a decrease in support for pro-environmental actions by both government and individuals, it signified a change in who was expected to handle environmental issues; "the crisis of confidence [did not emerge] out of whether to protect the environment but of how to do it" (John 1994). Civic environmentalism in this respect was a conceptual theory on how to handle environmental problems at state and local levels, using the political process, in conjunction with individuals and organizations (John 1994).

However, it emerged out of a supposed lack of resources and action at federal levels and therefore shifted the responsibility toward citizens to manage environmental problems without

government resources or programs. It relied heavily on a neoliberal responsibilization approach – contrary to a top-down approach where federal officials are meant to consider the impacts of their decisions – and instead relies on the cumulative actions and decisions of locals (John 1994). In effect, civic environmentalism employs all levels of government in addition to local community members and what is referred to as a "shadow community of experts from many different agencies" (John 33:2003). While there is a heavy emphasis on the local level, civic environmentalism still relies on federal government for legal tools and technical assistance and is not meant to be a revolution of environmental governance, but merely a complementary factor (John 2004).

Civic environmentalism works best in diverse and dynamic nations - such as Canada - due to the inherent efficacy of allowing the space for local and community participants to take their environmental governance under their own control taking into consideration their unique context (John 1994). By engaging with diverse and dynamic localities, however, civic environmentalism is challenged by beliefs and values about nature that are just as diverse and dynamic. In this way, civic environmentalism, in terms of how to govern, is less about the bureaucracies of higher-level government bodies and instead about "experimentation, openness to unanticipated outcomes, and acceptance of uncertainty" (Evans and Karvonen 2011; Hinchliffe and Whatmore 2006 as cited in Karvonen & Yocom 2011).

Local government handling of environmental issues is, however, often dismissed in favour of international societies, knowledge, and other actions that embrace our globalized world (Luke 2009). However, civic environmentalism does not argue that the local should be self-governing in terms of environmental politics, but rather that it offers the most important insights and scope towards issues of the environment (Karvonen & Yocom 2011). Based on more contemporary definitions, civic environmentalism emphasizes active engagement in civic action that – in line with the previously discussed definition of ecological citizenship – is based in a responsibility to others (Cannavo 2007; Smith and Pangsapa 2008; Dobson and Bell 2005).

However, civic environmentalism emphases this responsibility and fosters it with a focus towards the 'local' space itself (Cannavo 2007; Smith and Pangsapa 2008; Dobson and Bell 2006). This led to many different forms of action from local projects such as river cleanups and voluntary waste management solutions to forming local protests - more notable examples include the Florida Riverglades restoration and the Chesapeak Bay program (John 2004). This collective,

local development of solutions around environmental issues intersected well with the fact that many environmental issues first emerged at these local levels, where citizens would demand change or be most affected by these issues (John 1994).

Civic environmentalism, as it has been developed through more contemporary literature, places an emphasis on inclusion, transparency, and order (Jarrell, Ozymy, McGurrin 2013). All of this is in an effort to avoid as much conflict as possible and encourage collaboration (Jarrell, Ozymy, McGurrin 2013). It has been suggested that if these goals are to be met, then they must be applied when government-level priorities are set and towards our governing institutions (Jarrell, Ozymy, McGurrin, 2013). These processes, to be effective, must rely on a transparent conveyance of information (Ball 2009) as well as norms of inclusiveness (Moug 2011) to adequately engage citizens. Overall, for civic environmentalism to be effective, citizens must feel that they have opportunities and that their impacts will be felt in policy outcomes (Herian et al. 2012)

Civic environmentalism has been critiqued for bringing a 'devolution' to environmental policy that will not result in more sustainable communities and greater engagement from citizens (Abel & Stephan 2000). In addition, one of the main challenges for civic environmentalism is that it must enact these hybrid forms of governance and relations within an entrenched political system (Meadowcroft 2004; Karvonen & Yocom 2011) The same barriers that limit citizens from participating at the national level may exist at the local and community levels (Abel & Stephan 2000). Many studies have concluded that public participation in local environmental regulation results in inadequate results (Cunningham and Tiefenbacher 2008; Duffy et al. 2010). The concern is that these barriers - such as a bias towards the elite in these communities - will affect the impact that everyday citizens can have on this process (Abel & Stephan 2000). Furthermore, while civic environmentalism does not assume that these barriers are to be overcome without disagreement of failure, issues of political deliberation within an already entrenched system are numerous (Karvonen & Yocom 2011).

It has also been discussed that the concept of civic environmentalism is not adequate for large-scale and complex environmental problems (Morris 2008). However, civic environmentalism could be understood as a foundation for a larger project, one that incorporates many of the engagement strategies and ideals of the concept to be combined with more 'global' concepts. In addition, civic environmentalism has been applied in a way that has resulted in new

modes of collaboration at community levels in resolving environmental issues and creating political organization at local levels (Shutkin 2001; Agyeman 2005).

Civic environmentalism pushes for a global civil society, while understanding our context in a state-centric society, and instead pushes for a hybridization of the two to increase public accountability surrounding climate change (Bäckstrand & Lövbrand 2007). The goal of civic environmentalism is in the creation of sustainable communities through various public participation engagement strategies (Agyeman & Angus 2003). To do this, a 'narrow focus' or alternatively 'broad focus' civic environmentalism could be enacted (Agyeman & Angus 2003).

The narrow focus, referred to as the 'information deficit model' focuses on providing information to citizens to increase their pro-environmental behaviour and beliefs, empowering them to feel competent in engaging in policy discussions and civic actions (Agyeman & Angus 2003; Kollmuss & Agyeman 2002). The information deficit model has been largely understood as the more traditional model to alter citizen participation and behaviour (Burgess et al. 1998). 'Deliberative and inclusionary processes and procedures' - or DIPS - makes up the 'broad focus' civic environmentalism and refers to the process of actively engaging the public in areas of policy formation and implementation (Agyeman & Angus 2003).

These models have, however, been largely criticized for their failing to create any transformational policies in comparison to their deliberate counterpart models (Agyeman & Angus 2003). The two, however, should be considered as complimentary and in process of evolution as the needs and expectations of the public change (Agyeman & Angus 2003). Many programs have been enacted at international, federal, and local levels of government – some based on methods described above – and play a role in developing the behaviours, values, and attitudes of Canadians.

2.3 Pro-Environmental Behaviours, Values, and Attitudes in Canada

Utilizing library databases, there is little empirical research into ecological citizenship and the behaviours or values that may be associated with the concept to build the foundation for this research. However, there is a breadth of research into pro-environmental behaviours, values, and attitudes in Canada that could be associated with the idyllic concept of ecological citizenship. In this regard, pro-environmental behaviours are carried out when citizens are aware of how their actions effect others and feel an obligation to make more sustainable decisions. Furthermore, to create a sense of justice in regard to their environmental impacts.

The foundation of this work is the scholarly assumption that if there are pro-environmental values already existing, there is then a higher chance of pro-environmental behaviours as well (Kilbourne & Beckmann 1998; Dietz et al. 2005) – though this is not always the case, as will be discussed. Contributing to this foundation is supporting research that shows that those who value their own personal prosperity are more likely to be higher energy consumers and engage in less sustainable behaviours (Poortinga, Steg, and Vlek 2004).

Environmental values are constantly intersecting or competing with internal altruism and self-interest which in turns actively defines the actions and values of individuals (Dietz et al. 2005; Gatersleben, Murtagh, & Abrahamse 2014). These values can be impacted by many contextual aspects dependent on where an individual lives or the local culture (Laroche et al. 1996; Kilbourne, Beckmann, & Thelen 2002). This interaction between values and behaviours forms individual identities that may or may not be pro-environmental and sustainable in nature (Gatersleben et al. 2014). These pro-environmental identities, when formed or already present, can have an impact on consumer decisions and behaviours (Fekadu & Kraft 2001). In addition, many of the behaviours we would deem pro-environmental are planned and self-expressive of these constructed pro-environmental identities (Mannetti, Pierro, & Livi 2004).

On the notion of identify formation mentioned earlier, certain activities such as buying organic and local produce, can aid in this self-image construction (Skill and Gyberg 2010). The act of engaging in pro-environmental behaviours is also one that is bound with social norms, awareness of pro-environmental behaviours can lead to feelings of responsibility in individuals (Onwezen, Antonides, and Bartels 2013). Furthermore, this can incite feelings of pride and guilt dependent on whether an individual is engaging in this activity, and may even encourage them to participate (Onwezen, Antonides, and Bartels 2013). Participation in pro-environmental behaviours can also have positive effects on an individual's well-being, specifically in a feeling of making meaningful impacts on their environment, and feeling good about this impact (Venhoeven, Bolderdijk, and Steg 2013). In this way, emotions are an important factor to consider when attempting to motivate individuals to engage in pro-environmental behaviours just as much as identity formation.

Variance in perception amongst environmental behaviours further complicates these identities. For example, activities such as recycling or other energy saving behaviours are seen as reasonable compared to other activities that may require radical and unrealistic changes to an

individual's lifestyle and therefore their identity (Skill and Gyberg 2010). An intrinsic motivation, based in moral obligation, is related to a pro-environmental self-identity and can motivate certain behaviours – even if they do not have a large impact (van der Werff, Steg, and Keizer 2013). In addition, individuals must identify with a sense of self-efficacy to participate in these behaviours (Lauren et al. 2016). Behaviours such as talking about environmental issues publicly, re-using plastic bags, or volunteering for environmental organizations are typically considered accessible to individuals, even if they are not radical in change (Chen et al. 2011). While these behaviours may create a 'green' identity for some, they are arguably small contributions made to reduce overall waste and consumption (Dunn 2010).

Attitudes and beliefs, while incredibly important in driving our environmental actions, are greatly effected by the socio-economic, lived context and opportunities afforded to an individual (Poortinga, Steg, and Vlek 2004). Education and knowledge can play a large part in whether individuals engage or do not engage in pro-environmental activities. However, even with appropriate knowledge, consumers will still often make choices that may be viewed as non-environmentally friendly (Jackson 2005). Consumers may be unable to discern which choice is the "right" one when making purchasing decisions, or, they may simply choose to make only their "fair share" of these purchasing decisions (Moisander 2007). Research has found that this limited agency and lack of knowledge has been expressed by individuals in regard to environmentally friendly lifestyles (Boström and Klintman 2009; Wibeck and Linner 2012; Hobson 2013). Implementing more effective environmental education has been a main focus for quite some time, though it has been critiqued on the notion that that environmental education does not necessarily result in positive environmental behaviours (Courtenay-Hall and Rogers 2002). Instead, Courtenay-Hall and Rogers point towards a need for education centred around broader critical thinking (2002).

The literature is clear that there is no explanation or singular context under which individuals will behave in a sustainable way, regardless of socio-economic status or accessibility, and so the focus to date has been on identifying consistent and stable archetypes to target (Moisander 2007; Vermeir & Verbeke 2006). These archetypes are based on a combination of primary motives, selective motives, resources, and opportunities which funnel into the motivation and abilities of an individual, finally leading to a behaviour (Moisander 2007). These archetypes can vary, however, based on many factors. Research within Canada on pro-

environmental behaviours and potential archetypes have revealed the presence of a "gap" (Kennedy et al. 2009). This gap exists between how individuals value the environment around them and how they choose to act in different situations – referred to as the environmental-behaviours (EVB) gap (Kennedy et al. 2009:48). Specifically, individuals may report that they have pro-environmental values but report a lack of concrete action in their behaviours and activities that do not align with their reported attitudes (Kennedy et al. 2009). Attempts to model this EVB gap have taken into consideration individuals internal and external context (Kollmuss and Agyemen 2002) as well as personal experience (Maiteny 2002). Canadians responded that they were often restrained by time, money, and a lack of knowledge to explain their own EVB gap (Kennedy et al. 2009). Already established patterns of behaviour, lack of incentives (either monetary or personal), as well as surrounding political and social infrastructure has also been found to contribute to the EVB gap (Kollmuss and Agyeman 2002). In addition, many of the daily behaviours that Canadians engage in are habits that have been well-established and only in the recent decades have these behaviours come into mainstream discussion surrounding the environment (Biel and Dahlstrand 2005).

Cost-benefit analysis (CBA) plays a large part in these choices by Canadians, especially those who refer to time and money as a large barrier for their participation and has seen a great deal of research into how to examine environmental problems and policy through a CBA lens (Atkinson and Mourato 2008). CBA is widely used by governmental institutions when examining how to combat environmental problems or raise engagement in environmental concerns with citizens (Atkinson and Mourato 2008). In addition, when examining the EVB gap through a CBA lens, it is important to consider issues of inequality and inequity as costs, benefits, and access to these options are not evenly distributed across populations (Atkinson and Mourato 2008).

Emerging out of the EVB gap is one hybrid archetype referred to as the "citizen-consumer." Citizen-consumers have most commonly been associated with tactics such as 'voting with one's dollar;' satisfying both their consumer tendencies and internal values. This tactic of voting with one's dollar has been an often-used strategy by pro-environmental brands and groups (Johnston 2008). While research has shown that these types of financial incentives are a potentially effective motivating strategy (Eriksson 2004), this strategy of green consumption has been criticized for failing to contribute to social and environmental change in a meaningful way

(Lorenzen 2014). In addition, also failing to be accessible to larger demographics based on race, class, and gender (Lorenzen 2014). Tactics such as these rely heavily on consumer awareness and an understanding of sustainable practices and the economic and environmental impact of their decisions (Turrentine and Kurani 2007). Environmental labelling is one attempt at equipping individuals with appropriate knowledge, but has been critiqued of representing a simplified form of environmental education that fails to capture the complex relations between consumer attitudes, values, and behaviours (Pedersen and Neergaard 2006).

Frameworks have been developed that attempt to map encouraging factors for pro-environmental behaviour and indicate that all factors discussed so far have a part to play (Steg, Bolderdijk, Keizer, and Perlaviciute 2014). This includes motivations – both extrinsic and intrinsic. In addition, the role of an individual's context in terms of financial resources, education, and time alongside the normative goals of a sustainable environment are key components of these behaviours. However, it is important to acknowledge the associated costs with acting pro-environmentally and that many of the barriers to pro-environmental behaviour discussed can be overcome by reducing these costs.

Chapter 3: Methodology

3.1 Operationalizing Ecological Citizenship

According to the literature reviewed in the previous chapters, ecological citizenship is primarily based on a mindset of justice and obligation to others. How that justice and responsibility is met, regarding what specific actions are taken, is not specified and have been argued that should not be. The understood notion is that individuals have an obligation to align their behaviours to sustainable practices, with the knowledge that in doing so, they are making efforts to meet a conception of justice to other individuals present and future. However, the nature of measuring attitudes and behaviours quantitatively produces imperfect approximations that are limited to being indicative to a predisposition to ecological citizenship at best.

Ecological Citizenship, at the time of writing this thesis, has not been quantitatively operationalized outside of a linkage between pro-environmental behaviours and beliefs. An extensive review of literature through library databases was performed to verify this. Limited research has been conducted that attempts to quantity the beliefs associated with ecological citizenship (e.g. Jagers, Mattison, and Matti 2014) but has so far not looked at behaviours.

The focus of this thesis then is on behaviours that could theoretically be associated with ecological citizenship. The behaviours captured within the dataset used in this project act as possible, but not exhaustive, avenues for individuals to meet their obligation to justice and responsibility to others within the scope of ecological citizenship. What ecological citizenship looks like in practice is not wholly defined or understood in terms of specific behaviours and actions. Many of the questions included in the used dataset focus on ways that citizens could reduce their impact in small personal ways. Examples of potential pro-environmental behaviours captured within this dataset include participating in composting programs, making sustainable renovations to a household, or volunteering in conservation programs. Behaviours such as these have been mentioned throughout this thesis as being associated with pro-environmental behaviours and have aided in identifying suitable variables for analysis. In addition, the behaviours included needed to represent an actionable behaviour that a household can or can not participate in.

As mentioned, the behaviours included in this study are not meant to be an exhaustive list of behaviours that could theoretically be linked to ecological citizenship. However, they represent the extent of the behaviours that could be included based on their availability within

the chosen dataset. Many additional behaviours that lead to larger negative environmental impacts could have been included in this questionnaire and therefore could have contributed to this study (e.g. occupation and development of larger than necessary homes (Garon 2013), higher levels of meat consumption (Sovacool and Brown 2010), and widespread use of automobile and air travel (Shaw and Thomas 2006)).

Within this thesis, a set of questions measuring behaviours have been theoretically operationalized and categorized as pro-environmental (based in part on the literature previously mentioned). No attribution in the participation or non-participation of these behaviours can be made to indicate if they were carried out based on a pro-environmental attitude or belief. These behaviours are not necessarily adopted with the intention to be ecological and results should be interpreted with this in mind. Individuals could be carrying out these activities but have no regard for the impact they have on the environment. Additionally, respondents may be participating in activities outside of the scope of this survey that may be more so damaging to the environment.

This study operationalizes a form of ecological citizenship that is based on participation or non-participation in the behaviours included within the Households and Environment Survey (HES). More specifically, ecological citizenship is operationalized as household participation in activities that could be conceptually associated with the types of behaviours that are associated with the enactment of ecological citizenship, captured within the chosen dataset, that are deemed to be pro-environmental in nature.

Based on the availability of current data, balanced with the need to create a national-level instrument of ecological citizenship, this operationalization was deemed to be the most appropriate for this thesis. This operationalization of ecological citizenship will be applied to respondent's demographic and contextual data of the (HES), a large aggregate dataset on the Canadian population.

3.2 Households and Environment Survey

The dataset used in this thesis is the 2013 cycle of the Households and Environment Survey (HES), the most recent set of data available when starting this project, which is run on a biennial basis by Statistics Canada. The survey has been conducted since 1991 and has changed considerably overtime as environmental priorities in Canada have shifted and new information has become available. For example, pesticide use and quality of drinking water have recently

been added to the survey to capture these new concerns (Statistics Canada 2016). This dataset was accessed at the Quebec Inter-University Centre for Social Statistics as part of the Canadian Research Data Centres program. The survey covers topics such as household consumption habits and members' behaviours but also includes themes such as "heating and cooling, appliances, the physical features of your dwelling, and your household's energy consumption" (Statistics Canada 2016).

The HES sample is selected from the respondents to the Canadian Community Health Survey (CCHS) which has a population coverage error of less than 2%. Exclusions include households located on First Nations reserves or Crown lands, and households consisting entirely of full-time members of the Canadian armed forces. Institutional housing (such as old age living facilities) and certain remote regions are also excluded. Unique to the HES are further exclusions including those in the Yukon, Northwest Territories, and Nunavut. Acknowledging these exclusions, language use around the representativity of the analysis presented will consider this data to be representative of the clear majority of Canadian households. These exclusions are likely due to sampling issues common with more rural and remote regions of Canada that would make a representative sample of these regions impossible. The survey is cross-sectional in design and nature and had a response rate of 71.8%. The sample size available was 22,363 dwellings. Responses that had an unacceptable margin of sampling error (or coefficient of variation [CV]) were suppressed by Statistics Canada due to their unreliability in reporting. (Statistics Canada 2016). The survey is voluntary and responses are collected directly from the respondents over the phone with a computer-assisted telephone interviewing (CATI) application. Respondents to Statistics Canada surveys are typically asked if they are a member of the household, of age at least 18+, who makes decisions regarding the household.

Results were weighted with a combined post-stratification and population weight provided by Statistics Canada. This allowed for the results to be representative of the total population of households in Canada – estimated at roughly 13.6 million in 2013. However, when population weighted data are used in analyses run through IBM's Statistical Package for the Social Sciences (SPSS) the results come back with a significance value of 0.000 due to the tests being run on the weighted N and not the sample N. In order to overcome this problem and ensure that any significance tests were accurate, a new weight variable has been computed which is an

adjusted version of the combined population and post-stratification weight. This new weight variable was generated with the following equation:

$$\frac{Original\ Weight\ Value\ x\ Sample\ Size}{Weighted\ Population\ Size} = \frac{WEIGHT\ x\ 31{,}962}{13{,}599{,}121} = NewWEIGHT$$

This new weight variable brings the post-stratification effects of the weight, but adjusted to bring the estimation to the sample rather than the population. Results presented in this thesis are thus representative of the population value, not simply the sample.

3.3 Independent Variables

Independent variables available and included in this project encompass: region of residence, census metropolitan area (CMA) designation, language, education, income, household size, household composition, and type of dwelling. All variables that could have acted as independent variables with the purpose of contextualizing the household's situation were used. See Table 1 for a breakdown of sub-populations and sample sizes. The choice to use these variables was informed not only by their availability within the dataset that was used, but also by their ability to speak to some of the themes that have been presented in the previous chapter of this thesis.

Region of residence is coded as Ontario, Québec, British Columbia, the Prairie Region (comprising of Alberta, Saskatchewan, and Manitoba), and the Atlantic Region (comprising of Nova Scotia, Prince Edward Island, Newfoundland and Labrador, and New Brunswick). CMA Designation is coded as the respondent living in Toronto, Montréal, Vancouver, any other CMA, or in a Non-CMA. Both variables are expected to have an impact on the participation in certain activities as many environmental programs are run at municipal and provincial levels, creating variance between provinces and municipalities. The objective of their inclusion is to potentially speak to the notion that environmental impacts are asymmetrically distributed not only globally, but also within large and variable nations such as Canada.

Language is binary and based on the language the survey was conducted in; French or English. Differences between mainly French or English-speaking Canadians could potentially indicate either accessibility issues in different programs across Canada or cultural differences in environmental beliefs and behaviours. Language brings a lens of variability within a single nation to this project.

Education is based on the highest education of any member of the household and is coded as less than high school, high school graduate, some post-secondary (or a trade diploma or university certificate), and university graduate. Household income is based on the income of all household members and is coded $20,000 or less (including loss), more than $20,000 to $60,000, more than $60,000 to $100,000, and more than $100,000. Income was re-coded in this study due to sample size and reportability potential disclosure issues to allow for publishable results. Both income and education are expected to have a positive association with the number of activities a household participates in. This is based partly in the literature that has been reviewed, which noted that Canadians often feel they either do not have the money or the knowledge to participate in activities. Education and income both look to understand how an individual's socio-economic status can impact their participation or non-participation in certain behaviours. However, it takes for granted that these characteristics (such as education and income) are distributed evenly among household members.

Household size is coded as one person, two people, three people, four people, five people, and 6 or more people. Household composition is a derived variable and coded as households with no children (no one between the ages of 0 and 17), households with only members 65 and over, households with children (between the ages of 0 and 17), and 'other' compositions. Variables such as number of people in the household, the composition (if children are present or not), and the type of dwelling all aim to answer different questions and speak to different accessibility and participation issues for ecological citizenship. Household size and composition are expected to vary in their ability to participate in a higher number of activities.

Type of dwelling is binary and coded as Single/Double/Row/Duplex detached home and Low- and High-rise Apartment. Type of dwelling is expected to impact participation, specifically for Low- and High-rise apartments which are expected to negatively affect the number of activities a household can participate in due to their lack of accessibility to programs and resources due to the compact and urban nature of these dwellings.

Table 1. *Frequencies for Independent Variables (N = 22,363)*

Variable	Sub-population	N	%
Region of Residence	Ontario	8347	37.3%
	Quebec	5570	24.9%
	British Columbia	3009	13.5%

	Prairie Region	3855	17.2%
	Atlantic Region	1585	7.1%
CMA Designation	Non-CMA	6509	29.1%
	Other CMAs	7568	33.9%
	Vancouver	1589	7.1%
	Montreal	2744	12.3%
	Toronto	3938	17.6%
Language	English	16560	76.3%
	French	5154	23.7%
Household Education	Less than High School	1583	7.2%
	High School Graduate	3319	15.0%
	Some Post-Secondary	6159	27.9%
	University	11021	49.9%
Household Income	$20,000 or less, including loss	1490	8.0%
	More than $20,000 to $60,000	6471	34.7%
	More than $60,000 to $100,000	4900	26.3%
	More than $100,000	5791	31.0%
Household Size	One Person	5777	25.8%
	Two People	7820	35.0%
	Three People	3438	15.4%
	Four People	3225	14.4%
	Five People	1339	6.0%
	Six or More People	771	3.4%
Household Composition	Households with only members 19 - 64	7363	32.9%
	Households with only members 65+	3925	17.6%
	Households with children 0 - 18	7014	31.4%
	Other compositions	4062	18.2%

Type of Dwelling	Detached Home	16021	75.7%
	Low- and High-rise Apartment	5156	24.3%
Total Sample Size		22,363	100.0%

3.4 Dependent Variables

To better understand the context under which households engage in behaviours that could be associated with eco-citizenship in Canada, based on the operationalization of the concept, an index was decided as the best way to make use of available data. An index allows for a better understanding of the number of households in Canada participating at certain 'levels' of ecological citizenship. Specifically, which activities are most common and under what demographic context (household income, education, location, etc.) they are most likely to occur at.

Utilizing factor analysis allows us to identify different dimensions of activities to be considered. It is important to note that the levels designated by the index are defined by the author of this thesis and are based on the number of activities currently being participated in – no weight was given to certain activities over others and no classification of acceptable level of ecological citizenship was defined in line with the exploratory nature of this project.

These levels are meant to act as a proxy for varying levels of ecological citizenship based on the number of activities that a household is participating in that could be associated with ecological citizenship. In theory, higher levels on this index would indicate higher participation in behaviours that could be conceptually associated with ecological citizenship. The use of levels allows for the categorization of households – such as those who are participating in an above-average number of activities that could be linked to ecological citizenship.

Over 20 variables were identified from the overall dataset that targeted household behaviours that could be considered pro-environmental (see Appendix A for full list). These behaviours were chosen based on the behaviours 1) being an actionable behaviour that the household can or can not participate in 2) be related to a pro-environmental behaviour either by previous literature or by association to previously identified behaviours.

Examples of variables that were excluded include the heat source in a home, having received a household boil advisory in the past year, and household air quality. Variables such as these were identified as not being actionable by the household, representing a simple reporting of

household circumstances, while also not being linked to any pro-environment behaviour literature. From this initial list of 20 variables, face validity with this thesis' committee was conducted to confirm the inclusion of each variable.

This process identified certain variables that were over-emphasizing certain behaviours over others. In addition, other variables were derived from more general questions and deemed too specific for the proposed general index. Specifically, there were several variables that covered the subject of water conservation in multiple different ways. To include all of them would have meant a larger portion of the index questions were related to water conservation (and not a general list of variables of household environment activities). The concept of water conservation could instead be captured through the inclusion of one water conservation question, which was included in the final index.

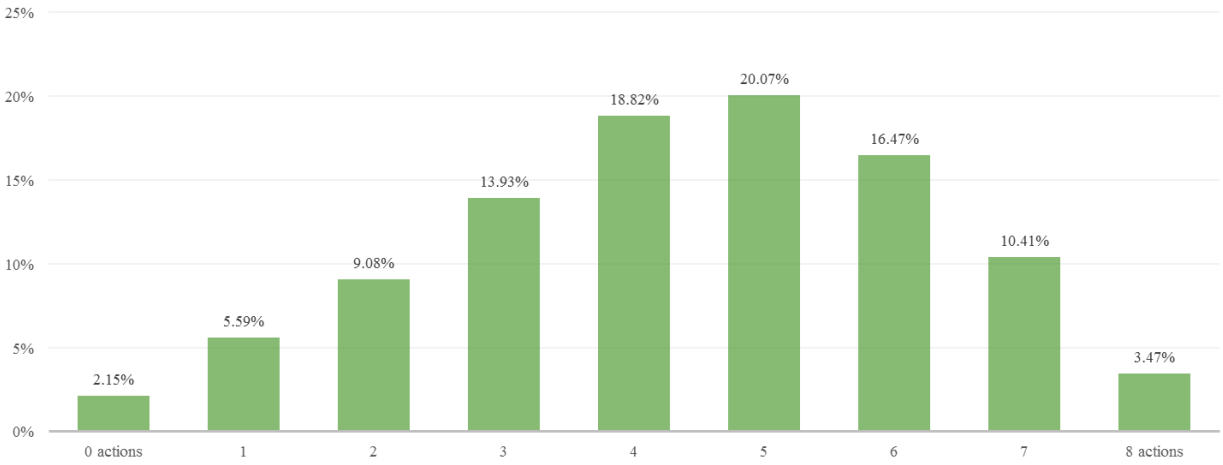
From this initial list, 16 variables were identified to move forward into the further stages of the index creation. These 16 variables covered a wide variety of behaviours that a household could engage in from composting to engaging in environmental conservation programs. The analysis plan from this stage was to use factor analysis to identify different dimensions based on these 16 variables that could then be used to further contextualize through cross-tabulation with independent variables. Factor analysis will identify dimensions of variables (groupings of the behaviours included in the dataset) that are closely related for further analysis alongside the index. In doing so, multiple indexes would be created: an overall index and sub-dimensional indexes. Four dimensions were identified from the initial factor analysis which were coded as green consumer behaviour, connection to nature, water conservation, and sustainable household behaviours.

However, further face validity was conducted on these dimensions with this thesis' committee. Due to this, further variables were eliminated for various reasons including: repetitive nature, higher than normal missing values, incorrect target population, and inadequacy in the question itself. This reduced the working list of variables to the following 8 variables of interest that would finally make up the overall index: devices used to conserve or reduce consumption of water; composted kitchen waste in past 12 months; grew vegetables, herbs, fruits or flowers in past 12 months; participated in activities aimed at conservation/protection of environment without pay in the past 12 months; purchased food advertised as being locally grown/produced in the past 12 months; purchased "green" cleaning products in the past 12

months; uses own bags/containers to carry groceries in past 12 months; and visited any parks or public greenspaces in past 12 months.

With these eight variables, the "Index of Behaviours Associated with Ecological Citizenship Practice" was created. For each behaviour that the household participated in, a point was gained on the index for a maximum score of eight. The index itself (see Figure 1) was observed to have a mean of 4.4, a mode of 5.0, and a standard deviation of 1.9.

Figure 1: Index of Behaviours Associated with Ecological Citizenship in Canada



Dimensions – or sub-groups of household behaviours – that can be conceptually understood together can be formulated from these behaviours and activities. These dimensions can be used to further understand the effect of certain household characteristics on certain typologies of behaviours based on which dimension they occupy. To generate the dimensions from our dataset, factor analysis was chosen due to the ability to summarize and categorize data based on the relationships and patterns between the chosen variables (Yong & Pearce 2013; Child 2006).

In addition, factor analysis is the best use of resources and time for a project such as this, with easily interpretable results (Harman 1976). Factor analysis will reduce the large number of variables available in this dataset into separate, identified dimensions for further analysis as an index. Factor analysis looks at the chosen variables and identifies a common variance, primarily unobservable through other analyses, and uses this to identify clusters (or dimensions) of variables as separate constructs (Bartholomew, Knott, & Moustaki 2011; Cattel 1973).

Through factor analysis, two sub-dimensions were identified based on the initial eight questions. Kaiser-Meyer-Olkin Measure of Sampling Adequacy was performed and results in a

value of 0.703 which indicated that factor analysis is appropriate for identifying dimensions with the selected variables (Significance = 0.000). The total variance explained with the chosen eight variables is 26.9% when rotated, with factor analysis identifying two dimensions through Principal Component Analysis with Varimax rotation and Kaiser Normalization (see Appendix B for full details).

Each sub-dimension had a range from zero to four based on the number of activities that the household participated in and are visualized in Figures 2 and 3. Sub-dimension 1, titled Daily Green Behaviours, included the following variables: purchased food advertised as being locally grown/produced in the past 12 months; purchased "green" cleaning products in the past 12 months; uses own bags/containers to carry groceries in past 12 months; and visited any parks or public greenspaces in past 12 months. Sub-dimension 1 had a mean of 1.9, a mode of 3.0, and a standard deviation of 1.2.

Sub-dimension 2, titled Sustainable Household Behaviours, included the remaining variables: devices used to conserve or reduce consumption of water; composted kitchen waste in past 12 months; grew vegetables, herbs, fruits or flowers in past 12 months; participated in activities aimed at conservation/protection of environment without pay in the past 12 months. Sub-dimension 2 had a mean of 2.4, mode of 2.0, and standard deviation of 1.1.

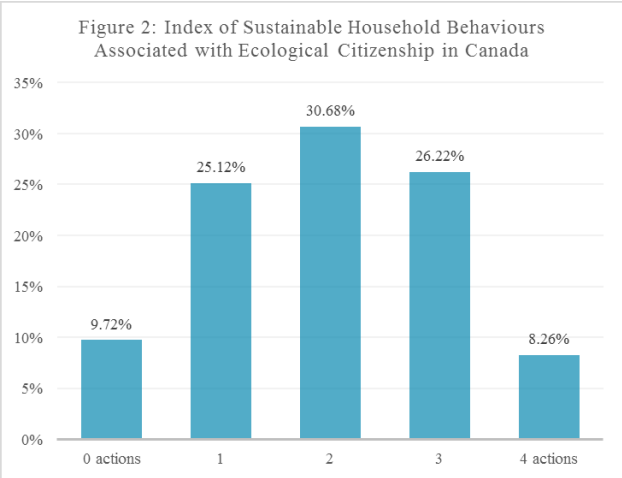


Figure 2: Index of Sustainable Household Behaviours Associated with Ecological Citizenship in Canada

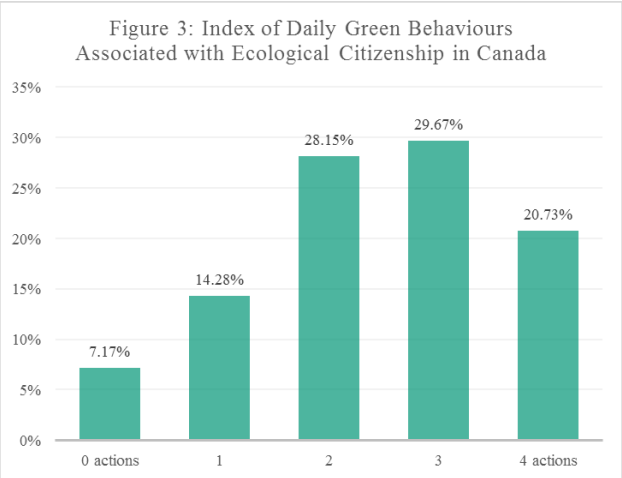


Figure 3: Index of Daily Green Behaviours Associated with Ecological Citizenship in Canada

Tests of reliability were conduced on the overall index as well as the two separate sub-dimensional indexes. While just barely acceptable for the cumulative index (Cronbach's Alpha = 0.536) the two dimensions fall below the cut-off for reliability (0.420 for Sub-dimension 1 and 0.423 for Sub-dimension 2), however, multiple other factor analyses were run with different

combinations of available data and the variables used in this configuration provided the most reliable results. See Appendix B for full tables on factor analysis and reliability analyses.

3.5 Analysis Plan for Index of Behaviours

The primary analysis will focus on cross-tabulations to identify the prevalence of certain levels of activity participation based on household characteristics. These will be primarily focused on the independent variables, the index, and the sub-dimensional indexes identified through factor analysis. The means are presented for each index by the independent variables. Analyses of variance (ANOVA) tests were performed alongside post hoc tests to determine if the populations represented in the independent variables are significantly different from one another between groups. Post-Hoc tests are conducted to determine the direction and relationship for these differences. Measures of association will be calculated alongside these cross-tabulations to identify the strength (and direction, as appropriate) of the relationship between the independent variable and the index itself.

A multivariate linear and logistic analysis of these variables and the indexes was also conducted to determine the effect of the variables, controlling for one another, on the index level reported. As the index has a discrete range of levels – with the smaller sub-dimensional indexes having even fewer levels – a mix of logistic and linear regressions was performed to identify these effects.

Chapter 4: Results

4.1 Bivariate Analyses

All bivariate cross tabulations are significant (full cross-tabulation tables are available in Appendix C) and analyses are presented in terms of their means, mean differences, and measures of association.

4.1.1 Province of Residence

There is a slightly higher prevalence of greater household scores for those in British Columbia. Québec reports the highest number of residents with a score of four (22.5%), one below the national mode. In addition to this, Québec reports the lowest number of residents participating in all eight behaviours (1.7%) in direct contrast to British Columbia (4.8%) and Ontario (4.3%). The Atlantic Region reports the lowest proportion of residents who are participating in zero activities (1.3%). Québec also reports the same percentage (1.3%) of residents participating in zero activities. The mean scores for each region (Table 2) show Ontario leading, followed by British Columbia, the Atlantic Region, Prairie Region, and Québec respectively. Overall, region of residence does not have a very strong relationship with the index (Cramer's V = 0.085, p = <0.001).

Table 2. *Means of Indexes by Region of Residence*

	Mean				
Index	Ontario (N = 8347)	Quebec (N = 5570)	British Columbia (N = 3009)	Atlantic Region (N = 3855)	Prairie Region (N = 1585)
Global Index of Behaviours Indicative of Eco-Citizenship	4.6	4.2	4.5	4.4	4.2
Sub-dimension 1: Index of Daily Green Behaviours	2.5	2.6	2.4	2.3	2.2
Sub-dimension 2: Index of Sustainable Household Behaviours	2.2	1.6	2.1	2.1	1.9

When we make comparisons between the two separate dimensions of the index we can see that there are differences in the means within regions, which suggests that different types of behaviours are more accessible, received greater support, or become more popular in differing regions. For example, in Québec, there is a mean of 1.6 for sustainable household behaviours

compared to a mean of 2.6 for the daily green behaviours. Between provinces there is a difference in means such as a 2.5 mean for daily green behaviours for Ontario compared to the Prairie region which only has a mean of 2.2 for the same index. This trend continues to varying degrees in all the regions discussed in this work, whereby the Sustainable Household Behaviours index displays lower proportions of high participation. Sustainable Household Behaviours does report a stronger relationship than Daily Green Behaviours to region of residence (Cramer's V = 0.111 and 0.066 respectively, p = <0.001).

Games-Howell post hoc tests, shown in table 3, revealed that some of the mean differences between regions are significant. Ontario had significant mean differences compared to Québec, British Columbia, the Prairies, and the Atlantic provinces. Québec had significantly negative mean differences compared to British Columbia. British Columbia itself had significantly mean differences that were greater than Prairie Region. Finally, the Prairie Region itself had significant mean differences that were less than the scores in the Atlantic Region. When separating the index into the two dimensions, there are some differences. For example, while the difference between Ontario and Quebec is significantly different in favour of Ontario's scores, for the Daily Green Behaviours the results are reversed. This same effect is seen between Québec and British Columbia. Overall, Québec has a positive mean difference that is statistically significant compared to British Columbia and the Prairie and Atlantic regions.

Table 3. *Games-Howell ANOVA Post Hoc Tests for Indexes by Region of Residence*

	Index of Behaviours Indicative of Eco-Citizenship				Daily Green Behaviours				Sustainable Household Behaviours			
Sub-Population	QC	BC	PR	ATL	QC	BC	PR	ATL	QC	BC	PR	ATL
Ontario	+++	++	+++	+++	---	NS	+++	+++	+++	+++	+++	NS
Quebec		---	NS	NS		+++	+++	+++		---	---	---
British Columbia			+++	NS			+++	++			+++	NS
Prairie Region				---				NS				---

Note. Significance: +++ or --- $p \leq 0.001$; ++ or -- $p \leq 0.01$; + or - $p \leq 0.05$; NS: non-significant difference

+ Indicates a statistically significant negative difference where the population on the Y-axis has a greater score than the population on the X-axis.

- Indicates a statistically significant negative difference where the population on the Y-axis has a lower score than the population on the X-axis.

4.1.2 Census Metropolitan Area Designation

Between the different CMA designations there is little difference between Non-CMA regions (the most rural in this study) and Other CMA regions. There is however, a high variance in means (Table 4) between the three largest CMA regions, suggesting a difference in accessibility and participation (or in contrast, a reflection of values) between the metropolitan cities. For example, Toronto has a higher mean for the overall index of behaviours compared to Montréal's mean of 4.1. The relationship is weak between the index and this variable, only 0.067 per Cramer's V ($p = <0.001$).

Table 4. *Means of Indexes by CMA Designation*

	Mean				
Index	Non-CMA (N = 6509)	Other CMAs (N = 7568)	Vancouver (N = 1589)	Montreal (N = 2744)	Toronto (N = 3938)
Index of Behaviours Indicative of Eco-Citizenship	4.4	4.5	4.4	4.1	4.5
Index of Daily Green Behaviours	2.4	2.4	2.4	2.6	2.4
Index of Sustainable Household Behaviours	2.1	1.3	2.0	1.5	2.1

Between our two dimensions, we see similar differences as we did in region of residence. Namely, higher means in all CMA categories for Daily Green Behaviours versus Sustainable Household Behaviours – a difference that is especially pronounced when looking at Montréal and other CMA regions. The activities included on the sustainable household behaviours sub-dimensional index appear to be less accessible in smaller metropolitan areas and Montréal. The relationship between CMA designation and these two dimensions is weak with Cramer's V = 0.054 for Daily Green Behaviours and 0.095 for Sustainable Behaviours.

Games-Howell ANOVA Post Hoc tests, shown in Table 5, revealed that there are significant mean differences between the different urban and rural designations. Furthermore, some of these differences vary between the sub-dimensional indexes. In the overall index, Non-CMA, Vancouver and other CMA regions all had statistically significant positive mean differences compared to Montreal. For Montreal, there were statistically significant mean differences less than the Toronto region. For the Daily Green Behaviours sub-dimension, Non-CMA regions

have a statistically significant lower mean difference compared to Other CMA regions and Montreal. This same finding is found for Other CMA regions and Vancouver compared to Montreal. Montreal itself, in contrast to the overall index, has significantly higher mean differences compared to the Toronto region for this sub-dimension. For the Sustainable Household Behaviours, Non-CMA regions have significantly higher mean differences compared to Other CMA regions, Vancouver, and Toronto – which contrasts with the overall index's results. In addition, other CMA regions and Vancouver have significantly lower mean differences compared to Toronto for this sub-dimension.

Table 5. *Games-Howell ANOVA Post Hoc Tests for Indexes by CMA Designation*

	Index of Behaviours Indicative of Eco-Citizenship				Daily Green Behaviours				Sustainable Household Behaviours			
Sub-populations	Other CMA	Vancouver	Montreal	Toronto	Other CMA	Vancouver	Montreal	Toronto	Other CMA	Vancouver	Montreal	Toronto
Non-CMA	NS	NS	+++	NS	---	NS	---	NS	++	+	+++	+
Other CMAs		NS	+++	NS		NS	---	NS		NS	+++	---
Vancouver			+++	NS			---	NS			+++	---
Montreal				---				+++				---

Note. Significance: +++ or --- $p \leq 0.001$; ++ or -- $p \leq 0.01$; + or - $p \leq 0.05$; NS: non-significant difference

+ Indicates a statistically significant negative difference where the population on the Y-axis has a greater score than the population on the X-axis.

- Indicates a statistically significant negative difference where the population on the Y-axis has a lower score than the population on the X-axis.

4.1.3 Household Language

Table 6. *Means of Indexes by Language*

Index	Mean	
	English (N = 16560)	French (N = 5154)
Index of Behaviours Indicative of Eco-Citizenship	4.6	4.2
Index of Daily Green Behaviours	2.5	2.6
Index of Sustainable Household Behaviours	2.1	1.6

The differences between respondents who spoke English versus those who spoke French were very minor, with those speaking French having a slightly lower mean in the overall index (Table 6). For example, only 1.8% of French respondents reported all eight actions compared to 4.1% of English respondents. This is similar to the means that were observed for the Quebec region, and may be linked to the fact that the majority of the French respondents likely live in Quebec. A weak relationship is once again reported between the index and language, with a Cramer's V of 0.121 ($p = <0.001$). Regarding Daily Green Behaviours, French respondents are observed to have a higher mean compared to English respondents. The relationship here though is almost non-existent (Cramer's $V = 0.074$, $p = <0.001$). The opposite is true for Sustainable Household Behaviours where we observe a lower mean for French households compared to English households. A percentage of 3.2% of households reported all four behaviours for French compared to 10.2% for English households. The relationship between this dimension and language is stronger than the overall and daily green behaviours index, with a Cramer's V value of 0.205 ($p = <0.001$). In addition, an analysis of variance test revealed that there was a significant difference between English and French for the overall index and both sub-dimensions. These differences were observed to be both in the same direction, however the variance for the sustainable household behaviours index was much greater than that of the daily green behaviours.

4.1.4 Household Education

Between the different levels of highest level of education for a household member (thereafter called household education), we can see a stepwise gradient increase in the means for all indexes (Table 7) going from the least to the most educated households. For these higher educated households, we see 4.8% of them engaging in all eight of the indexed behaviours

compared to 0.8% for those households with less than high school education. In addition, we see 5.9% of these lower educated households engaged in none of the behaviours compared to only 1.9% for the highest educated households. The relationship between the index and education is stronger than any variables discussed thus far, but still only weak-moderate with a Gamma of 0.250 (p = <0.001).

Table 7. *Means of Indexes by Household Education*

Index	Mean			
	Less than high school (N = 1583)	High school graduate (N = 3319)	Some postsecondary (N = 6159)	University graduate (N = 11021)
Index of Behaviours Indicative of Eco-Citizenship	3.2	3.9	4.4	4.8
Index of Daily Green Behaviours	1.7	2.2	2.4	2.6
Index of Sustainable Household Behaviours	1.5	1.7	1.9	2.2

Between our sub-dimension indexes, the same shift between lower and higher levels of education is observed. We do see the same trend as we have seen throughout, however, in that there is lower high-scoring participation for Sustainable Household Behaviours. For Daily Green Behaviours, we have a similar strength for the Gamma relationship of 0.228 (p = <0.001). For Sustainable Household Behaviours, we see a Gamma of 0.220 (p = <0.001). Games-Howell ANOVA Post Hoc tests (Table 8) were conducted to determine statistically significant mean differences between the different educational levels and shown in Table 8. In all cases, there is a stepwise gradient whereby each education sub-population has a significant mean difference greater than the previous sub-population.

Table 8. *Games-Howell ANOVA Post Hoc Tests for Indexes by Household Highest Education*

Sub-population	Index								
	Index of Behaviours Indicative of Eco-Citizenship			Daily Green Behaviours			Sustainable Household Behaviours		
	HS	SPS	UG	HS	SPS	UG	HS	SPS	UG
Less than High School	---	---	---	---	---	---	---	---	---
High School		---	---		---	---		---	---

Graduate			
Some Post-Secondary	---	---	---

Note. Significance: +++ or --- $p \leq 0.001$; ++ or -- $p \leq 0.01$; + or - $p \leq 0.05$; NS: non-significant difference

+ Indicates a statistically significant negative difference where the population on the Y-axis has a greater score than the population on the X-axis.

- Indicates a statistically significant negative difference where the population on the Y-axis has a lower score than the population on the X-axis.

4.1.5 Household Income

Table 9. *Means of Indexes by Household Income*

	Mean			
Index	$20,000 or less, including loss (N = 1490)	More than $20,000 to $60,000 (N = 6471)	More than $60,000 to $100,000 (N = 4900)	More than $100,000 (N = 5791)
Index of Behaviours Indicative of Eco-Citizenship	3.8	4.5	5.0	5.2
Index of Daily Green Behaviours	2.1	2.4	2.7	2.8
Index of Sustainable Household Behaviours	1.7	2.1	2.3	2.5

Income has a similar effect on the index as education, with a stepwise gradient that shows the means for all indexes (Table 9) increasing as income increases. However, the relationship between income and the index is weaker compared to education, with a Gamma of only 0.195. Both sub-dimensional indexes see a similar trend, with a Sustainable Household Behaviours having a Gamma relationship of 0.220 and Daily Green Behaviours only a 0.120. All results are significant with a p of less than 0.001. Games-Howell ANOVA Post Hoc tests (Table 10) also revealed significant mean differences similar to household education. Specifically, that regardless of index, an income group had statistically significant lower mean than those households with higher income levels.

Table 10. *Games-Howell ANOVA Post Hoc Tests for Indexes by Household Income*

	Index								
	Index of Behaviours Indicative of Eco-Citizenship			Daily Green Behaviours			Sustainable Household Behaviours		
Sub-population	(2)	(3)	(4)*	(2)	(3)	(4)	(2)	(3)	(4)
(1) $20,000 or less, including loss	---	---	---	---	---	---	---	---	---
(2) $20,000 to less than $60,000		---	---		---	---		---	---
(3) $60,000 to less than $100,000			---			---			---

Note. Significance: +++ or --- $p \leq 0.001$; ++ or -- $p \leq 0.01$; + or - $p \leq 0.05$; NS: non-significant difference

+ Indicates a statistically significant negative difference where the population on the Y-axis has a greater score than the population on the X-axis.

- Indicates a statistically significant negative difference where the population on the Y-axis has a lower score than the population on the X-axis.

* $100,000 or more.

4.1.6 Household Size and Composition

Table 11. *Means of Indexes by Household Size and Composition*

	Mean					
Index	One person (N = 5777)	Two people (N = 7820)	Three people (N = 3438)	Four people (N = 3225)	Five people (N = 1339)	Six people or more (N = 771)
Index of Behaviours Indicative of Eco-Citizenship	3.8	4.5	4.5	4.8	5.0	4.7
Index of Daily Green Behaviours	2.2	2.5	2.5	2.6	2.6	2.4
Index of Sustainable Household Behaviours	1.6	2.1	2.0	2.3	2.4	2.2
	Households with only members 19 – 64 (N = 7363)	Households with only members 65+ (N = 3925)	Households with children 0 – 18 (N = 7014)	Other compositions (N = 4062)		
Index of Behaviours Indicative of Eco-Citizenship	4.2	4.0	4.7	4.6		
Index of Daily Green Behaviours	2.4	2.1	2.6	2.5		
Index of Sustainable Household Behaviours	1.8	1.8	2.1	2.1		

The mean for households (Table 11) with only one occupant is 3.8, as you increase the number of occupants in the household the means increase as well, with a mean of 5.0 for five occupants. This indicates that there is a rather positive relationship between household size, though weak, confirmed with a Gamma value of 0.195 ($p = <0.001$). This same relationship is seen in the sub-dimensional indexes, with five people in the household having the highest mean scores on the indexes. Games-Howell Post Hoc ANOVA tests (Table 12) revealed that when increasing the number of people in the household, regardless of overall index or sub-dimension, there were statistically significant lower mean for households with fewer individuals. These results were significant in almost all cases, with only some instances (notably comparisons between four, five, and six or more person households) being insignificantly different. Between the different compositions of households, a weak relationship is seen (Cramer's $V = 0.098$). Households with children have the highest mean score and this is true for all sub-dimensional

indexes as well. Games-Howell Post Hoc ANOVA tests (Table 13) revealed that there are varying significant mean differences between certain household compositions – specifically those with children and only adults. Within the sub-dimensional indexes, some mean differences were no longer significant.

Table 12. *Games-Howell ANOVA Post Hoc Tests for Indexes by Household Size*

	Index														
	Index of Behaviours Indicative of Eco-Citizenship					Daily Green Behaviours					Sustainable Household Behaviours				
Sub-populations	2	3	4	5	6+	2	3	4	5	6+	2	3	4	5	6+
One Person	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Two People		NS	---	---	NS		NS	---	---	NS		NS	---	---	---
Three People			---	---	NS			NS	-	NS			---	---	---
Four People				NS	NS				NS	NS				NS	NS
Five People					--					--					NS

Table 13. *Games-Howell ANOVA Post Hoc Tests for Indexes by Household Composition*

	Index								
	Index of Behaviours Indicative of Eco-Citizenship			Daily Green Behaviours			Sustainable Household Behaviours		
Sub-populations	65+	0 - 18	Other	65+	0 - 18	Other	65+	0 - 18	Other
Households with only members 19 - 64	+++	---	---	+++	---	NS	NS	---	---
Households with only members 65+	NA	---	---	NA	---	---	NA	---	---
Households with children 0 - 18	NA	NA	NS	NA	NA	++	NA	NA	NS

Note. Significance: +++ or **---** $p \leq 0.001$; ++ or **--** $p \leq 0.01$; + or **-** $p \leq 0.05$; NS: non-significant difference

+ Indicates a statistically significant negative difference where the population on the Y-axis has a greater score than the population on the X-axis.

- Indicates a statistically significant negative difference where the population on the Y-axis has a lower score than the population on the X-axis.

4.1.7 Type of Dwelling

Table 14. *Means of Indexes by Type of Dwelling*

Index	Mean	
	Detached home (N = 16021)	Low- and High-rise apartments (N = 5156)
Index of Behaviours Indicative of Eco-Citizenship	4.7	3.6
Index of Daily Green Behaviours	2.5	2.3
Index of Sustainable Household Behaviours	2.2	1.3

Significant mean differences are observed between the two types of dwellings (Table 14). For those detached homes, there is a high mean of 4.7 for the overall index indicating a greater prevalence of higher scores. For example, 4.4% of households in detached homes respond to participating in all eight behaviours. This is in comparison to apartments where only 0.8% of respondents claimed to be participating in all eight behaviours. Overall, the mean for apartments was 3.6. The relationship between the index and the type of dwelling however is a 0.252 per Cramer's V ($p = <0.001$).

For the Daily Green Behaviours, there is little difference between the two types of dwellings, suggesting accessibility to these activities regardless of dwelling type. However, for the Sustainable Household Behaviours there is a clear difference in accessibility between the two types of dwellings. Mean scores for detached homes for this sub-dimension is 2.2 compared to apartments with a mean of 1.3. In both low- and high-rise apartments only 1.7% of households are participating in all 4 behaviours, this is compared to detached homes where 10.6% of households participate in all four. For the Daily Green Behaviours index, there is a Cramer's V value of 0.064 ($p = <0.001$) and for the Sustainable Household Behaviours a value of Cramer's V of 0.343 ($p = <0.001$). An analysis of variance test indicated statistically significant mean differences between the two types of dwellings, for both the overall index and the sub-dimensional indexes.

4.2 Multivariate Regression Analyses

Multivariate regression analyses were run to assess the effect of all of our independent variables, while controlling for the others, on both the overall index and two sub-dimensional indexes. Due to the nature of the index itself, several regression analyses were run. For the overall index, both a logistic and linear regression analysis was run. A linear regression was run under the notion that even though the index has a discrete number of possible scores, they were numerous enough to consider the index as an interval-ratio variable. However, the same could not be theoretically done for the sub-dimensional indexes with a max score of only four. In this way, the Daily Green Behaviours and Sustainable Household Behaviours indexes were re-coded to a binomial variable based on the median of the two (the median scores were three and two respectively) and logistic regressions were run for these two indexes. For Daily Green Behaviours, the recoded values were zero for all scores three and below and one for all scores above three. For Sustainable Household Behaviours, the recoded values were zero for values two and below and one for values above two. A logistic regression was also run for the overall index, again splitting the index in half based on the median of five with all values five and below being coded as zero and all values above five being coded as one, for comparative purposes.

4.2.1 Regression Analyses of Overall Index

For the linear regression, dummy variables were created for all independent variables. References were chosen as appropriate for ordinal variables, typically as the "last" category. For nominal variables such as region of residence, the reference is indicated clearly in the table below. Ontario was chosen as the reference category for region of residence due to its similarity to the overall national index. Enter method was used for the linear regression and the model explained 15% of the total variance (R square = 0.149).

Table 15. *Linear Regression with predictors of Index of Behaviours Indicative of Eco-Citizenship*

Variable	Population	B Values	Significance
(Constant)		3.888	0.000
Region of residence	Ontario*	---	---
	Quebec	-0.469	0.000
	British Columbia	-0.056	0.342
	Prairie Region	-0.696	0.000
	Atlantic Region	-0.404	0.000
CMA Designation	Non-CMA*	---	---

	Other CMAs	-0.039	0.228
	Vancouver	-0.055	0.443
	Montreal	-0.109	0.031
	Toronto	-0.085	0.074
Education	Less than high school*	---	---
	High school graduate	0.352	0.000
	Some Post-secondary	0.591	0.000
	University graduate	0.913	0.000
Income	$20,000 or less, including loss*	---	---
	More than $20,000 to $60,000	0.237	0.000
	More than $60,000 to $100,000	0.342	0.000
	More than $100,000	0.538	0.000
Language	English*	---	---
	French	0.039	0.580
Household Composition	Households with 19 – 64 only*	---	---
	Households with 65+ only	0.064	0.100
	Households with 0 – 18	-0.101	0.070
	Other Compositions	-0.052	0.263
Households Size	One Person*	---	---
	Two People	0.307	0.000
	Three People	0.246	0.000
	Four People	0.373	0.000
	Five People	0.501	0.000
	Six or more people	0.689	0.000
Type of Dwelling	Detached Home*	---	---
	Low- and High-rise Apartment	-0.746	0.000

Note. * Indicates reference category for dummy variables.

When taking all variables into consideration, the linear regression (Table 15) shows similar relationships, but still different, compared to our bivariate analyses. For example, while our post hoc tests showed that Vancouver, Other CMAs and Non-CMA regions all had significant mean differences greater than Montreal, our linear regression shows that this is only still significant for Montreal and Non-CMA regions (and only with significance less than 0.05). There is no longer a significant difference or effect between English and French households when controlling for all other variables – indicating that this is not a significant factor in comparison to those with higher impacts on the dependent variable – likely due to the fact that

region of residence is taken into account. Region of residence likely has a more significant impact on the number of behaviours a household participates in compared to language – in addition, the majority of the francophone population lives in Quebec. Education, Income, and Household Size show similar results to the bivariate analyses, indicating that as both increase there is a greater positive effect on the overall index. The variability between household compositions remains, but is no longer a significant factor and some compositions that previously had a negative or positive impact now show the opposite – such as with households with children. This is especially apparent for households with children and "other" compositions, which were significantly different in the bivariate analyses and showed high mean differences compared to households with only members 19 – 64, this effect is no longer significant within our multivariate analysis. Finally, the significant difference between type of dwelling is shown consistent with bivariate analyses, showing a strong negative effect for those living in low- or high-rise apartments.

To make comparisons between the overall index and the sub-dimensional indexes, a logistic regression was also run for the overall index. The index was recoded into a binary variable, splitting the scores by the median, a value of five. Enter method was used to remain consistent with the linear results. Cox and Snell R Square was calculated as 9.7%; Nagelkerke R Square at 13.4%. While binary logistic regression analyses are not as precise as linear regressions, the sub-dimensional indexes have too few scores to be properly analyzed through a linear regression. In future research, a different operationalization with more robust data may yield indexes that can all be analyzed and compared through linear regressions. For the most part, the effects and their significance of the different variables remains the same as the linear regression analysis and can be seen in Table 16.

Table 16. *Logistic Regression with predictors of Index of Behaviours Indicative of Eco-Citizenship*

Variable	Population	Odds Ratios	Significance
(Constant)		0.258	0.000
Region of residence	Ontario*	---	---
	Quebec	0.721	0.004
	British Columbia	0.938	0.406
	Prairie Region	0.468	0.000
	Atlantic Region	0.652	0.000
CMA Designation	Non-CMA*	---	---

	Other CMAs	0.998	0.967
	Vancouver	1.082	0.406
	Montreal	0.761	0.000
	Toronto	0.952	0.443
Education	Less than high school*	---	---
	High school graduate	1.629	0.000
	Some Post-secondary	1.954	0.000
	University graduate	2.724	0.000
Income	$20,000 or less, including loss*	---	---
	More than $20,000 to $60,000	1.097	0.258
	More than $60,000 to $100,000	1.191	0.042
	More than $100,000	1.553	0.000
Language	English*	---	---
	French	0.838	0.083
Household Composition	Households with 19 – 64 only*	---	---
	Households with 65+ only	0.974	0.652
	Households with 0 – 18	0.871	0.074
	Other Compositions	1.010	0.872
Households Size	One Person*	---	---
	Two People	1.229	0.000
	Three People	1.037	0.682
	Four People	1.420	0.000
	Five People	1.401	0.002
	Six or more people	2.185	0.000
Type of Dwelling	Detached Home*	---	---
	Low- and High-rise Apartment	0.379	0.000

Note. * Indicates the reference sub-population.

4.2.2 Regression Analyses of Daily Green Behaviours

Due to the nature of the sub-dimensional indexes, a logistic regression was run to analyze the effects of our independent variables while controlling for each of their individual effects. The index was split into a binary variable based on the median, a value of three. Enter method was used and Cox and Snell R Square resulted in 3.0%; Nagelkerke R Square in 4.5% - significantly less than the linear regression. Of notable difference between this logistic regression and that of the overall index are differences in effects and significance. There is no longer a significant effect for Quebec compared to Ontario despite there being a significant mean difference when they were compared in the bivariate analysis. For the lower income populations, effects are now

significant compared to the overall index indicating that income is a more significant factor for this typology of activities included in the sub-dimension. Effects from household size are no longer significant except for households with six or more people. Finally, the strong effect from living in an apartment is no longer significant for daily green behaviours. Overall, this loss of significance indicates that daily green behaviours are more accessible for these populations when considered alone, compared to alongside the sustainable housing behaviours in the overall index. The remaining effects are consistent with the logistic regression of the overall index and are shown in table 17.

Table 17. *Logistic Regression with predictors of Index of Daily Green Behaviours*

Variable	Population	Odds Ratios	Significance
(Constant)		0.092	0.000
Region of residence	Ontario*	---	---
	Quebec	1.037	0.760
	British Columbia	1.190	0.039
	Prairie Region	0.710	0.000
	Atlantic Region	0.602	0.000
CMA Designation	Non-CMA*	---	---
	Other CMAs	1.107	0.042
	Vancouver	1.063	0.541
	Montreal	1.023	0.768
	Toronto	0.862	0.039
Education	Less than high school*	---	---
	High school graduate	1.559	0.000
	Some Post-secondary	1.971	0.000
	University graduate	2.799	0.000
Income	$20,000 or less, including loss*	---	---
	More than $20,000 to $60,000	1.329	0.000
	More than $60,000 to $100,000	1.431	0.000
	More than $100,000	1.569	0.000
Language	English*	---	---
	French	0.985	0.888
Household Composition	Households with 19 – 64 only*	---	---
	Households with 65+ only	0.860	0.017
	Households with 0 – 18	1.002	0.982
	Other Compositions	1.026	0.708

Households Size	One Person*	---	---
	Two People	1.082	0.180
	Three People	1.120	0.241
	Four People	1.088	0.418
	Five People	1.166	0.195
	Six or more people	1.318	0.040
Type of Dwelling	Detached Home*	---	---
	Low- and High-rise Apartment	0.990	0.838

Note. * Indicates the reference sub-population.

4.2.3 Regression Analyses of Sustainable Household Behaviours

Due to the nature of the sub-dimensional indexes, a logistic regression was run to analyze the effects of our independent variables while controlling for each of their individual effects. The index was split into a binomial variable based on the median, a value of two. Enter method was used and Cox and Snell R Square resulted in 15.5%; Nagelkerke R Square in 21.2%. Of notable difference between this logistic regression and that of the overall index are differences in effects and significance. When compared to the logistic regression of daily green behaviours there are notable differences in the odds ratios between the two indexes, though significance is roughly comparable. Regional, rural and urban, income, and household size odds ratios are roughly comparable between the two indexes. This would indicate that, when taking into consideration all variables, accessibility and ability to participate in the different activities between the sub-dimensional indexes is roughly the same. For education, the odds ratios are lower compared to their values in the regression analysis for the daily green behaviours, indicating that education has a diminished effect on sustainable household behaviours compared to daily green behaviours. In addition, the sustainable household behaviours analysis shows less significant results compared to the daily green behaviours. The impact remains similar between the two sub-dimensional indexes despite this. For language, the odds ratio for the sustainable household behaviours is 0.580 compared to 0.985 in the daily green behaviours analysis indicating a stronger effect – that language is a more important factor in whether a household would participate in activities deemed as sustainable household behaviours. This same result is seen for type of dwelling, with an odds ratio of 0.218 in the sustainable household behaviours analysis compared to 0.990 in the daily green behaviours analysis. Full results shown in Table 18.

Table 18. *Logistic Regression with predictors of Index of Sustainable Household Behaviours*

Variable	Population	Odds Ratios	Significance

(Constant)		0.507	0.000
Region of residence	Ontario*	---	---
	Quebec	0.666	0.001
	British Columbia	0.961	0.608
	Prairie Region	0.513	0.000
	Atlantic Region	0.761	0.000
CMA Designation	Non-CMA*	---	---
	Other CMAs	0.897	0.014
	Vancouver	0.899	0.265
	Montreal	0.485	0.000
	Toronto	0.961	0.536
Education	Less than high school*	---	---
	High school graduate	1.276	0.016
	Some Post-secondary	1.380	0.001
	University graduate	1.785	0.000
Income	$20,000 or less, including loss*	---	---
	More than $20,000 to $60,000	1.077	0.363
	More than $60,000 to $100,000	1.256	0.000
	More than $100,000	1.552	0.000
Language	English*	---	---
	French	0.580	0.000
Household Composition	Households with 19 – 64 only*	---	---
	Households with 65+ only	1.272	0.000
	Households with 0 – 18	0.828	0.015
	Other Compositions	1.014	0.826
Households Size	One Person*	---	---
	Two People	1.279	0.000
	Three People	1.115	0.227
	Four People	1.619	0.000
	Five People	1.653	0.000
	Six or more people	2.410	0.000
Type of Dwelling	Detached Home*	---	---
	Low- and High-rise Apartment	0.218	0.000

Note. * Indicates the reference sub-population.

4.3 Summary of Results

Presented within this thesis is the creation and analysis of three indexes related to behaviours theoretically associated with ecological citizenship. The first, is an overall index that

takes into consideration eight varying household behaviours. The second is a sub-dimension of this index and relates to behaviours deemed more accessible in the daily lives of household members. The third is a sub-dimension of the overall index and relates to larger, sustainable related household behaviours.

These indexes were analyses through cross-tabulations between eight independent variables covering various demographic characteristics of the households. Analyses were run to test for significant mean differences between the different sub-population groups as well as measures of association to indicate strength of any relationships. In addition, several multivariate linear and logistic analyses were run to identify the effects on each index when taking all independent variables into consideration. This included a linear and logistic regression analysis for the overall index. The two sub-dimensional indexes each had a logistic regression analysis. The results of the multivariate analyses revealed the most comprehensive results within this thesis and will be summarized by independent variable and sub-population group.

Region of residence proved variable, dependent on the type of activities captured between the indexes. Within the overall index: Québec, the Prairies, and the Atlantic region all had significantly less scores on the index compared to British Columbia and Ontario. No significant difference exists between Ontario and British Columbia, when all other variables are taken into consideration. Within the Daily Green Behaviours index, British Columbia had greater scores than Ontario while the Prairie and Atlantic regions had lower scores than Ontario. For Sustainable Household Behaviours, Québec, the Prairies, and the Atlantic region had lower scores than Ontario and British Columbia, similar to the overall index.

Rural and urban differences – represented by CMA designation – showed that Montreal had significantly lower scores than Non-CMA regions. On the Daily Green Behaviours index, Other CMAs had greater scores than Non-CMAs while Toronto had scores that were lower than Other CMAs. Sustainable Household Behaviours has observed significant differences with Montreal and Other CMA regions being less than Non-CMAs.

Both Education and Income had observed significant effects in the form of a step-wise, positive gradient. This resulted in household scores being greater for those with higher income and higher education in the household. This effect was seen across all indexes, for both income and education. For the Overall Index and the Sustainable Household Behaviours index, no significant differences were found between the two lowest income sub-populations.

When all independent variables were taken into consideration, there were no significant effects due to language for both the overall index and the daily green behaviours index. This is in contrast to the bivariate analyses where significant differences were observed between French and English sub-populations. In addition, French speaking households do have a significant difference that results in lower scores on the Sustainable Household Behaviours index.

Household composition did not have a significant effect on the overall index. However, for Daily Green Behaviours, households with only those aged 65 and over had observed scores lower than households with only those aged 18 to 64. For household size, the effect was relatively positive as the number of individuals living in the household increased for both the Overall Index and the Sustainable Household Behaviours index. For the Daily Green Behaviours index, only households with six or more people had a significant effect on index scores, with expected scores greater than households with only one person. Type of dwelling had an observed significant difference between apartments and detached homes: for the Overall Index and the Sustainable Household Behaviours index apartments were significantly lower. However, for the Daily Green Behaviours index, there was no significant effect.

With the most comprehensive aspect of this thesis' analysis summarized, it will now move into the discussion to explore the potential impact of the results presented here. Independent variables will be grouped together into three related categories: geography, socio-economic characteristics, and household demographics.

Chapter 5: Discussion

5.1 "Ecological Citizenship" in Canada

Before entering the discussion on the results outlined above, it's important to take a look back at the original goal of this project: to index behaviours associated with ecological citizenship in the Canadian household population. While this project acknowledges that ecological citizenship can take on many different forms, the index above is more than likely a fragment of the whole. A discussion is still necessary on the impact and interpretations of the results presented in the previous chapter. In doing so, an argument could be made on the efficacy of an index such as this to examine a very specific aspect of household behaviours potentially associated with ecological citizenship.

5.1.1 Variability Due to Geography

As it was noted extensively in our literature review and exploration of ecological citizenship, due to the effects of globalization the effects of climate change are distributed asymmetrically across different populations. The results shown in this thesis also indicate that pro-environmental behaviour participation is also distributed asymmetrically. This is seen at the provincial level, with different distributions across the eight levels in each province and region, and at the urban and rural level. While these results are not surprising, many programs aimed at waste management and other sustainable practices are operated at the local level and therefore should be an area of interest for research such as this.

A challenge to the integration of standardized environmental education for all Canadians exists as education is typically a provincial concern as well. Investigations into the curriculum on climate change in Canada has revealed that it is not as developed and standardized as it could be (McSheffrey 2016). Standardizing environmental education across regions, provinces, and Canada as a whole would likely face many systemic and institutional barriers – some of which may account for the asymmetrical distribution seen in the index.

Provinces, such as British Columbia, had an observed distribution with greater scores compared to other provinces on sub-dimension 1, but not sub-dimension 2. This is compared to a province such as Québec, which had an observed distribution with significantly lower means. Cultural differences, and in some cases language differences, could be potential impacts for index scores. When all variables are taken into considerate in multivariate analyses, Ontario and British Columbia were significantly more likely to have higher scores on two of the three

indexes. The effects of these differences were also quite strong – with certain regions having odds ratios much lower compared to the effects of other variables. This indicates that region of residence is a significant factor when looking at the number of pro-environmental behaviours a household may engage in.

Differences such as these could be cultural in nature – British Columbia is a province with a higher connection to nature and one of the smaller major urban centres in Canada. However, it could easily be an issue of accessibility as well. Provinces in the Prairie and Atlantic regions, which consistently had significantly lower scores compared to other regions, potentially have fewer programs and services. This could be due to an allocation of resources resulting in less funding for environmental programs in smaller provinces, or alternatively, inaccessibility due to more rural and less urban environments.

On the issue of differences between urban and rural environments, Montreal and Toronto – the two cities with the highest populations in Canada – had significantly lower scores than other CMAs when all other variables were taken into consideration. This was observed for Montreal on both the overall index and Sustainable Household Behaviours while Toronto was significantly lower than Non-CMA regions on the Daily Green Behaviours index. The effects of CMA were less severe compared to region of residence, except for certain urban centres such as Montreal and Toronto. This indicates that the effect is not great between the different non-urban centres, but dependent on the type of behaviours, where you live can make a significant difference in the likelihood of a household engaging in certain behaviours.

Alongside having the highest populations in Canada, these two cities are also the most urban, which may result in a decreased connection to nature for households or an inaccessibility to programs and behaviours such as composting. In addition, these cities likely have a higher proportion of renters compared to owners – a variable that could not be examined within this study. Smaller, less urban cities – likely with more green spaces and more geographic space to provide for certain programs – was observed to be significantly likely to have higher scores compared to the more urban regions. This again could be the cause of both inaccessibility issues or due to cultural mindsets of households in large urban centres.

Between the three most urban cities in Canada, there is a high amount of variance that could speak to cultural differences as well. In addition to the issue of cultural differences that may result in an asymmetrical distribution of participation across the country, there is the issue

of access to programs and services in a household's preferred language. Except when observing the second sub-dimension, cultural differences based on language were no longer significant when considered alongside all other variables in multivariate analyses. Language only had a significant effect in the Sustainable Household Behaviours index, and a fairly strong effect was observed.

As these regions differ culturally, they also differ in the availability of programs and education that could potentially encourage and allow individuals to participate in pro-environmental behaviours. Upon initial inspection, Ontario and Toronto appear to be exemplary in terms of the prevalence of higher scoring household. To think critically of this, however, would be to acknowledge the fact that Ontario is the centre of political activity for Canada, and a region that has a large influx of federal funds and government programs. It is no surprise then, since many of the behaviours on the index rely on the availability of a government created program, that Ontario and Toronto appear to be much more 'greener' than the rest of Canada. In addition, certain provinces are no longer significantly different than Ontario (as is the case for British Columbia) once all variables are taken into consideration.

Taking into consideration the two sub-dimensional indexes explored in this project, there is a great difference between green behaviours that can be carried out on a daily basis (bringing your own bags to the grocery store, for example) compared to the sustainable household behaviours presented (such as composting kitchen waste). Accessibility to some of these programs can be quite difficult for some areas, as evidenced by some regions being significantly different on one index compared to another.

For example, activities on the Sustainable Household Behaviours index seem to be less accessible for Québec. This finding is evidenced at the regional with Québec being less likely to score higher or equal to Ontario. In addition, Montréal and French households are observed with similar findings on this index compared to the Daily Green Behaviours index where there is no significant difference between Ontario, Non-CMA regions, and English households. All of this is to say that there is a difference between the factors analyzed in this thesis between the two sub-dimensions. This indicates that within Canada, certain activities are difficult or easier to access for certain populations compared to others. In addition, that there was merit in analyzing these sub-dimensions separately.

All of this is to say that it is important to take into consideration that accessibility and participation is asymmetrically distributed among geographic regions in ways similar as environmental impacts. In addition to this, many of the ways in which we could make a more sustainable and positive impact rely on accessibility to programs, equipment, and other resources that may not be available in certain regions. In the case of region of residence, this was observed to be a significant factor, even in consideration of all independent variables included in this study. Furthermore, cultural differences that exist within countries and regions can make the translation of certain activities difficult. In the case of Canada, cultural differences appear to have an effect on a certain typology of activities, with a preference towards regions of Canada that are English-majority speaking.

While the goal should not be to standardize one system across a whole country, efforts could be made to make sure that environmentally friendly programs are accessible to as many populations as possible. One way of doing this, which will be expanded on towards the conclusion of this thesis, would be to engage with policymakers at all levels of government to attempt to meet the needs of each individual population, with support provided from all levels of government. The goal here is to be able to provide the opportunity for Canadians to be able to engage in sustainable behaviours by providing accessibility regardless of geography region of residence, urban and rural location, or linguistic differences.

5.1.2 Socio-Economic Restraints on Participation

As it was established in our literature that examined pro-environmental behaviours participation in Canada and the environment values-beliefs gap (EVB), individuals often feel that they do not have the economic resources or the knowledge required to live sustainably. Our results reflect this reality, though the association is weak in our bivariate analyses, the multivariate analyses reveal that income and education are significant factors. In addition, income and education represented the most systematic impact, even on both sub-dimensions. As the level of education within the household increased, or the overall household income, it is observed that the score of the household will increase as well. These results indicate that economic resources can limit or allow for higher rates of participation across all the activities captured in this research.

It is important to consider however that even if some activities such as visiting a greenspace may be freely accessible, cost wise, these spaces may be asymmetrically distributed

in a way that favours regions with a higher average income. Results such as this indicate that even more theoretically accessible activities (such as purchasing organic or locally grown produce) are still inaccessible either due to more economical stores not offering these options or due to the inherent costs in what may be considered a luxury purchase. It is also likely that based on the typology of behaviours, that income and education may have a weaker or stronger effect.

To examine a different set of behaviours, namely Daily Green Behaviours, the effect of education on the household's score is much greater than it is for Sustainable Household Behaviours. This suggests that education is a more important factor for this typology of activities. The activities included on the Daily Green Behaviours index seem to be greatly influenced by education, even though they are more accessible in nature compared to Sustainable Household Behaviours. Income, on the other hand, does not see large differences between its impact on the two sub-dimensional scores.

The large disparity between the richest and poorest Canadians points out a systemic issue that exists within our society. Perhaps green products and a sustainable lifestyle are viewed as a luxury, and therefore priced this way, or the demand is not yet great enough to warrant competitive and appropriate market practices that would lower the costs of many of these actions. Education is still vitally important not just to inform individuals on how to live more sustainably, to motivate citizens to understand the impact of their actions to encourage behaviour. Previous literature referenced in this thesis has pointed to individuals often asking 'why' they should carry out these behaviours, which greater education may be able to influence.

It is important to acknowledge that education and income are linked intrinsically, those with the lowest education may want to live sustainably and possess the necessary knowledge, but may not have the financial resources to do so. Overall, income and education represent the most systematic impacts on the number of behaviours that a household may be engaging in. In addition, this is true regardless of the dimension you are observing. Finally, that this effect is even stronger when looking at certain typologies of behaviours.

5.1.3 Household Demographics

Critical for many of the activities presented in this index is the physical space and accessibility to appropriate resources. For example, while not entirely impossible, it is much more difficult to garden or compost without a yard. With approximately 12.1% of Canadians living in condominium dwellings (low- or high-rise), this creates a problem for over a tenth of

our population (Statistics Canada 2016). Within the results presented in this thesis, the type of dwelling has a substantial impact on a household's index score. For the overall index, it represented the greatest impact. In addition, it was observed to be a negative impact for those living in low- and high-rise apartments compared to those in detached homes.

Furthermore, there are stark differences between the sustainable household behaviours index and the daily green behaviours index. For the Daily Green Behaviours index, there is no significant difference between those in apartments compared to those in detached homes. This indicates that these behaviours are potentially accessible regardless of type of dwelling. However, for the Sustainable Household Behaviours, the negative impact of living in an apartment on a household's score is even greater than in the overall index. This is theoretically because of the higher prevalence of renters living in apartments who are unable to make sustainable renovations to their home or engage in activities that require yard space such as gardening or composting.

Based on these findings, efforts need to be made to either increase accessibility to these kinds of activities for those living in urban, mainly low- or high-rise apartment areas. Regarding composting, this is a municipal responsibility and composting pick-up programs have been growing in areas all over the country, though mainly in more rural and suburban areas. However, some programs are being developed with urban dwellers in mind. For example, combinations of both public- and privately-operated curbside pickup and community drop boxes are being utilized across the city of Montreal (Ville de Montréal 2016; Compost Montréal 2016). Renovations for homes, while often subsidized for home owners, could be organized in a way that includes low- and high-rise apartments with programs that target building owners and tenants.

Household composition is also observed to have an effect on the ability to participate in certain levels of activities. The results presented in this thesis show that as the number of people in the household increases, the more likely it is that the household will participate in a higher number of activities. This could suggest that living greener, sustainable lives is easier to do collectively as a household unit – as the it can create a sense of community and belonging that seems to be integral to the concept of ecological citizenship that we have discussed. Alternatively, that as the number of individuals live in a household, it is statistically more likely that at least one member may be environmentally-inclined. Between the two sub-dimensional

indexes, Daily Green Behaviours has an observed insignificant impact based on the number of people living in the household. This is in contrast to the Sustainable Household Behaviours, where the impact is significant and substantial in comparison to other variables.

The composition of the household was included as a variable in this analysis, but within the overall index, does not have an observed significant effect when all other factors are considered. However, when looking at the two sub-dimensional indexes there are significant impacts. For the Daily Green Behaviours index, households with only members ages 65 and over were likely to have lower scores compared to households with only adults. In contrast, on the Sustainable Households Behaviours index, the opposite was true in addition to households with children having lower scores compared to households with only adults. This indicates potential generational differences between whether or not a household participates in certain typologies of activities or that different compositions of households have different priorities towards the environment. An analysis such as this would benefit from the inclusion of more detailed variables into the composition of the household.

5.1.4 Summary of Discussion

Overall, our multivariate analyses provide a comprehensive snapshot of the effect of all our independent variables on the likelihood that households may or may not participate in a greater number of activities compared to other households. Many of the observed differences between sub-populations indicate that an asymmetrical distribution of accessibility and programs exists within Canada. Whether this is due to more systemic differences based on household resources and education or issues of accessibility due to dwelling type or region of residence, the analyses of this thesis contribute to the knowledge that there are significant impacts on pro-environmental behaviour participation. Furthermore, that these impacts vary in significance when taken into consideration with other intersecting characteristics of a household. This thesis then moves to its conclusion by considering how we might address this asymmetrical distribution, targeting several groups of stakeholders and utilizing novel methods of engagement.

Chapter 6: Conclusion

6.1 Research Contributions

The data presented in this thesis contributes to knowledge and debates on contextual factors affecting pro-environmental behaviours within Canada. The main contribution of this thesis is in the creation of an index of behaviours potentially associated with ecological citizenship. This thesis was then able to provide analyses that took into consideration the impact and effect of multiple variables on the number of behaviours that a household participated in. In addition, different typologies of behaviours were identified (following on research by Stern 2000) and analyzed as separate sub-dimensional indexes and revealed that certain contextual factors of a household can impact these behaviours in different ways.

In regard to how these contextual factors impacted the indexes, the limitations of income and education and how they contribute to the environmental-values gap in Canada (such as presented in Poortinga et al. 2004; Dietz et al. 2007; Kennedy et al. 2009) was analyzed, showing a systemic effect due to these variables. While this research is unable to speak to the values of the Canadians that were surveyed, it still indicates that income and education have a positive and systemic relationship with the number of pro-environmental behaviours a household can participate in.

In addition, significant differences were observed across the different regions of Canada with substantial impacts of the number of behaviours a household participated in. This finding is also able to be linked to our theoretical foundation that negative environmental impacts (but also access to pro-environmental programs and resources) is asymmetrically distributed geographically. These findings contribute to our exploration of civic environmentalism and the notion that environmental issues may need to be engaged with locally, alongside policymakers and citizens in an inclusive and transparent process, to allow for all regions to participate at similar levels.

Finally, this research contributes new findings on the impact of living in apartments can have on the ability for a household to participate in pro-environmental behaviours. That the physical context that a household lives in has one of the most substantial impacts on the level of participation a household can achieve. Households that lived in apartments were at a significant disadvantage on the overall index and behaviours associated with a sustainable household living.

This variable intersects with those living in urban environments and those with lower incomes who are more likely to be renters – both also at a disadvantage.

Overall, this thesis contributes to our knowledge of the contextual factors that affect participation and accessibility in pro-environmental behaviours. A link has been developed between the concept of ecological citizenship and several of the components of this concept insofar as who does and who does not live in a potentially sustainable way. Finally, by creating a foundation of knowledge through the use of aggregate and representative data that covers the vast majority of Canadian households. This thesis now moves in to a more general discussion and conclusion of the data presented in this thesis and possible avenues of discussion for future research and work.

6.2 Indicative of Ecological Citizenship

The operationalization of ecological citizenship in this project stated that the behaviours included in the index were those that could be associated with sustainable practices that, by extension, may be associated with ecological citizenship. But what does composting, bringing used bags to the grocery store, and installing sustainable devices in one's home have to do with ecological citizenship? It is undeniable that a western nation state such as Canada has substantial impacts on the environment due to the average lifestyle of our citizens. Canada was the 8th "leading" country of CO_2 emissions per capita in 2014 (Olivier et al. 2015). Without a clear definition of what behaviours are or are not required of ecological citizens, is it worth it to quantify and track behaviours such as these?

Dobson (2003) is lax on his exact specifications of the type of behaviours that could contribute to meeting this obligation for justice, or if they could indeed be considered enough to enact such a transformative change in society. In addition, there are competing sets of literature that state behaviours, such as those presented in this thesis, have little to no impact while other literature notes that demanding more impactful behaviours for citizens would be deemed too radical (Skill and Gyberg 2010). In addition, numerous authors are critical of the notion that individuals' actions are the key to ecological citizenship (Bell 2005, Carter and Huby 2005, Drevensek 2005, Hailwood 2005, Luque 2005). Furthermore, critical of the individualization that places responsibility on individuals to be informed in to making their own choices rather than part of a collective whole (Hursh and Henderson 2011; Middlemiss 2014).

This emphasis on citizens ignores the social, economic, cultural, and institutional contexts that citizens live in and assumes that these behaviours can shape these larger structural contexts (Valencia 2005). This is especially prominent in Dobson's arguments that ecological citizenship is meant to go beyond our current conceptions of nation states, however, he does not contend with the fact that the context lived in currently for many is heavily dependent on nation states. Ecological citizenship, rather simply, assumes that if we all 'do our share' structural and institutional changes will follow (Luque 2005). Citizens are heavily dependent on nation states for programs, education, and services while being heavily directed in our daily lives by these larger institutions and structures of governance.

If governance were to broaden past the notion of elected, localized governments, traditional forms of governance could be seen as unnecessary for environmental policy, causing a shift toward individuals choosing to regulate and responsibilize between themselves (Hursh and Henderson 2011; Soneryd and Uggla 2015). However, this line of thought has tended to forget intersecting identities and power dynamics that exist within our society, such as related to class and gender, even as responsibilities develop potentially inequitable relations still remain (Gronow and Warde 2001; Middlemis 2014).The notion that these could be dismantled to allow for a transformative ideology such as ecological citizenship should instead think about how citizens can work within their respective nation state towards the global obligations that ecological citizenship suggests. In a more practical sense, the responsible consumer and the emphasis on individual responsibility could be co-opted towards a shift in responsibility to one another's ecological space (Hobson 2013; Soneryd and Uggla 2015). However, as will be discussed further, it is important to consider the role of policymakers in creating legislation – an area that can shape and direct larger institutions.

Since this index is not exhaustive of all the potential ways that an individual could behave more sustainably it cannot express a direct quantification of ecological citizenship. However, this is not necessarily the goal of this project and the knowledge gained from a tool such as the one created in this project is still indicative of the current state of behaviours that could be associated with ecological citizenship. Rather, the objective of this work has been to observe the link between behaviours that could be associated with ecological citizenship and the characteristics of these varying Canadian households under their nation state context.

The language used to describe what the index measures is chosen very carefully, indicating that there is no concrete association between the behaviours that are being participated in and the concept of ecological citizenship. This is due to the fact that this questionnaire, and by extension this index, is unable to measure any attitudes or motives behind these actions would not fully capture ecological citizenship. The Households and Environment Survey (HES) lacked any questions that might investigate the motivations behind an individual choosing to participate in any of the behaviours included in the index. While this may be a limitation of surveys in general, with only so much time allotted and many questions to ask (the HES itself covers 11 topics and at least 100 questions). When wanting to examine motivations and values of individuals we must consider that a mixed-methods approach would be most appropriate.

In addition, as will be further discussed, Canada is a culturally and geographically diverse country with many communities that will have unique needs and approaches towards sustainable practices. Under the concept of ecological citizenship, some regions may be more affected by negative environmental impacts than others. Overall, it can be argued that the index created in this thesis captures a fragment of ecological citizenship – one that examines the participation in behaviours that could be associated with ecological citizenship and under what context Canadians are participating at certain levels of participation.

6.3 How-To Use This Data

In the first chapter of this thesis, the concept of ecological citizenship was explored alongside literature that pointed to ways that we can engage citizens in the presence of a gap between environmental behaviours and values of Canadians. In the results chapter of this thesis, an index was created and cross-tabulated alongside several different demographic characteristics of households in Canada, revealing varying disparities among different populations of Canadians. In this section of the discussion chapter, the goal is to take this conception of ecological citizenship and the data that has been presented thus far in combination to suggest ways in which this information can be used for the betterment of human environmental relations. As this project began on the foundation of Andrew Dobson's work on ecological citizenship, it is only natural that this thesis returns to his thoughts on how wider society might use education as a way of incorporating ecological citizenship on a societal level.

6.3.1 Environmental Education

This thesis has used data available from the Households and Environment Survey and indexed households across Canada based on the number of participating activities that could be associated with ecological citizenship. The question then remains: how do we increase these numbers? Or alternatively, how do we make sure it is the right motivation behind these activities? More practically, how do we take the knowledge in this thesis and disseminate it in an effective way to the general public? Dobson (2003) suggests that since some form of citizenship is included in the curriculum of many liberal societies that educational institutions be one of the main drivers of ecological citizenship. There have been significant changes in the way that environmental education is conceived, specifically in the form this education takes and how it is taught to students (Dobson 2003). What has been documented and ingratiated in some curriculums is a shift from education about the environment to education *for* the environment based on teaching values (Dobson 2003). In this regard, students learn on topics and practices with the intent of altering how they might view a certain activity or a certain aspect of the world, with the hope of creating a value of sustainability by doing so.

Similar shifts are noted in citizenship education, no longer is it simply *about* citizenship – such as how parliament or local government may function – but about the moral and ethical standards and dilemmas associated with citizenship (Dobson 2003). One barrier to educating students for the environment is that within liberal societies there is the assumption that our educational institutions are not 'indoctrinating' our students into one moral view, rather allowing for a multitude of views (Dobson 2003). With all this in mind, Dobson (2003) aims to explore three main areas of environmental education: what is taught, how is it taught, and can it legitimately be taught?

On what is to be taught, Dobson (2003) suggests distilling down his exploration of environmental and post-cosmopolitan citizenship into curriculum. For example, there is a heavy reliance on the concept of rights as it pertains to citizenship alongside justice (Dobson 2003). In addition, education on citizenship would need to integrate the intergenerational, interspecies obligations that come with ecological citizenship (Dobson 2003). This is in great contrast to current civics courses that usually only touch on the function and structure of governments or of environmental rights when present. A focus on the systemic aspects of any political system

glosses over the normative questions that may be associated with any such system, as they merely seek to define the system and its format.

Dobson (2003) also finds that recent curriculum in the UK specifically asks for education on sustainable development and effective citizen participation in democratic processes that affect the environment. Again, while these are good steps in Dobson's (2003) mind, he is cautious that sustainable development will be taught as simply a set of determined practices and not as a wider set of values and beliefs to guide daily life. One aspect of the new UK curriculum is the inclusion of the goal to raise awareness and understanding of differing values in the world, an aspect Dobson (2003) says is intrinsically tied with ecological citizenship's goals of learning about and negotiating the questions of value associated.

Finally, this curriculum calls for the development of students' critical appreciation of right, wrong, justice, rights, and obligations in society (Dobson 2003). On paper, this seems like a curriculum that would allow for ecological citizenship to be taught in its full right, in a way that is for the environment and emphasises the characteristics of justice, duty, and responsibility that underpin it. For him, the idea of ecological citizenship being taught correctly, or at all, has a much greater chance with guidelines for educators such as these (Dobson 2003). However, as has already been discussed within the theoretical overview, environmental education as proposed by Dobson has several critiques and limitations.

In this regard, this discussion moves into the subject of how best ecological citizenship should be taught to students. Dobson (2003) explored three different modes that this concept could potentially be taught through: through a single subject course, throughout many subjects, or overall through the school as an institution itself. To teach it within single or multiple courses would unfortunately seem like subsequent material or simply 'flavour' to the students (Dobson 2003). To teach it within the institution as a whole would again fall short as he still believed courses should be focused on civic studies and ethics to be truly effective (Dobson 2003). The most effective way to teach students on ecological citizenship might be to teach through the citizenships themselves in a similar way to his breakdown of the different forms of citizenship (as has also been paraphrased in the literature review of this thesis) (Dobson 2003).

In doing so, educators would be able to present different forms of citizenship that we see in the world today, while also providing new ways to conceive citizenship that emphasizes concepts of justice, values, and responsibility that need to be taught and intertwined into the

curriculum (Dobson 2003). It is important to remember that when we want to teach transformative concepts, such as ecological citizenship, we may have to transform the ways in which we teach these subjects as well. It has been noted that effective environmental education for citizenship such as this includes: ecological literacy, civics literacy, self efficacy, and values awareness (Berkowitz et al. 2005). In addition to this, that academics have a role in environmental education by assuring that educators (and by extension policy makers) have the tools needed to properly educate citizens and students (Berkowitz et al. 2005).

Instruments, such as the index created in this thesis, could be considered such key tools in addressing the needs of environmental educators. Instruments have the potential to increase the ecological literacy available to individuals (Berkowitz et al. 2005). It has been argued however that lived experience may be the most effective way to alter behaviours of individuals in comparison to hours within a classroom (Valencia 2005). Following this, individuals participating within systems towards a collective good has been debated as a likely compelling educational approach to this kind of global citizenship thinking (Schild 2016). In this regard, place-based education that seeks to place students in local environments where they can experience environmental concerns may be more effective than simply a re-adjustment to current curriculum and in-class teaching (Tuck, McKenzie, and McCoy 2014; Schild 2016).

Moving on to the next aspect of environmental education, the question remains of the possibility to teach a concept like this within our current liberal societies. With an emphasis on neutrality in our educational systems, can ecological citizenship be effectively taught as the 'best' form of citizenship for our society and the environment? Citizenship education has long been co-opted by politicians and educators of all stripes to promote their own political views or interests (Moss 2001: p. xiii as cited in Dobson 2003). However, as Dobson (2003) has explored the concept of ecological citizenship, it is not only about living a sustainable material life but a rather more complex system of justice, responsibility, and duty within one's society. Dobson (2003) concludes by arguing that by omitting teaching conceptions of citizenship such as ecological citizenship, liberal education systems are non-neutral by omission, thus defeating their own initial goal. In this way, he proposes that views should be taught and debated, including those like ecological citizenship (Dobson 2003).

The question for Dobson (2003) then moves, after exploring *what*, *how*, and *if* ecological citizenship can be taught is whether it will make a difference in our society. Dobson (2003)

agrees with the results that point to the importance of a connection to nature and experience outdoors as influential on an individual's environmental values – especially at a young age. He argues that the most likely place for ecological citizens to emerge is out of their lived experiences, those that live in poor environments (Dobson 2003). The question then remains, how can we replicate a 'lived experience' in a classroom, one way would be to involve students in active campaigns related to environmental and ecological issues in a way that incorporates their required teachings on citizenship and civic duties (Dobson 2003).

While Dobson's discussion of environmental education is interesting and proposes some interesting points. It still lacks the clarity of many of his other conceptions for ecological citizenship. He offers suggestions in some methods that might be apt for teaching ecological citizenship, but by omitting in his previous chapters many specifics of ecological citizenship, has failed to offer *what* exactly should be taught.

In addition, many of the same arguments that have been brought about environmental education can be applied here as well. Courtenay-Hall and Rogers (2002) have argued that environmental education does not always result in environmental citizens. Furthermore, environmental education typically fails to capture the complex relations between consumer attitudes, values, and behaviours (Pedersen and Neergaard 2006). Dobson also ignores the large structural and institutional barriers to educational reform that would be required for many of his suggestions. Finally, it is unlikely that negative environmental impacts could all be solved from within a classroom, due in part to the large systemic barriers and impacts outside of the education system.

6.3.2 For Policymakers, Citizens, and Academics

The previous section of this chapter aimed to detail Dobson's views on how ecological citizenship can be taught through environmental education in schools. In this section, this thesis aims to provide a more applied approach to how the data presented in this thesis could potentially be used in a Canadian context. To do so, this section will explore different ways that key influencers and stakeholders may utilize this knowledge – this includes methods of knowledge translation of both the data presented within the thesis and the notions of Dobson's ecological citizenship.

As has been suggested throughout this thesis, policymakers and all levels of government have a role to play in achieving sustainability goals alongside their constituents and citizens. For

example, grants and subsidiaries can be made available for poorer populations to allow them to renovate their homes to be more sustainable. However, this can prove difficult for those who rent their home compared to home owners. In addition, these grants are not always accessible for the populations they are meant to target, either going unknown or unused, or used by populations not necessarily in the greatest need.

Education, as demonstrated by our data, is an equally important factor in participation. Providing knowledge of available programs to citizens while also providing them with the information needed to successfully participate in an activity should not only be expected, but required for environmental programs. Environmentally beneficial activities, such as composting, can be subsidized and provided for by municipal governments. However, without the proper knowledge or a feeling of adequacy for citizens, participation is likely to be low or potentially result in a low sustainable impact.

Geography plays an important role for legislation – especially for a country such as Canada – with distinctions and separations of government responsibilities between municipal, provincial, and federal levels. As many of these activities are run at municipal levels, it is important to keep engaged at all levels of, not simply federal levels. If the federal government can not have a direct role on programs available, they can instead focus on increasing environmental funding for provinces and municipalities that specifically attempt to deal with environmental programs at local levels.

The possibilities for environmental problems open when we consider how data, such as that which was presented in this thesis, can be incorporated into their conception, engagement, and evaluation. For example, by understanding the sub-populations where lower prevalence of certain activities is observed could inform the creation of targeted programs for these groups. Furthermore, data from participation in programs, outside of that collected in the HES, should become common practice at all levels of government and made available to researchers. This could include municipal data on the use of composting programs to provincial data on the use of sustainable housing renovation grants.

Policymakers and public servants have the opportunity to take a more critical role toward data collection and quality within their governments. This is especially important as they act as both custodians and users of the data collected by agencies, such as Statistics Canada. As evident in the quality of the data presented in this thesis, there are plenty of improvements to be made to

this government-funded and run survey. While the survey was not intended to be used to create an index of behaviours potentially associated with ecological citizenship, it still represented the best source of nationally representative aggregate data. As further cycles of this survey are conducted, more questions could be added that seek to target environmental attitudes or motivations behind certain activities. In addition, as future environmental programs are created, their impact could potentially be tracked by examining this index using data from future cycles. Together, this could create the foundation for a more comprehensive instrument to better understand the relationship between citizens, their behaviours, and their impacts on the environment.

Despite academics' identity as knowledge generators, the ability to disseminate information effectively to the wider public has been effectively diminished by systemic barriers. Statistics Canada releases several reports based on the HES data, however, there is a lack of depth tot heir work that could instead be done by researchers within academia. By combining concepts such as ecological citizenship with aggregate collected data, this research broaches novel ground in environmental sociology in Canada, even if only in preliminary ways.

To date, few studies have used empirical research data alongside this conception of citizenship (Horton 2005; Seyfang 2006; Jagers, 2009; Wolf et al. 2009). In addition, none of these projects have used data that captures the Canadian picture on a larger scale to analyze the concept of ecological citizenship. To expand this thesis and previous research, academics should continue to be critical towards our national data custodians and demand higher quality data. In doing so, this will allow more exhaustive instruments and the potential for a higher quality of work with a larger impact.

Geographers, sociologists, psychologists, political scientists, and computer scientists can all benefit from work such as this. As educators and experts, it is the job of academia to be leaders in educating the next generation, such as concepts of ecological citizenship. Dobson (2003) detailed possible avenues for this information to be disseminated within the education systems, and while problematic, could still be incorporated within current curriculum.

Highlighting the potential role of policymakers, citizens, and academics has allowed us to think critically of the future directions of research like this. Not only in how this research could be expanded upon or improved, but in how this work could be applied practically to benefit the 'common good.' Following this discussion in how to best engage with this thesis by each of

these stakeholders, this thesis moves to discuss how technological advances could potentially best use the data presented in this thesis.

6.3.3 Combining Emerging Technologies with Data

The potential use of this data does not only reside with the public sector or within academia, but could potentially be used by individual citizens. Individuals can also make use of this data in creative ways, potentially encouraging themselves and others to live more sustainably. If this information was to be made available at more accessible level it could act as a catalyst to seek out further knowledge. For instance, if citizens were actively aware of their place on the index, this could prompt a reaction that may encourage them to engage in new environmentally friendly behaviours.

Looking at the example of composting: assume a household does not currently participate in composting, but wishes to do so to increase their place on the index, they may seek out knowledge on how to properly compost or if any programs are available in their area. However, they may find that no composting program currently exists in their neighbourhood. Encouraged by the information presented in this thesis, that civic engagement is a key part of ecological citizenship, they may seek out their local representatives or waste management officials to urge them to add composting to their waste management programs. The question then remains how to make the information presented in this thesis both accessible and actionable for the average Canadian.

Technological advances have found their way into most aspects of an individual's life, and while potentially problematic at times, can be a valuable asset when applied correctly. Analyzing a dataset such as the one within this thesis provides the opportunity to begin thinking about how the knowledge generated can be translated and mobilized to different populations – whether citizen, policymaker, or other special interest group. Civic environmentalism, alongside data and new technological innovative techniques of engagement, could prove to be a successful and novel mode of engagement for data such as this. The concept of gamification seems apt for this goal and will be discussed as a possible avenue for knowledge mobilization of this data.

Gamification is understood as the use of game mechanics and elements – such as badges, goals, and leaderboards – in a non-gaming context to affect behaviours in an individual (Seaborn and Fels 2015). Gamification is increasingly proliferated through the emergence of new forms of technology, data manipulation and analysis methods, and the growing digital games market

(Deterding 2012). While gamification is a relatively recent focus in academia, it is not a new concept and has been the subject of inquiry in many areas such as education (Bonde et al. 2014; Christy and Fox 2014), government services (Bista et al. 2014), public engagement (Tolmie et al. 2014), and marketing (Terlutter and Capella 2013). Relevant to this project is the already applied use of gamification with environmental behaviour (Lee et al. 2013; Lounis et al. 2014).

Games themselves have long been a part of human culture (McGonigal 2011), and a sound understanding of what a game entails is critical to understanding how to apply these principals in the context of gamification. Juul (2003) states that all games have six main features: there are rules; there are variables; the outcomes are quantifiable; the outcomes are value-laden; there is player effort; there is player investment; and there are negotiable consequences. We would assume then that gamification aims to apply these same six features to a given aspect of everyday life that would typically be considered a non-game context.

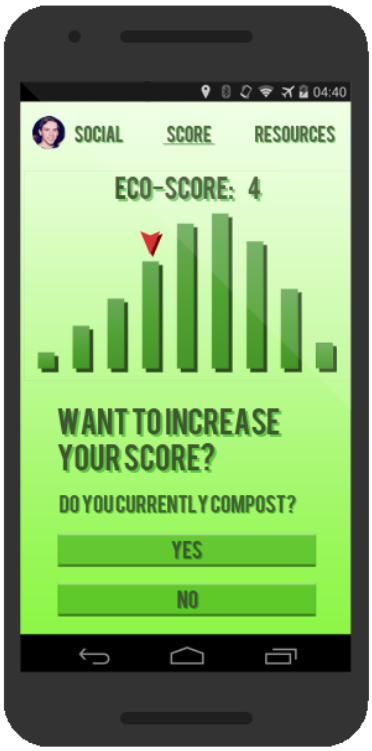
However, the concept of gamification also requires that the final product not be considered a game in and of itself, but rather it should be recognized as a means of engaging individuals in certain behaviours using game-like features (Seaborn and Fels 2015). Per Robertson (2010), gamification is poorly implemented if it focuses too much on the aspects of game design that least exemplify a full game experience (such as leaderboards, points, and badges). In this way, when trying to conceive of using gamification to mobilize sets of data, thinking outside of what one might traditionally think of a game is necessary. Instead, it would benefit designers to incorporate elements of games into traditional methods of engagement and education.

Critiques of the gamification argue that gamified technologies are exploitative, which is evidenced by their tendency to offer rewards that are non-lucrative (Bogost 2011a) and serve only for businesses to make easier profits (Bogost 2011b). However, the hope is that data such as this would be utilized by governments or non-government organizations and would be made freely available to the public for educational use only. This would avoid any potential exploitation of citizens for profits. Critical research into gamification also suggests that users may misconceive or overvalue the tangible benefits they receive from services that use gamification due to the novelty aspects of gamification (Koivisto and Hamari 2014; Hamari and Koivisto 2015).

From a psychological perspective, the end goals of gamified services can be broken down into two avenues: extrinsic motivation and intrinsic motivation (Zichermann and Linder 2010). Per the authors, extrinsic motivation occurs when rewards are offered for a certain behaviour or action. This sort of motivation is what typically comes under scrutiny by critics of gamification as the exploitative nature and tangible value of these is called into question. Critics, such as Bogost (2011a; 2011b), do not consider the intrinsic rewards that can come from these services such as self-efficacy, peer approval, and community (Antin 2012). These three rewards are all directly linked back to Dobson's ecological citizenship: a global ideology based on individual's working within a system of environmental obligations with the understanding of their impacts on their global community.

Past research has looked to 'rank' and 'score' the behaviours of citizens, though typically focused on one topic such as energy use (Gatersleben, Steg, & Vlek 2002; Geyer-Allely 2002; Bin & Dowlatabadi 2005), self-reported motivation (Green-Demers, Pelletier, & Ménard 1997), or environmental concern (Zhou 2013). As there are many ways in which a household can impact their environment, it may be more effective to create tools that cover a multitude of behaviours, rather than focusing on only one aspect of household environmental impacts – such as energy use or recycling program participation (Peattie 2010).

Figure 4: Ecological Citizenship Index Application Mock-Up



Gamification has been used in countries such as Sweden (Carlsson-Kanyama et al. 2002) but has been critiqued for the use of government-collected data on citizens. However, it is important to remember the intent of the project, as Nikolas Rose and Peter Miller (1992) explain, the objective should be simply to "link private decisions and public objectives in a new way." Similar to Dobson's (2003) notion of ecological citizenship, private behaviours have public implications, and Canadians should be able to contend with this reality without fear for their "freedom or autonomy" (Rose and Miller 1992). Applying this literature, gamification could be used to inspire action in citizens across the country. If the data and survey technique used in this thesis were integrated into a game-like mobile phone application, it could

allow users to answer the questions posed in the survey. This would allow them to make direction comparisons between their household and an index that is representative of all households within Canada captured within the HES. In visually presenting this data, it could potentially provide the opportunity for the user to reflect on activities they could be engaging in, in an effort to both live sustainably but also increase their score.

To adequately address the needs of the user, the application would need to understand why someone did not participate in an activity to properly identify the best way to engage them in this activity. In our example of composting, it would need to ask if it was because they did not have the proper knowledge, time, or resources - all previously discussed reasons for non-participation (Kennedy et al. 2009). In providing this extra information, the application could then either provide educational resources for a beginning composter, information on already existing programs in their area, or contact information for local representatives responsible for waste management. In addition, this technology could allow users to connect to their friends, family, and community members to compare scores and encourage each other to act together to meet local goals of sustainability – which has been researched to be an effective mode of engagement with gamification and the environment (Lee et al. 2013; Lounis et al. 2014).

Due to the nature of applications such as this, it would also allow for simultaneous data capture from users, learning more about how users interact and engage with their surrounding environment in addition to the data that the HES has already collected. This quantification of the self, or the ecological citizen, allows a more targeted experience where individuals could willingly govern, regulate, and optimize their sustainable behaviours (Whitson 2014). This co-creation of the applications data could encourage the addition of new behaviours to the index in innovative ways outside of traditionally adding them to the original survey.

Overall, technological advances allow for us to use data in novel ways to engage and interact with citizens. In doing so, opportunities exist to translate and mobilize knowledge and data for citizens in an effective and collaborative way. Gamification provides this opportunity to not only potentially alter the behaviours and attitudes of citizens, but to build upon the data that is currently collected. The possibility exists for engaged and motivated citizens to be inspired and directed by tools such as the one theoretically proposed in this section. In doing so, a collectively mutual benefit is experienced by all parties: citizen, researcher, and communities at all levels.

6.4 All Together Now

To conclude this thesis, it would be pertinent to return to the original statement that the project was based on: “using the Households and Environment Survey, this project seeks to index household behaviours that could be associated with ecological citizenship. In doing so, the objective is to quantify the prevalence of households performing at theoretical levels of ecological citizenship across Canada. Furthermore, the thesis examines under what conditions they are able or unable to participate in an effort to theorize on issues of accessibility, engagement, and participation.” To do so, this thesis explored and defined the concept of ecological citizenship in an attempt to better understand how society could re-organize the relations between humans and non-humans by reconceiving the idea of citizenship, justice, duty, and responsibility. To conceive of this future is one thing, however, and a more applied approach to the problem of achieving ecological citizenship was necessary. To do so, emerging technologies and existing data were utilized in conjunction with the theoretical foundation of ecological citizenship and the notion that to shape this change within our institutions and policy, we must first understand where our nation states and citizens stand. In doing so, this thesis was meant to create a baseline indication of behaviours that could be associated with ecological citizenship in the form of an index of behaviours. These indexes and their subsequent analyses highlighted the number of households performing at certain ‘levels’ of a certain conception of ecological citizenship in Canada. Furthermore, this allowed the analyses to begin to conceive of how different lived contexts (such as income, household education, place of residence) can affect the number of behaviours a household may or may not be participating in.

Results showed that overall in the Canadian population households in Canada yield a normal distribution of different levels of behaviours associated with ecological citizenship. Specifically, a higher prevalence can not be discerned on either the ‘positive’ or ‘negative’ sides of the index. This trend continued for many of the different sub-population groups, such as income, education, and region of residence. However, some sub-populations (such as those with the least income or least household education) had a higher prevalence of lower scoring households and indicate target sub-populations for possible interventions. While this research is not conclusive in all behaviours that could be associated with ecological citizenship, nor does it take into consideration the intersectional aspects of the many contextual factors that can go into participation or accessibility to certain behaviours, it acts as a solid quantitative foundation going

forward to operationalize ecological citizenship for future monitoring of the concept in Canada. In addition, some aspects of intersectionality are addressed through our multivariate analyses, but are limited to the extent of the available independent variables.

Policymakers, government officials, and public servants each have a role in not only making positive change and accessibility for Canadians, but also to utilize the vast amount of data that is collected and to further improve on data collection quality and availability. In addition, academics should be critical of their government's data collection and quality. As this thesis aimed to be a foundation for future work in academia, this seemed like a fair place to conclude: after contextualizing the situation Canada finds itself in, providing an alternative conception of how to think about our relations in the world, providing data to direct action and change, and finally providing concrete suggestions on how we might begin to create this change.

Going forward with future research, this thesis would propose the development of more complex and comprehensive survey tools – built upon the foundation of the Households and Environment Survey. Specifically, in both the expansion of the number of behaviours captured in the survey but also in capturing more complex variables such as intent behind participation in an activity and the environmental values of individuals. In doing so, specific and targeted tools can be better developed to outdate this index, providing more comprehensive data that can be tracked over time to see if change has occurred within Canada. Furthermore, the use of this existing data in novel ways – such as those suggested above – in trying to incite change in the behaviours of individuals. The creation of new applications, based in technology and gamification, alongside traditional educational information dissemination techniques should all be utilized.

Finally, future research should continue to develop the concept of ecological citizenship with the knowledge that it must leave a place of theoretical conception and enter a realm of applied pedagogy, to find ways of translating concepts such as this into ways that can be passed through applications and education proposed here. The last remaining piece of this would be to incite this change in the stakeholders discussed in this work, to build upon this foundation for the 'sustainable globe' or future that is so often talked about. However, to create such a change, there must be action on knowledge. Hopefully, this thesis creates that foundation of knowledge that can lead to action, discussion, and growth in society.

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Appendix A: Full List of Survey Questions Considered

The following is the list of questions that were identified from the survey as relating to household pro-environmental behaviours:

Alternative energy sources (Yes/No)

Use of energy saving lights (Yes/No)

Dwelling has a low flow showerhead (Yes/No)

Dwelling has a low volume toilet/tank with modified water volume (Yes/No)

Dwelling has a garden, trees, shrubs, flowers or vegetables outside (Yes/No)

Dwelling has a barrel or cistern to collect rain water (Yes/No)

Devices used to conserve or reduce consumption of water (Yes/No)

Organic or natural fertilizers applied to lawn or garden – last 12 months (Yes/No)

Organic or natural pesticide applied to lawn – last 12 months (Yes/No)

Composted kitchen waste during previous 12 months (Yes/No)

Composted yard waste during the previous 12 months (Yes/No)

Grow vegetables, herbs, fruits or flowers – previous 12 months (Yes/No)

Planted trees on property – last 5 years (Yes/No)

Purchases to feed or shelter birds – past 12 months (Yes/No)

Participated in outdoor activities (Yes/No)

Parks or public greenspace – close to home (Yes/No)

Visited parks and public greenspaces in the past 12 months (Yes/No)

Visited any other public greenspaces in past 12 months (Yes/No)

Activities aimed at conservation/protection of environment without pay (Yes/No)

Environmental activities done on behalf of an organization (Yes/No)

Environmental activities done independently (Yes/No)

Participated in cleaning up the shoreline etc. – past 12 months (Yes/No)

Participated in assessing wild species/natural habitats – past 12 months (Yes/No)

Taught about nature without pay – past 12 months (Yes/No)

Frequency purchased foods advertised as being locally grown/produced

Frequency purchased “green” cleaning products – past 12 months

Frequency used own bags/containers to carry groceries – past 12 months

Appendix B: Factor Analysis and Reliability Analyses

Table B-1: Factors loadings using Principal Component analysis (rotated solution)

	Component	
	1	2
Devices used to conserve or reduce consumption of water		.531
Composted kitchen waste during previous 12 months		.667
Grew vegetables, herbs, fruits or flowers - previous 12 months		.688
Activities aimed at conservation/protection of environment without pay		.464
Purchased foods advertised as local always/often or sometimes/rarely/never	.729	
Purchased green cleaning products always/often or sometimes/rarely/never	.729	
Uses own bags/containers always/often or sometimes/never	.505	
Visited any parks or public greenspaces in past 12 months	.303	

Table B-2: Reliability Statistics for Indexes

Cronbach's Alpha (Cumulative Index)	N of Items	Cronbach's Alpha (Daily Green Behaviours)	N of Items	Cronbach's Alpha (Sustainable Household Behaviours)	N of Items
0.536	8	0.420	4	0.423	4

Appendix C: Cross-Tabulations and Supporting Analyses

Index of Behaviours Indicative of Eco-Citizenship * Region

Crosstab

			Region					
			Ontario	Quebec	British Columbia	Prairie Region	Atlantic Region	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	174	71	74	141	21	481
		% within Region	2.1%	1.3%	2.5%	3.7%	1.3%	2.2%
	1	Count	411	353	207	197	82	1250
		% within Region	4.9%	6.3%	6.9%	5.1%	5.2%	5.6%
	2	Count	658	513	245	447	169	2032
		% within Region	7.9%	9.2%	8.1%	11.6%	10.7%	9.1%
	3	Count	885	1011	426	585	208	3115
		% within Region	10.6%	18.2%	14.2%	15.2%	13.1%	13.9%
	4	Count	1468	1254	433	741	313	4209
		% within Region	17.6%	22.5%	14.4%	19.2%	19.7%	18.8%
	5	Count	1733	1076	578	773	329	4489
		% within Region	20.8%	19.3%	19.2%	20.1%	20.8%	20.1%
	6	Count	1637	789	503	504	251	3684
		% within Region	19.6%	14.2%	16.7%	13.1%	15.8%	16.5%
	7	Count	1024	407	399	348	152	2330
		% within Region	12.3%	7.3%	13.3%	9.0%	9.6%	10.4%
	8	Count	357	96	144	119	60	776
		% within Region	4.3%	1.7%	4.8%	3.1%	3.8%	3.5%
Total		Count	8347	5570	3009	3855	1585	22366
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Index of Behaviours Indicative of Eco-Citizenship * CMA Designation

Crosstab

			CMA Designation					
			Non-CMA	Other CMAs	Vancouver	Montreal	Toronto	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	115	192	36	25	112	480
		% within CMA Designation	1.8%	2.5%	2.3%	0.9%	2.8%	2.1%
	1	Count	360	404	124	183	178	1249
		% within CMA Designation	5.5%	5.3%	7.8%	6.7%	4.5%	5.6%
	2	Count	609	681	139	264	339	2032
		% within CMA Designation	9.4%	9.0%	8.7%	9.6%	8.6%	9.1%
	3	Count	940	976	259	498	440	3113
		% within CMA Designation	14.4%	12.9%	16.3%	18.1%	11.2%	13.9%
	4	Count	1211	1392	202	673	726	4204
		% within CMA Designation	18.6%	18.4%	12.7%	24.5%	18.4%	18.8%
	5	Count	1302	1542	296	534	812	4486
		% within CMA Designation	20.0%	20.4%	18.6%	19.5%	20.6%	20.1%
	6	Count	1021	1250	260	367	784	3682
		% within CMA Designation	15.7%	16.5%	16.4%	13.4%	19.9%	16.5%
	7	Count	680	834	221	169	424	2328
		% within CMA Designation	10.4%	11.0%	13.9%	6.2%	10.8%	10.4%
	8	Count	271	297	52	31	123	774
		% within CMA Designation	4.2%	3.9%	3.3%	1.1%	3.1%	3.5%
Total		Count	6509	7568	1589	2744	3938	22348
		% within CMA Designation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Index of Behaviours Indicative of Eco-Citizenship * Language

Crosstab

			Language		
			English	French	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	217	45	262
		% within Language	1.3%	0.9%	1.2%
	1	Count	749	253	1002
		% within Language	4.5%	4.9%	4.6%
	2	Count	1466	469	1935
		% within Language	8.9%	9.1%	8.9%
	3	Count	2097	998	3095
		% within Language	12.7%	19.4%	14.3%
	4	Count	3021	1156	4177
		% within Language	18.2%	22.4%	19.2%
	5	Count	3441	1017	4458
		% within Language	20.8%	19.7%	20.5%
	6	Count	2949	732	3681
		% within Language	17.8%	14.2%	17.0%
	7	Count	1939	389	2328
		% within Language	11.7%	7.5%	10.7%
	8	Count	681	95	776
		% within Language	4.1%	1.8%	3.6%
Total		Count	16560	5154	21714
		% within Language	100.0%	100.0%	100.0%

Index of Behaviours Indicative of Eco-Citizenship * Highest level of education ever completed by a member of the household

Crosstab

			Highest level of education ever completed by a member of the household				
			0 to 8 years or some secondary	Grade 11 to 13, graduate	Some postsecondary or postsecondary certificate or diploma	University	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	94	107	68	204	473
		% within Highest level of education ever completed by a member of the household	5.9%	3.2%	1.1%	1.9%	2.1%
	1	Count	197	290	360	390	1237
		% within Highest level of education ever completed by a member of the household	12.4%	8.7%	5.8%	3.5%	5.6%
	2	Count	327	393	534	762	2016
		% within Highest level of education ever completed by a member of the household	20.7%	11.8%	8.7%	6.9%	9.1%
	3	Count	283	602	943	1232	3060
		% within Highest level of education ever completed by a member of the household	17.9%	18.1%	15.3%	11.2%	13.9%

	4	Count	288	608	1304	1932	4132
		% within Highest level of education ever completed by a member of the household	18.2%	18.3%	21.2%	17.5%	18.7%
	5	Count	219	609	1223	2387	4438
		% within Highest level of education ever completed by a member of the household	13.8%	18.3%	19.9%	21.7%	20.1%
	6	Count	118	427	978	2121	3644
		% within Highest level of education ever completed by a member of the household	7.5%	12.9%	15.9%	19.2%	16.5%
	7	Count	45	227	578	1465	2315
		% within Highest level of education ever completed by a member of the household	2.8%	6.8%	9.4%	13.3%	10.5%
	8	Count	12	56	171	528	767
		% within Highest level of education ever completed by a member of the household	0.8%	1.7%	2.8%	4.8%	3.5%
Total		Count	1583	3319	6159	11021	22082
		% within Highest level of education ever completed by a member of the household	100.0%	100.0%	100.0%	100.0%	100.0%

Index of Behaviours Indicative of Eco-Citizenship * Recoded Income

Crosstab

			Recoded Income				
			$20,000 or less, including loss	More than $20,000 to $60,000	More than $60,000 to $100,000	More than $100,000	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	34	53	5	9	101
		% within Recoded Income	2.3%	0.8%	0.1%	0.2%	0.5%
	1	Count	123	231	79	68	501
		% within Recoded Income	8.3%	3.6%	1.6%	1.2%	2.7%
	2	Count	224	584	265	236	1309
		% within Recoded Income	15.0%	9.0%	5.4%	4.1%	7.0%
	3	Count	291	991	609	568	2459
		% within Recoded Income	19.5%	15.3%	12.4%	9.8%	13.2%
	4	Count	295	1342	926	974	3537
		% within Recoded Income	19.8%	20.7%	18.9%	16.8%	19.0%
	5	Count	231	1369	1133	1293	4026
		% within Recoded Income	15.5%	21.2%	23.1%	22.3%	21.6%
	6	Count	174	1078	976	1328	3556
		% within Recoded Income	11.7%	16.7%	19.9%	22.9%	19.1%
	7	Count	99	598	632	929	2258
		% within Recoded Income	6.6%	9.2%	12.9%	16.0%	12.1%
	8	Count	19	225	275	386	905
		% within Recoded Income	1.3%	3.5%	5.6%	6.7%	4.9%
Total		Count	1490	6471	4900	5791	18652
		% within Recoded Income	100.0%	100.0%	100.0%	100.0%	100.0%

Index of Behaviours Indicative of Eco-Citizenship * Recoded Household Size

Crosstab

			Recoded Household Size						
			One person	Two people	Three people	Four people	Five people	6 or more people	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	284	77	50	31	12	28	482
		% within Recoded Household Size	4.9%	1.0%	1.5%	1.0%	0.9%	3.6%	2.2%
	1	Count	421	422	171	149	36	52	1251
		% within Recoded Household Size	7.3%	5.4%	5.0%	4.6%	2.7%	6.7%	5.6%
	2	Count	906	634	222	176	67	27	2032
		% within Recoded Household Size	15.7%	8.1%	6.5%	5.5%	5.0%	3.5%	9.1%
	3	Count	978	1014	516	371	141	97	3117
		% within Recoded Household Size	16.9%	13.0%	15.0%	11.5%	10.5%	12.6%	13.9%
	4	Count	1164	1525	629	531	236	123	4208
		% within Recoded Household Size	20.1%	19.5%	18.3%	16.5%	17.6%	16.0%	18.8%
	5	Count	900	1662	797	679	326	126	4490
		% within Recoded Household Size	15.6%	21.3%	23.2%	21.1%	24.3%	16.3%	20.1%
	6	Count	628	1396	581	684	235	161	3685
		% within Recoded Household Size	10.9%	17.9%	16.9%	21.2%	17.6%	20.9%	16.5%
	7	Count	392	802	337	457	207	134	2329

		% within Recoded Household Size	6.8%	10.3%	9.8%	14.2%	15.5%	17.4%	10.4%
	8	Count	104	288	135	147	79	23	776
		% within Recoded Household Size	1.8%	3.7%	3.9%	4.6%	5.9%	3.0%	3.5%
Total		Count	5777	7820	3438	3225	1339	771	22370
		% within Recoded Household Size	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Index of Behaviours Indicative of Eco-Citizenship * Recoded Type of Household Based On Composition

Crosstab

			Recoded Type of Household Based On Composition				
			Households with only members 19 - 64	Households with only members 65+	Households with children 0 - 18	Other compositions	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	166	169	78	67	480
		% within Recoded Type of Household Based On Composition	2.3%	4.3%	1.1%	1.6%	2.1%
	1	Count	374	306	388	183	1251
		% within Recoded Type of Household Based On Composition	5.1%	7.8%	5.5%	4.5%	5.6%
	2	Count	931	415	408	277	2031
		% within Recoded Type of Household Based On Composition	12.6%	10.6%	5.8%	6.8%	9.1%
	3	Count	1077	600	888	550	3115
		% within Recoded Type of Household Based On Composition	14.6%	15.3%	12.7%	13.5%	13.9%
	4	Count	1454	787	1227	741	4209
		% within Recoded Type of Household Based On Composition	19.7%	20.1%	17.5%	18.2%	18.8%
	5	Count	1346	747	1544	852	4489

		% within Recoded Type of Household Based On Composition	18.3%	19.0%	22.0%	21.0%	20.1%
	6	Count	1084	551	1273	777	3685
		% within Recoded Type of Household Based On Composition	14.7%	14.0%	18.1%	19.1%	16.5%
	7	Count	693	271	898	467	2329
		% within Recoded Type of Household Based On Composition	9.4%	6.9%	12.8%	11.5%	10.4%
	8	Count	238	79	310	148	775
		% within Recoded Type of Household Based On Composition	3.2%	2.0%	4.4%	3.6%	3.5%
Total		Count	7363	3925	7014	4062	22364
		% within Recoded Type of Household Based On Composition	100.0%	100.0%	100.0%	100.0%	100.0%

Index of Behaviours Indicative of Eco-Citizenship * Type of Dwelling

Crosstab

			Type of Dwelling		
			Single/Double/Row/Duplex	Low- and High-rise apartment	Total
Index of Behaviours Indicative of Eco-Citizenship	0	Count	267	195	462
		% within Type of Dwelling	1.7%	3.8%	2.2%
	1	Count	760	373	1133
		% within Type of Dwelling	4.7%	7.2%	5.4%
	2	Count	1090	829	1919
		% within Type of Dwelling	6.8%	16.1%	9.1%
	3	Count	1949	999	2948
		% within Type of Dwelling	12.2%	19.4%	13.9%
	4	Count	2823	1183	4006
		% within Type of Dwelling	17.6%	22.9%	18.9%
	5	Count	3420	831	4251
		% within Type of Dwelling	21.3%	16.1%	20.1%
	6	Count	3034	455	3489
		% within Type of Dwelling	18.9%	8.8%	16.5%
	7	Count	1971	251	2222
		% within Type of Dwelling	12.3%	4.9%	10.5%
	8	Count	707	40	747
		% within Type of Dwelling	4.4%	0.8%	3.5%
Total		Count	16021	5156	21177
		% within Type of Dwelling	100.0%	100.0%	100.0%

Daily Green Behaviours * Region

Crosstab

			Region					
			Ontario	Quebec	British Columbia	Prairie Region	Atlantic Region	Total
Daily Green Behaviours	.00	Count	646	299	264	302	93	1604
		% within Region	7.7%	5.4%	8.8%	7.8%	5.9%	7.2%
	1.00	Count	1045	604	462	767	317	3195
		% within Region	12.5%	10.8%	15.4%	19.9%	20.0%	14.3%
	2.00	Count	2298	1608	797	1129	463	6295
		% within Region	27.5%	28.9%	26.5%	29.3%	29.2%	28.1%
	3.00	Count	2600	1827	748	985	475	6635
		% within Region	31.1%	32.8%	24.9%	25.6%	30.0%	29.7%
	4.00	Count	1759	1233	736	672	236	4636
		% within Region	21.1%	22.1%	24.5%	17.4%	14.9%	20.7%
Total		Count	8348	5571	3007	3855	1584	22365
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Daily Green Behaviours * CMA Designation

Crosstab

			CMA Designation					
			Non-CMA	Other CMAs	Vancouver	Montreal	Toronto	Total
Daily Green Behaviours	.00	Count	476	488	152	124	362	1602
		% within CMA Designation	7.3%	6.4%	9.6%	4.5%	9.2%	7.2%
	1.00	Count	1089	1157	234	234	480	3194
		% within CMA Designation	16.7%	15.3%	14.7%	8.5%	12.2%	14.3%
	2.00	Count	1830	2097	413	811	1136	6287
		% within CMA Designation	28.1%	27.7%	26.0%	29.5%	28.8%	28.1%
	3.00	Count	1899	2200	392	940	1202	6633
		% within CMA Designation	29.2%	29.1%	24.7%	34.2%	30.5%	29.7%
	4.00	Count	1214	1625	399	636	758	4632
		% within CMA Designation	18.7%	21.5%	25.1%	23.2%	19.2%	20.7%
Total		Count	6508	7567	1590	2745	3938	22348
		% within CMA Designation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Daily Green Behaviours * Language

Crosstab

			Language		
			English	French	Total
Daily Green Behaviours	.00	Count	856	188	1044
		% within Language	5.2%	3.6%	4.8%
	1.00	Count	2628	554	3182
		% within Language	15.9%	10.7%	14.7%
	2.00	Count	4707	1521	6228
		% within Language	28.4%	29.5%	28.7%
	3.00	Count	4871	1757	6628
		% within Language	29.4%	34.1%	30.5%
	4.00	Count	3499	1135	4634
		% within Language	21.1%	22.0%	21.3%
Total		Count	16561	5155	21716
		% within Language	100.0%	100.0%	100.0%

Daily Green Behaviours * Highest level of education ever completed by a member of the household

Crosstab

			Highest level of education ever completed by a member of the household				
			0 to 8 years or some secondary	Grade 11 to 13, graduate	Some postsecondary or postsecondary certificate or diploma	University	Total
Daily Green Behaviours	.00	Count	314	290	364	616	1584
		% within Highest level of education ever completed by a member of the household	19.8%	8.7%	5.9%	5.6%	7.2%
	1.00	Count	381	652	926	1183	3142
		% within Highest level of education ever completed by a member of the household	24.1%	19.6%	15.0%	10.7%	14.2%
	2.00	Count	430	1057	1740	2962	6189
		% within Highest level of education ever completed by a member of the household	27.2%	31.8%	28.2%	26.9%	28.0%
	3.00	Count	337	851	1951	3421	6560
		% within Highest level of education ever completed by a member of the household	21.3%	25.6%	31.7%	31.0%	29.7%
	4.00	Count	121	469	1179	2839	4608

	% within Highest level of education ever completed by a member of the household	7.6%	14.1%	19.1%	25.8%	20.9%
Total	Count	1583	3319	6160	11021	22083
	% within Highest level of education ever completed by a member of the household	100.0%	100.0%	100.0%	100.0%	100.0%

Daily Green Behaviours * Recoded Income

Crosstab

			Recoded Income				
			$20,000 or less, including loss	More than $20,000 to $60,000	More than $60,000 to $100,000	More than $100,000	Total
Daily Green Behaviours	.00	Count	129	248	66	52	495
		% within Recoded Income	8.7%	3.8%	1.3%	0.9%	2.7%
	1.00	Count	318	1052	591	620	2581
		% within Recoded Income	21.3%	16.3%	12.1%	10.7%	13.8%
	2.00	Count	465	1991	1439	1573	5468
		% within Recoded Income	31.2%	30.8%	29.4%	27.2%	29.3%
	3.00	Count	380	2007	1630	1996	6013
		% within Recoded Income	25.5%	31.0%	33.3%	34.5%	32.2%
	4.00	Count	198	1173	1174	1550	4095
		% within Recoded Income	13.3%	18.1%	24.0%	26.8%	22.0%
Total		Count	1490	6471	4900	5791	18652
		% within Recoded Income	100.0%	100.0%	100.0%	100.0%	100.0%

Daily Green Behaviours * Recoded Household Size

Crosstab

			Recoded Household Size						
			One person	Two people	Three people	Four people	Five people	6 or more people	Total
Daily Green Behaviours	.00	Count	641	446	233	155	45	84	1604
		% within Recoded Household Size	11.1%	5.7%	6.8%	4.8%	3.4%	10.9%	7.2%
	1.00	Count	1057	1133	386	380	152	85	3193
		% within Recoded Household Size	18.3%	14.5%	11.2%	11.8%	11.4%	11.0%	14.3%
	2.00	Count	1630	2148	1021	916	400	179	6294
		% within Recoded Household Size	28.2%	27.5%	29.7%	28.4%	29.9%	23.2%	28.1%
	3.00	Count	1516	2475	998	995	399	251	6634
		% within Recoded Household Size	26.2%	31.7%	29.0%	30.9%	29.9%	32.6%	29.7%
	4.00	Count	933	1616	798	778	340	171	4636
		% within Recoded Household Size	16.2%	20.7%	23.2%	24.1%	25.4%	22.2%	20.7%
Total		Count	5777	7818	3436	3224	1336	770	22361
		% within Recoded Household Size	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Daily Green Behaviours * Recoded Type of Household Based On Composition

Crosstab

			Recoded Type of Household Based On Composition				
			Households with only members 19 - 64	Households with only members 65+	Households with children 0 - 18	Other compositions	Total
Daily Green Behaviours	.00	Count	467	498	401	238	1604
		% within Recoded Type of Household Based On Composition	6.3%	12.7%	5.7%	5.9%	7.2%
	1.00	Count	1160	665	790	579	3194
		% within Recoded Type of Household Based On Composition	15.8%	16.9%	11.3%	14.3%	14.3%
	2.00	Count	2061	1087	1996	1151	6295
		% within Recoded Type of Household Based On Composition	28.0%	27.7%	28.5%	28.3%	28.1%
	3.00	Count	2168	1113	2146	1208	6635
		% within Recoded Type of Household Based On Composition	29.5%	28.4%	30.6%	29.7%	29.7%
	4.00	Count	1505	562	1681	887	4635
		% within Recoded Type of Household Based On Composition	20.4%	14.3%	24.0%	21.8%	20.7%
Total		Count	7361	3925	7014	4063	22363

	% within Recoded Type of Household Based On Composition	100.0%	100.0%	100.0%	100.0%	100.0%

Daily Green Behaviours * Type of Dwelling

Crosstab

			Type of Dwelling		
			Single/Double/Row /Duplex	Low- and High-rise apartment	Total
Daily Green Behaviours	.00	Count	1031	449	1480
		% within Type of Dwelling	6.4%	8.7%	7.0%
	1.00	Count	2212	802	3014
		% within Type of Dwelling	13.8%	15.6%	14.2%
	2.00	Count	4407	1560	5967
		% within Type of Dwelling	27.5%	30.3%	28.2%
	3.00	Count	4890	1410	6300
		% within Type of Dwelling	30.5%	27.4%	29.8%
	4.00	Count	3480	933	4413
		% within Type of Dwelling	21.7%	18.1%	20.8%
Total		Count	16020	5154	21174
		% within Type of Dwelling	100.0%	100.0%	100.0%

Sustainable Household Behaviours * Region

Crosstab

			Region					
			Ontario	Quebec	British Columbia	Prairie Region	Atlantic Region	Total
Sustainable Household Behaviours	.00	Count	587	765	250	457	115	2174
		% within Region	7.0%	13.7%	8.3%	11.9%	7.3%	9.7%
	1.00	Count	1704	1895	725	956	337	5617
		% within Region	20.4%	34.0%	24.1%	24.8%	21.3%	25.1%
	2.00	Count	2481	1862	834	1163	522	6862
		% within Region	29.7%	33.4%	27.7%	30.2%	33.0%	30.7%
	3.00	Count	2680	879	877	981	446	5863
		% within Region	32.1%	15.8%	29.2%	25.5%	28.2%	26.2%
	4.00	Count	897	169	321	297	164	1848
		% within Region	10.7%	3.0%	10.7%	7.7%	10.4%	8.3%
Total		Count	8349	5570	3007	3854	1584	22364
		% within Region	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sustainable Household Behaviours * CMA Designation

Crosstab

			CMA Designation					
			Non-CMA	Other CMAs	Vancouver	Montreal	Toronto	Total
Sustainable Household Behaviours	.00	Count	515	727	146	462	324	2174
		% within CMA Designation	7.9%	9.6%	9.2%	16.8%	8.2%	9.7%
	1.00	Count	1519	1839	429	1016	810	5613
		% within CMA Designation	23.3%	24.3%	27.0%	37.0%	20.6%	25.1%
	2.00	Count	2062	2269	440	894	1191	6856
		% within CMA Designation	31.7%	30.0%	27.7%	32.6%	30.2%	30.7%
	3.00	Count	1793	2070	448	310	1238	5859
		% within CMA Designation	27.6%	27.4%	28.2%	11.3%	31.4%	26.2%
	4.00	Count	619	662	127	63	375	1846
		% within CMA Designation	9.5%	8.7%	8.0%	2.3%	9.5%	8.3%
Total		Count	6508	7567	1590	2745	3938	22348
		% within CMA Designation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sustainable Household Behaviours * Language

Crosstab

			Language		
			English	French	Total
Sustainable Household Behaviours	.00	Count	1293	660	1953
		% within Language	7.8%	12.8%	9.0%
	1.00	Count	3585	1766	5351
		% within Language	21.6%	34.3%	24.6%
	2.00	Count	4989	1748	6737
		% within Language	30.1%	33.9%	31.0%
	3.00	Count	5011	816	5827
		% within Language	30.3%	15.8%	26.8%
	4.00	Count	1682	165	1847
		% within Language	10.2%	3.2%	8.5%
Total		Count	16560	5155	21715
		% within Language	100.0%	100.0%	100.0%

Sustainable Household Behaviours * Highest level of education ever completed by a member of the household

Crosstab

			Highest level of education ever completed by a member of the household				
			0 to 8 years or some secondary	Grade 11 to 13, graduate	Some postsecondary or postsecondary certificate or diploma	University	Total
Sustainable Household Behaviours	.00	Count	251	501	559	846	2157
		% within Highest level of education ever completed by a member of the household	15.9%	15.1%	9.1%	7.7%	9.8%
	1.00	Count	641	917	1663	2323	5544
		% within Highest level of education ever completed by a member of the household	40.5%	27.6%	27.0%	21.1%	25.1%
	2.00	Count	423	998	2011	3339	6771
		% within Highest level of education ever completed by a member of the household	26.7%	30.1%	32.6%	30.3%	30.7%
	3.00	Count	228	758	1495	3298	5779
		% within Highest level of education ever completed by a member of the household	14.4%	22.8%	24.3%	29.9%	26.2%
	4.00	Count	40	145	433	1215	1833

	% within Highest level of education ever completed by a member of the household	2.5%	4.4%	7.0%	11.0%	8.3%
Total	Count	1583	3319	6161	11021	22084
	% within Highest level of education ever completed by a member of the household	100.0%	100.0%	100.0%	100.0%	100.0%

Sustainable Household Behaviours * Recoded Income

Crosstab

			Recoded Income				
			$20,000 or less, including loss	More than $20,000 to $60,000	More than $60,000 to $100,000	More than $100,000	Total
Sustainable Household Behaviours	.00	Count	217	476	192	165	1050
		% within Recoded Income	14.6%	7.4%	3.9%	2.8%	5.6%
	1.00	Count	491	1591	920	855	3857
		% within Recoded Income	33.0%	24.6%	18.8%	14.8%	20.7%
	2.00	Count	422	2064	1620	1815	5921
		% within Recoded Income	28.3%	31.9%	33.1%	31.3%	31.7%
	3.00	Count	287	1787	1602	2099	5775
		% within Recoded Income	19.3%	27.6%	32.7%	36.2%	31.0%
	4.00	Count	73	553	566	857	2049
		% within Recoded Income	4.9%	8.5%	11.6%	14.8%	11.0%
Total		Count	1490	6471	4900	5791	18652
		% within Recoded Income	100.0%	100.0%	100.0%	100.0%	100.0%

Sustainable Household Behaviours * Recoded Household Size

Crosstab

			Recoded Household Size						
			One person	Two people	Three people	Four people	Five people	6 or more people	Total
Sustainable Household Behaviours	.00	Count	1030	591	257	178	68	49	2173
		% within Recoded Household Size	17.8%	7.6%	7.5%	5.5%	5.1%	6.4%	9.7%
	1.00	Count	1921	1873	829	627	212	156	5618
		% within Recoded Household Size	33.2%	24.0%	24.1%	19.5%	15.9%	20.3%	25.1%
	2.00	Count	1584	2508	1167	970	431	203	6863
		% within Recoded Household Size	27.4%	32.1%	34.0%	30.1%	32.2%	26.4%	30.7%
	3.00	Count	988	2165	927	1063	434	286	5863
		% within Recoded Household Size	17.1%	27.7%	27.0%	33.0%	32.5%	37.1%	26.2%
	4.00	Count	256	682	257	385	192	76	1848
		% within Recoded Household Size	4.4%	8.7%	7.5%	11.9%	14.4%	9.9%	8.3%
Total		Count	5779	7819	3437	3223	1337	770	22365
		% within Recoded Household Size	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sustainable Household Behaviours * Recoded Type of Household Based On Composition

Crosstab

			Recoded Type of Household Based On Composition				
			Households with only members 19 - 64	Households with only members 65+	Households with children 0 - 18	Other compositions	Total
Sustainable Household Behaviours	.00	Count	971	427	503	273	2174
		% within Recoded Type of Household Based On Composition	13.2%	10.9%	7.2%	6.7%	9.7%
	1.00	Count	2010	1155	1582	870	5617
		% within Recoded Type of Household Based On Composition	27.3%	29.4%	22.6%	21.4%	25.1%
	2.00	Count	2241	1168	2159	1293	6861
		% within Recoded Type of Household Based On Composition	30.4%	29.8%	30.8%	31.8%	30.7%
	3.00	Count	1596	963	2019	1285	5863
		% within Recoded Type of Household Based On Composition	21.7%	24.5%	28.8%	31.6%	26.2%
	4.00	Count	546	210	750	342	1848
		% within Recoded Type of Household Based On Composition	7.4%	5.4%	10.7%	8.4%	8.3%
Total		Count	7364	3923	7013	4063	22363

	% within Recoded Type of Household Based On Composition	100.0%	100.0%	100.0%	100.0%	100.0%

Sustainable Household Behaviours * Type of Dwelling

Crosstab

			Type of Dwelling		
			Single/Double/Row /Duplex	Low- and High-rise apartment	Total
Sustainable Household Behaviours	.00	Count	985	1061	2046
		% within Type of Dwelling	6.1%	20.6%	9.7%
	1.00	Count	3241	2074	5315
		% within Type of Dwelling	20.2%	40.2%	25.1%
	2.00	Count	5105	1385	6490
		% within Type of Dwelling	31.9%	26.9%	30.6%
	3.00	Count	4994	549	5543
		% within Type of Dwelling	31.2%	10.6%	26.2%
	4.00	Count	1695	86	1781
		% within Type of Dwelling	10.6%	1.7%	8.4%
Total		Count	16020	5155	21175
		% within Type of Dwelling	100.0%	100.0%	100.0%