

Roots and Routes:
Exploring Environmental Identity Among Chinese Immigrants in the Capital Regional District
by

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COMMITTEE APPROVAL

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Abstract

This study investigates the environmental identity of first-generation Chinese immigrants in the Capital Region (CRD), focusing on how age at immigration, years of residence, and interaction with the natural environment affect their environmental identity. Findings indicate that these immigrants perceive environmental awareness to be significantly higher in Canada than in China, and that their environmental awareness and behaviors have increased since moving to Canada. Quantitative assessments using the Environmental Identity Scale (EID) showed high scores, especially among older adults, suggesting that environmental identity is shaped by their experiences and adaptation to Canadian environmental practices and values. This study highlights the role of sociocultural factors in shaping environmental identity and emphasizes the need for culturally sensitive environmental policies that enhance the participation of diverse communities in environmental protection through targeted activities, tailored educational programs, multilingual resources, and intergenerational learning opportunities.

Keywords: environmental identity, immigrants, age at immigration, length of residence, interaction with natural environment, environmental awareness, environmental behaviors, culturally sensitive environmental policies, sociocultural factors, intergenerational learning

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Introduction

One of the gravest challenges the world faces today is environmental degradation, and Canada is no exception. According to a report by the Environment and Climate Change Canada (ECCC), the country grapples with serious environmental issues such as air and water pollution, loss of biodiversity, and rising sea levels (Government of Canada, 2019). With the highest proportion of immigrants among the G7 nations—23.0% of its population—and 26.53% being visible minorities (Statistics Canada, 2022), Canada's diverse immigrant communities play a crucial role in addressing these environmental challenges. Understanding the environmental behaviors and attitudes of these groups is a first step towards enhancing their involvement in environmental management (Ono, 2020).

Environmental identity, proven to predict pro-environmental behaviors (Gatersleben et al., 2012) and influence attitudes towards the environment (Van der Werff et al., 2014), was first defined by Clayton and Opatow (2003) as a sense of connection with parts of the non-human natural environment, affecting how we perceive and interact with the world; it embodies the belief that the environment is significant to us and integral to our identity. Studies indicate that social attributional identities based on characteristics like gender, nationality, race, and socioeconomic status significantly influence an individual's relationship with nature (Clayton, 2012). Research on environmental identity across different cultures shows that it largely depends on cultural backgrounds and specific experiences (Chang & Opatow, 2009). As an identity, environmental identity is dynamic and shaped by social contexts (Clayton, 2012). For immigrants, adapting to the host country's culture is inevitable. Theories of cultural adaptation,

which are often employed to understand this process (Juang & Syed, 2019), suggest that the extent of cultural adaptation significantly influences immigrants' values and behaviors (Berry, 1992), and is a dynamic, changing process (Titzmann & Lee, 2022). This theoretical framework explains why immigrant groups, each bringing different cultural heritages to Canada, possess unique collective environmental identities that vary internally based on their levels of cultural adaptation.

To better study how immigrants integrate into society, Statistics Canada uses “generational status” to categorize immigrants, with first-generation immigrants defined as “persons who are now, or once were, immigrants to Canada” (Statistics Canada, 2021). Psychological studies have shown that different generations of immigrants encounter distinct challenges in cultural adaptation and integrating into the host culture (Abouguendia & Noels, 2010; Kunst & Sam, 2014), with first-generation immigrants often exhibiting higher cross-cultural sensitivity and a bicultural orientation (Christmas & Barker, 2014).

The Capital Regional District (CRD) at the southern tip of Vancouver Island, encompassing Victoria, the capital of British Columbia, and surrounding areas, serves as a microcosm of Canada's multicultural landscape. From 2001 to 2021, the number of immigrants and visible minorities in the CRD has been steadily increasing, with three-quarters of the new immigrants (who immigrated to Canada in the recent five years) belonging to visible minority groups, gradually transforming the city's demographic structure (Statistics Canada, 2021).

Among the immigrant communities in the CRD, the Chinese immigrant community is significant. Historically, they were among the earliest visible minority immigrants to Canada,

arriving in the 18th century with Victoria being their initial landing spot, home to Canada's oldest Chinatown. While early immigrants largely came from Hong Kong, Taiwan, and southern China (Chinese Canadian Museum, 2024), today the CRD is the second-largest Chinese community in BC after Greater Vancouver, with Mainland Chinese gradually becoming the predominant group, making up 8% of the total immigrant population and leading the visible minority immigrant population, a trend that has been rising since 2001 (Statistics Canada, 2021).

Notably, although people of Chinese descent from Mainland China, Hong Kong, Taiwan, and Southeast Asia may all identify as Chinese, historical, linguistic, social norms, and political systems significantly distinguish Mainland Chinese in terms of values and traditions from those in other regions, profoundly affecting their immigration experiences and cultural adaptation processes (Chuang et al., 2021). Therefore, in order to avoid confusion, all subsequent occurrences of the word "China" in this article, if not otherwise specified, represent the "People's Republic of China", i.e., the motherland of the Chinese people in mainland China, and "Chinese people" represents the Chinese people in mainland China.

Like many areas in Canada, the CRD and its municipalities have established numerous strategic goals, plans, and practices to guide residents in responding to and adapting to climate change, protecting the environment, and achieving sustainable development (CRD, 2023; City of Victoria, 2023; City of Langford, 2023). Despite active advocacy for environmental protection by organizations like Green Team Victoria (Green Team Victoria, 2024), the perspectives and values of immigrant communities on environmental issues seem underrepresented in these strategies and collaborations. The CRD Climate Action Strategy 2021 highlights the value of

diverse community participation and acknowledges the importance of incorporating multiple cultural perspectives, yet it lacks specific strategies on how to effectively integrate these diverse viewpoints, particularly those of immigrants, into concrete climate actions.

Given the unique characteristics of the first-generation immigrant group, the historical roots of Chinese immigrants in the CRD, the numerical superiority of Mainland Chinese immigrants, and my deep personal connection as a first-generation Mainland Chinese immigrant in this community, I have chosen first-generation immigrants from Mainland China residing in the CRD as the aiming participants for my study. In this study, I aim to explore the environmental identity of first-generation immigrants from Mainland China in the CRD, through surveys and semi-structured interviews. I hope my findings can assist policymakers in better understanding the environmental attitudes and behaviors of this community, thereby devising more culturally sensitive strategies to enhance their potential in environmental conservation. My research questions are:

What is the environmental identity of first-generation Chinese immigrants in the CRD?

How do different factors, including the length of residence, the age at immigration, or the contact with nature, affect the environmental identity of first-generation Chinese immigrants in the CRD?

Theoretical Framework

Environmental Identity

The concept of identity in psychological research provides insights across a variety of domains from race and gender, morality, development, and social groups to leadership, organizations, economics, and foreign policy (Clayton, 2012). In the context of the natural environment, Clayton & Opatow (2003) introduced "environmental identity," defining it as "a sense of connection to some part of the non-human natural world, which influences our perceptions and actions towards the world; believing the environment is important to us and is an essential part of our identity".

Social identity is a key factor in understanding how individuals interact with and perceive environmental issues. Identity, whether based on gender, nationality, race, or socioeconomic status, profoundly affects one's relationship with nature and vulnerability to environmental hazards (Bullard & Glenn, 2000). Moreover, environmental injustice, i.e., the unequal distribution of environmental hazards across social categories, highlights how the objective social reality shapes the varied experiences different social groups have with the natural environment, thereby forming different social identities related to nature (Shao et al., 2022).

Cultural differences play a crucial role in shaping environmental identity. For instance, some Native American cultures view the natural world and the human world as interdependent, sometimes even considering animals as ambassadors within human society, deserving of respect and fair treatment (Berkes, 1999; James et al., 2008). In contrast, Chang and Opatow (2009) found in their studies of Namibians and Americans that while all participants expressed a sense

of environmental identity, Americans' environmental identities were more rooted in narratives based on childhood experiences, whereas Namibians focused more on intergenerational changes in natural values and were more likely to recognize the sociopolitical implications of natural concepts.

Specific sociopolitical contexts also impact environmental identity. Environmental identity in the 21st century is not only related to the threats faced by the natural environment but also to the political realities that imbue environmental attitudes with social significance (Clayton, 2012; Opatow & Brook, 2003). For example, environmental information is often seen as a threat to the lifestyle associated with specific social identities, hence it may be rejected (Bouman et al., 2021). This phenomenon explains why there are politically related divergences in attitudes towards climate change

In summary, social identity shapes environmental identity both through the direct perceptual relationship individuals have with nature and indirectly through mediated relationships with social groups. This identity not only reflects how people see nature as part of their lives but also guides their participation in environmental actions and support for environmental policies (Clayton & Opatow, 2003; Ando et al., 2007).

The significance of exploring environmental identity is evident in studies that have found a positive correlation between environmental identity and emotional well-being (Hinds & Sparks, 2009). This relationship may manifest as enhanced self-esteem in beautiful environments, while polluted environments may trigger feelings of shame (Edelstein, 2002). Environmental identity also influences ethical decision-making and motivational behaviors.

According to Lerner and Clayton (2011), identity is a significant factor in considering environmental justice, involving the attribution and protection of rights. Strengthening environmental identity may encourage collective action in the face of commons dilemmas, with research showing that a sense of collective identity is a key factor in promoting cooperation (Brickson & Brewer, 2000; Parks et. al., 2001; Van Vugt, 2001). Moreover, enhancing environmental identity can foster commitment to pro-environmental behaviors (Kasser, 2009) and may inspire more environmentally friendly actions (Gatersleben et al., 2012; Van der Werff et al., 2014).

Given the importance of environmental identity and the inconsistency of environmental identities among individuals, it is essential to measure environmental identity. Researchers have developed various similar assessment tools to evaluate environmental identity and its related constructs, including:

Environmental Identity Scale (EID)

The Environmental Identity Scale (EID) assesses the importance of the natural environment in an individual's self-definition through 24 items (later simplified to 11). These items cover aspects such as the individual's connection with nature, the importance placed on nature, and participation in outdoor activities. The scale is reliable and positively correlated with ecocentrism, universal values, and collectivism, and negatively correlated with environmental apathy and individualism (Clayton, 2003). In 2021, to enhance the reliability of EID in cross-cultural research, Clayton et al. revised the simplified version of EID.

Environmental Identity Scale (Stets & Biga)

Developed by Stets and Biga (2003), this scale consists of 11 items that assess individuals' emotional engagement and participation with nature. The items reflect people's relationships with nature, such as transcendence vs. connection and care vs. indifference. The scale's reliability is high, making it suitable for assessing environmentally related self-concepts.

Inclusion of Nature in Self Scale (INS)

Designed by Schultz (2001, 2002), the Inclusion of Nature in Self (INS) scale measures the degree of an individual's relationship with nature by selecting a series of pictures showing "self" and "nature" circles ranging from separate to overlapping. INS shows a strong correlation with measures of environmental behavior.

Connectedness to Nature Scale (Dutcher et al.)

Developed by Dutcher and others (2007), this connectivity scale assesses the fundamental oneness an individual feels with the natural world. The scale includes survey items and overlapping circle graphics from INS, emphasizing the relationship between the individual and nature.

Implicit Association Test for Connection with Nature

Developed by Schultz and others (2004; Bruni & Schultz, 2010), this implicit association test uses reaction time to assess the strength of cognitive connections people have with nature. This method's advantage is that it avoids social desirability bias, providing a more in-depth assessment of the connection with nature.

Connection with Nature Scale (CNS):

Developed by Mayer and Frantz (2004), the Connection with Nature Scale (CNS) primarily assesses individuals' emotional responses to the natural world, similar to EID but shorter. CNS may be more sensitive to situational manipulations, making it useful for assessing emotional or cognitive responses to nature.

New Environmental Paradigm (NEP)

The New Environmental Paradigm (NEP; Dunlap & Van Liere, 1978) is a scale that assesses people's ideologies about nature and the human-nature relationship. It is proven to predict environmental behavior and is considered a unidimensional measure of cognition about nature.

Environmental Attitude Scale (EAS)

Developed by Thompson and Barton (1994), the Environmental Attitude Scale (EAS) aims to measure three different attitudes towards nature: ecocentrism, anthropocentrism, and indifference towards environmental issues. EAS has lower predictive power for self-relevant phenomena compared to measures of environmental identity.

Some studies have compared these measurement methods, finding that EID scores the highest among the eight methods and is more accurate in predicting environmental behavior (Brügger et al., 2011; Olivos & Aragonés, 2013; Tam, 2013). I made a table to show the comparison more directly and clearly.

Table 1. Overview of Environmental Identity Scales

Scale Name	Advantages	Disadvantages
------------	------------	---------------

Environmental Identity Scale (EID)	Reliable, positively correlated with related environmental attitudes and values.	Initial version is lengthy, may require more time to complete.
Environmental Identity Scale (Stets & Biga)	High reliability, clearly measures emotional engagement and participation with nature.	Some bipolar items may cause interpretative difficulties.
Inclusion of Nature in Self Scale (INS)	Easy to use, high correlation with environmental behavior.	Primarily measures perceived connections, may lack insight into deeper psychological motivations.
Connectedness to Nature Scale (Dutcher et al.)	Combines survey items and visual tools, enhancing depth of assessment.	Low internal reliability (0.72), which may affect result stability.
Implicit Association Test for Connection with Nature	Avoids social desirability bias, provides deep cognitive connection assessment.	Not always related to explicit measures of environmental behavior, requires special equipment and software.
Connection with Nature Scale (CNS)	Short and focused, emphasizes emotional responses.	May be sensitive to situational changes, leading to unstable results.
New Environmental Paradigm (NEP)	Widely used, validated for predicting environmental behavior, suitable for assessing environmental ideologies.	Generally considered a unidimensional measure, may not cover the diversity of environmental identity.
Environmental Attitude Scale (EAS)	Clearly distinguishes different attitudinal stances towards nature.	Lower predictive power for environmental identity, may not directly reflect individuals' relationships with the environment as effectively as identity scales.

In this study, I have chosen to use the EID that revised by Clayton et al. (2021) to measure the environmental identity of first-generation Mainland Chinese immigrants residing in the CRD, based on several reasons: first, the EID is a validated tool with high reliability (Cronbach's Alpha approx. 0.90), ensuring the scale's stability and reliability across different cultural contexts (Clayton, 2003), and it is the only one among these eight tools that has been revised in recent five years for cross-cultural contexts (Clayton et al., 2021). Second, the EID not only assesses the strength of an individual's relationship with nature but also involves aspects such as the individual's capability, autonomy, sense of belonging, and participation in outdoor activities, all of which are important facets of assessing environmental identity. Additionally, the EID is positively correlated with eco-centric attitudes, universal values, and collectivism, and negatively correlated with environmental apathy and individualism, which helps to deeply understand the characteristics of immigrant groups in terms of environmental attitudes and values. Therefore, the EID can comprehensively reflect the environmental identity of first-generation Mainland Chinese immigrants, providing rich data support and insights for the study.

Theory of Acculturation

Acculturation refers to the phenomenon that occurs when individuals or groups from different cultures come into continuous direct contact, and the original cultural patterns of one or both groups subsequently change (Redfield et al., 1936). This process is closely related to identity, as Erikson's (1968) theory of identity development emphasizes that individuals go through different stages of identity development throughout their lives, each accompanied by specific crises and challenges that need to be resolved to form a more mature identity. For immigrants,

acculturation itself is a process of identity redevelopment, as they need to integrate into a new cultural environment while maintaining their original cultural traits. In terms of environmental identity, this theory helps us understand how immigrants reassess and redefine their relationship with nature in the new culture, especially when faced with environmental values and practices different from their original culture.

In cross-cultural psychology, acculturation is the psychological and social process that individuals and groups experience when living, working, and communicating in a new cultural environment (Berry, 2006; 2008). The acculturation process of individuals and groups is a key factor influencing their behavior and identity. According to Sam and Berry (2010), cultural adaptation involves the cultural and psychological changes that occur after individuals come into contact with a new culture. These changes are reflected in immigrants' behavioral patterns and psychological well-being, and the modes of acculturation often include integration, assimilation, separation, and marginalization (Berry, 1997).

Combining the research of Crocetti and others, acculturation strategies, especially integration, encourage individuals to maintain their original cultural identities while also adopting new cultural values and behaviors regarding environmental conservation. This strategy helps individuals find a balance between two cultures, contributing to the formation of an inclusive environmental identity that reflects both their cultural heritage and the new environment's ecological concepts (Crocetti et al., 2008). Environmental identity not only reflects an individual's values and lifestyle but is also closely related to how they view their relationship with society and the natural environment. When individuals adapt to a new culture through integration strategies,

they not only find their place in the physical environment but also adjust their behaviors and beliefs in the social and cultural environment, directly influencing their environmental identity (Clayton, 2003; Schultz, 2002).

Based on these theories, we can conclude that environmental identity is often closely related to specific cultural values and practices, such as respect for and protection of nature. Secondly, during the acculturation process, immigrants encounter and may adopt the host country's environmental behaviors and attitudes, which can be combined with their original cultural concepts to form a unique environmental identity. Lastly, integration strategies particularly emphasize the duality of cultural identity, prompting individuals to remain active in both cultures, making the formation of environmental identity richer and more diversified (Berry & Sam, 2013; Crocetti et al., 2008).

Literature Review

In attempting to identify the changes in environmental identity experienced by first-generation Chinese immigrants after moving to Canada, it is necessary to first understand the environmental cultural heritage they inherit from their homeland and the social norms and environmental awareness of Canadians. I have organized a literature review and formulated hypotheses around the current research on cross-cultural psychology and environmental psychology, combined with my research topic.

Environmental Identity of the Public in the CRD and China

Studies on the environmental awareness and concern of the Canadian public are plentiful, but most are on a national scale. For example, Kennedy et al.'s 2009 study of Canadians in 10 provinces found that Canadians' public environmental awareness has grown over the past 40 years and is at a high level; Zhou's 2013 study indicated that environmental issues have attracted widespread attention in Canada, with 70.6% of respondents considering environmental protection more important than economic development.

In British Columbia, environmental issues have long been a hot topic in public and policy discussions, especially regarding logging, wildlife conservation, and environmental legislation (Blake et al., 1997). Although there is a lack of direct research on environmental identity in the CRD region; by studying the environmental attitudes and values in British Columbia, we can speculate on the characteristics of environmental identity in the CRD region.

Edgell and Nowell (1989) used the New Environmental Paradigm to study the wildlife and environmental views of BC residents, finding that residents support the environmental values of protecting natural resources and ecological balance. These values are widespread within the province, especially among members of environmental organizations, showing a strong eco-friendly attitude (Edgell & Nowell, 2008). At the same time, research by Blake et al (1997) revealed the reactions of BC residents to environmental policies, such as vehicle emission standards reforms, indicating that despite economic considerations, residents' support for environmental protection remains firm.

These studies indicate that CRD residents may also hold similar environmental conservation consciousness and active participation with other BC residents, which manifest in their daily lives through support for environmentally friendly policies, participation in environmental protection activities, and promotion of sustainable lifestyles in the community. These behaviors are part of their environmental identity, reflecting how they combine personal actions with environmental values to adapt to and influence the social and natural environment in which they live.

In contrast, China's environmental identity presents a complex picture of tradition versus modernity. Traditional Chinese philosophies, such as Taoism, Buddhism, and Confucianism, are regarded as educational in developing more environmentally friendly values (Harris, 2004). For example, Taoist philosophy—a common sense known to the Chinese—believes that "people must respect the wilderness (the 'natural' state of 'nature'), otherwise they may destroy her in the process of trying to improve her" and that "efforts should be made not to destroy its regenerative capacity"

when developing nature (Walls, 1998, p.56). Traditional Taoist thought once taught individuals and society to "maintain a balanced and harmonious lifestyle with the natural world" (Ponting 1991, p. 152). Additionally, certain forms of Buddhism are known for their concern for the environment, especially other species, and Confucianism is praised for its "unity of man and nature" concept (Li 1998, p. 307).

However, these traditional values are considered "powerless" in the face of the tremendous pressure from China's massive population and industrial force (Peterson, 2001). A study from the early 21st century showed that most urban water supplies in China are polluted by domestic, agricultural, and industrial waste. At the same time, the overuse and shortage of water resources mean that many areas do not have enough water for agriculture. Sulfur dioxide emissions are extremely high, acid rain covers at least one-third of the country, and air pollution is common in most Chinese cities. Aquifers near landfills are contaminated by large amounts of solid waste. Soil erosion, deforestation, and loss of grasslands are becoming increasingly severe, leading to droughts in agricultural areas and annual flooding of rivers (Wang, 2002, p. 186).

As the Chinese government became aware of the severity of environmental issues, they incorporated environmental topics into the national agenda and have been continuously striving to improve environmental governance (Carter & Mol, 2013; Li & Lang, 2010; Xue et al., 2007). The Ministry of Ecology and Environment of the People's Republic of China's 2023 report states that China has made progress in controlling pollution, increasing forest coverage, advancing low-carbon development, and enhancing environmental awareness, but issues such as substandard air

quality, imbalanced water ecology, and soil pollution remain serious (Ministry of Ecology and Environment of the People's Republic of China, 2023).

In recent years, a growing number of studies of various scales on the environmental awareness of the Chinese public have gradually pieced together a portrait of Chinese public environmental awareness: generally possessing high environmental consciousness but low levels of environmental knowledge (Lee, 2005; Harris, 2008); in cities, environmental awareness is positively correlated with education level (Xiao & Hong, 2010), while in rural areas, constrained by a lack of environmental education and information, rural residents' environmental awareness is significantly lower than that of urban residents (Yu, 2014).

Furthermore, although there is currently no more comprehensive literature directly comparing environmental governance or sustainability performance between Canada and China, the Environmental Performance Index (EPI) jointly released by Yale University and Columbia University, which scores and ranks 180 countries on climate change performance, environmental health, and ecosystem vitality, can serve as a reliable reference (Block et al., 2024). The results show that Canada ranks significantly ahead of China, ranking 27th, improving by 3.4 points compared to ten years ago; whereas China, despite a 7.4 point increase over the same period, still ranks at 154th (EPI, 2024).

Residence Duration and Environmental Identity

Studies indicate that immigrants living in a new cultural environment for an extended period tend to absorb and practice the values and behaviors of that culture (Berry et al., 2006). Especially concerning the formation of environmental identity, residence duration is a key factor

as it directly correlates with the frequency of exposure to environmental education and participation in community conservation efforts (Rudmin, 2009). According to Berry's acculturation theory, over time, immigrants increase their cultural adaptation through interaction with the host society, which includes adopting environmental values and behaviors, particularly when frequently engaging with the host country's environmental policies and community practices (Berry, 1997). The environmental socialization of immigrants requires time; long-term residents, due to their more frequent exposure to such environments, are more likely to adopt and internalize these environmental protection behaviors and attitudes (Sun & Fong, 2021). For example, immigrants to the USA that had lived in the country longer tended to have environmental behaviors similar to native-born Americans, suggesting that longer residence times help immigrants converge with the host country's environmental values and behavior standards (Hunter, 2000). Squalli (2021) confirmed, using state-level data in the USA from 1997-2014, that an increase in the number of immigrants correlates positively with improvements in environmental quality, reinforcing the positive relationship between residence duration and environmental behavior. Deng et al. (2006) observed that as residence duration increased, the difference in environmental values between immigrants and natives diminished. Similarly, Leung and Rice (2002) confirmed that environmental behavior is positively correlated with residence time.

Age at Immigration and Environmental Identity

Age is another critical variable affecting the changes in attitudes and behaviors during the acculturation process of immigrants. Younger immigrants perform better in language and cultural adaptation, which may influence their attitudes and behaviors toward environmental issues (Portes

& Rumbaut, 2006). According to psychosocial development theory, youth is a crucial period for the formation of values and attitudes (Erikson, 1968); additionally, young immigrants often come to Canada for education (Statistics Canada, 2021), which not only provides knowledge about environmental issues but also fosters critical thinking and complex problem-solving abilities—key factors in developing a sense of environmental responsibility (Kollmuss & Agyeman, 2002). The new cultural and environmental norms that immigrants encounter during this phase may profoundly affect their long-term environmental identity. For example, Caro & Ewot (1995) pointed out that younger immigrants tend to have a stronger environmental identity because they are exposed to the host country's environmental education and practices during their formative years; according to Heisz and Schellenberg (2004), immigrants in Canada who have received higher levels of education exhibit stronger environmental conservation behaviors. However, Otto and Kaser (2014) provided a new insight into the environmental behaviors of older individuals, suggesting that as people age, they are more likely to engage in pro-environmental behaviors because they encounter environmental issues more frequently over time. He argues that not just aging (maturity) enhances a sense of environmental responsibility but that an individual's lifelong cumulative learning from exposure to environmental information and education determines the occurrence of more pro-environmental behaviors.

Contact with Natural Environments and Environmental Identity

Within the framework of environmental identity theory, natural environments are crucial for providing distinct experiences to different social groups, subsequently shaping diverse social identities linked to nature (Clayton, 2012). Research by Peters et al. (2016) underscores the pivotal

role of natural settings in fostering place attachment and environmental identity among residents, including immigrant populations. The theory of place attachment suggests that increased interactions with natural environments enhance emotional bonds between individuals and their surroundings, facilitating a stronger environmental identity (Scannell & Gifford, 2010). These interactions are characterized by the restorative effects of natural settings, which not only alleviate stress but also promote psychological well-being (Kaplan, 1995).

For first-generation Chinese immigrants residing in the CRD, exposure to natural environments may be a key factor in shaping their environmental identity. This is particularly pertinent given the cultural transitions they experience, which could alter their environmental perceptions and values. Clayton (2012) notes that the process of place attachment involves cognitive and affective responses to the environment, significantly influencing environmental attitudes and behaviors. Furthermore, Korpela's (1989) research extends beyond mere familiarity to include elements of identity and dependency, which are crucial in the formation of environmental identity. Immigrants often seek connections with the new environment, providing continuity and a sense of belonging, which could lead to greater appreciation and concern for local environments (Lewicka, 2011). Moreover, the "mere exposure effect" within environmental psychology supports the hypothesis that repeated exposure to natural settings increases the likelihood of developing strong place attachments, thereby enhancing environmental identity (Zajonc, 1968).

Research Gaps and Contribution

The research on environmental identity has gradually matured since 2003, with a primary focus on understanding and promoting individuals' pro-environmental behaviors through environmental identity (Clayton & Opatow, 2003; Stets & Biga, 2003). However, studies exploring environmental identity among immigrant groups, especially those from countries with different environmental management backgrounds, remain scarce. For example, a search in the authoritative journal of environmental psychology, the *Journal of Environmental Psychology*, yielded 887 articles with "identity" as a keyword, 727 of which were published after 2003 (the year the concept of environmental identity was introduced), and 584 articles with "cross-cultural" as a keyword since 1996, yet only 42 articles were found with "immigration" as a keyword. This shows that research on immigrants' environmental identity is limited and not thoroughly explored within the research frameworks of environmental psychology.

Moreover, existing studies tend to focus on immigrants' economic, social, and cultural adaptation, with only preliminary explorations into their environmental adaptation. Especially for immigrants from countries facing significant environmental challenges, such as China, they may bring specific environmental notions and behaviors to Canada, which could significantly differ from Canadian environmental ideologies. How these differences affect immigrants' environmental identity and behavior during the cultural adaptation process is a critical research question that has yet to be explored in the literature.

My research aims to fill this gap by combining theories of environmental psychology with cross-cultural studies to systematically analyze how immigrants' environmental identity changes throughout the process of cultural adaptation. Using a combination of scale surveys and semi-

structured interviews, I explore various factors affecting environmental identity, such as residence duration, age, and contact with natural environment, to study the environmental identity of first-generation Chinese immigrants living in the Capital Regional District. This study not only helps to understand how cultural differences shape environmental identity but also provides a basis for developing more effective environmental policies and interventions, especially regarding environmental management strategies in a multicultural context.

Methodology

Understanding the complex interplay between cultural identity and environmental awareness, particularly among immigrant groups, requires a methodology capable of capturing both broad trends and nuanced individual experiences. This study employs a mixed methods approach to explore how the environmental identities and perceptions of climate change among first-generation Chinese immigrants in the Capital Regional District (CRD) are influenced by their length of residence. This group presents a unique and growing demographic within Canada's multicultural landscape, making their environmental perspectives particularly relevant for local policy and community integration.

This section details the research design, participant selection criteria, data collection methods, and analytical techniques. By integrating multiple methodologies, this study aims to provide meaningful insights that can inform more effective environmental policies and foster greater community cohesion within the CRD. The outlined methods reflect a rigorous approach designed to address the complex dynamics of immigration, cultural adaptation, and environmental engagement.

Research Design

A mixed-methods research design, which combines or integrates quantitative and qualitative research and data within a single study, offers several advantages, such as complementarity, diversity, and comprehensiveness (Hafsa, 2019). Creswell (2014) and Teddlie and Tashakkori (2008) advocate for this model because it provides a fuller understanding by confirming and supplementing findings from different methodologies.

In this study, I used a parallel convergent mixed-methods approach, collecting quantitative and qualitative data simultaneously. I then "fused or combined" the data to explore the research questions. I then integrated these data to clarify and further investigate inconsistent or contrasting findings. Given the need to address complex research questions that require understanding both the breadth (quantitative) and depth (qualitative) of phenomena, I chose a mixed-methods approach. I expected this approach to allow for a more nuanced interpretation of the relationship between quantitative results and qualitative insights. I used theoretical frameworks from environmental psychology and immigration studies to guide the integration. This helped to explain the complex interplay between cultural adaptation and environmental awareness.

Quantitative Methods

The quantitative component of the study used descriptive and inferential statistics to analyze how age and length of residence correlate with environmental identity scores among immigrants. The strength of this approach lies in its ability to produce data that, while not entirely free from subjectivity, typically remain independent of the researcher's personal beliefs. Established statistical methods provide a high degree of control over variables, ensuring the validity and reliability of findings. This method is useful for assessing patterns and trends in large samples, offering a general overview of community environmental perceptions (Libarkin & Kurdziel, 2002). I collected quantitative data using the Environmental Identity Scale (EID), revised by Clayton in 2021. This scale was adapted for the participants' cultural backgrounds and validated to ensure reliability in this specific setting (Clayton et al., 2021).

Qualitative Methods

Complementing the quantitative approach, the qualitative component involved semi-structured interviews with a purposive sample subset to delve into personal and cultural nuances that influence individual environmental perceptions and behaviors. Qualitative methods are valued for their ability to focus on details not constrained by analytical methods and to directly engage data sources, establishing validity and reliability through logical consensus (Libarkin & Kurdziel, 2002). Semi-structured interviews are particularly suited for quantitative research when seeking each individual's independent perspective within a group. By focusing on personal narratives, qualitative methods provide depth and context to statistical results, revealing the subjective meanings and experiences behind the numbers (Adams, 2015).

Participant Selection

The inclusion criteria for this study specifically targeted first-generation Chinese immigrants who were 18 years or older at the time of immigration and had resided in the CRD for at least one year. This ensured that participants had the influence of a Chinese background and sufficient exposure to the local environment and community to form informed views on local environmental issues. The age criterion ensured all participants were legal adults capable of providing informed consent.

Exclusion criteria included non-first-generation immigrants or individuals residing outside the CRD and those under 18 years old. These criteria helped maintain focus on the designated study group and ensured that findings were applicable to the intended research

population. These measures protected participants' rights and privacy, creating an ethical research environment.

Sampling Strategy

In qualitative research, I used purposive sampling to capture a broad range of experiences and insights. This method allowed for selecting participants representing different segments of the population, such as age, gender, and length of residence, ensuring that the study captured a wide range of perspectives (Creswell, 2013). For purposive sampling, I deliberately selected locations and methods to ensure diversity and representativeness of the sample. First, I visited Chinatown, a traditional gathering place for Chinese immigrants, to reach immigrants from various backgrounds and lengths of residence. Second, I attended events at cultural centers where Chinese immigrants regularly gather, which are typically hubs of community interaction encompassing a wide range of ages and occupations. Additionally, I visited recreational centers in areas densely populated by Chinese immigrants, which are part of daily life and provide access to long-term residents within the community.

Furthermore, I employed snowball sampling, where current participants recommended new participants. This method is particularly useful for reaching hard-to-access groups or when seeking to understand specific characteristics within a community or group through participants' social networks (Naderifar et al., 2017). Combining purposive and snowball sampling strategies ensured that the sample broadly covered different aspects of the Chinese immigrant population and enhanced the depth and quality of the research data (Parker et al., 2019).

For the quantitative component of this study, I employed a convenience sampling method to recruit participants from the local Chinese community in the CRD. This approach allowed me to efficiently reach a broad segment of the population through both online and offline channels (Zickar & Keith, 2023), though it is important to acknowledge that this method may introduce certain limitations in terms of generalizability, such as overrepresenting individuals who are more active in community networks, technologically proficient, or engaged with social media (Stratton, 2021).

To mitigate the potential biases associated with convenience sampling, I implemented several strategies aimed at improving the dependability of the sample. First, I utilized validated survey instruments as part of this study. Specifically, the EID Scale, which has been widely used and validated in cross-cultural research, was employed to assess participants' environmental identity. This aligns with the recommendation to use validated questionnaires and scripts to ensure the accuracy and reliability of the data collected (Andrade, 2020). By using a validated tool, I aimed to minimize measurement error and increase the credibility of the findings.

Additionally, to achieve a more diversified and representative sample, I used a variety of recruitment methods, including online platforms like WeChat and Facebook, as well as offline efforts such as visits to Chinatown and collaborations with local cultural organizations. This approach aligns with the recommendation to collect data in a diversified manner to improve representativeness and participation (Andrade, 2020). I also provided recruitment materials and surveys in Mandarin and Simplified Chinese to overcome potential language barriers, ensuring that participation was accessible to a broader segment of the community.

To ensure a balanced representation of individuals within this community I stratified participants based on the length of their residence in Canada, categorized as follows:

Recent Immigrants (0-2 years): This group includes individuals who have recently moved to Canada. Their experiences are likely to provide insights into the initial stages of cultural adaptation and its immediate impact on environmental perceptions.

Short-Term Residents (3-5 years): These participants have had more time to experience and interact with the local environment and community, potentially leading to evolving perceptions and identities.

Medium-Term Residents (6-10 years): Individuals in this category have had a considerable duration to adapt and integrate into the local culture. Their responses may reflect more established environmental views and identities that have been influenced by their experiences in Canada.

Long-Term Residents (More than 10 years): This group consists of those who have lived in Canada for an extended period, leading to a deep integration into the local culture and community. Their perspectives could provide insights into how long-term residency shapes environmental identity and engagement.

Sample Size Justification

In qualitative research, sample size decisions are primarily based on the principle of data saturation, which occurs when no new themes or information are introduced in the data collection process, indicating that the data collected is sufficient to comprehensively reflect all

aspects of the research question (Creswell, 2013). According to Gifford (2016), to achieve data saturation, the study employed the following strategies:

Initial Sample Setting: Initially aimed for 6-8 semi-structured interviews, based on the anticipated complexity of themes and diversity of the data.

Iterative Evaluation: Conducted preliminary analysis after each interview to assess whether new themes or information emerged. Data saturation was achieved when no new themes or information appeared in two consecutive interviews.

Sample Diversity: Ensured the sample included immigrants of different ages, genders, and lengths of residence to enhance the representativeness and breadth of the findings.

For the quantitative component, following guidelines from the Handbook of Quantitative Psychology (Little, 2013) and considering the anticipated effect size (Cohen's $d = 0.5$), I aimed for a sample size of 100 participants to ensure at least 80% statistical power at a 0.05 significance level to detect meaningful effects. This sample size allowed for sufficient data to support complex statistical analyses and increased the generalizability and robustness of the study results.

Data Collection Methods

Language Choice

All data for this study were collected in Mandarin and Simplified Chinese. Simplified Chinese has been the standardized script in Mainland China since 1956 (The State Council of the People's Republic of China, 1956), and Mandarin is widely spoken, with a prevalence of 80.72% as of 2022 (Ministry of Education of the People's Republic of China, 2022). It is important to

note that Cantonese, a Chinese dialect, is also widely spoken among the Chinese community in the CRD. According to Statistics Canada (2021), nearly 40% of native Chinese speakers in the CRD report Cantonese as their first language.

This study does not exclude Cantonese speakers. Although I am not proficient in Cantonese, I will seek the assistance of individuals with environmental expertise who are fluent in both Mandarin and Cantonese to help with participants who can only express their thoughts in Cantonese. Research indicates that bilingual individuals may express different personality traits in different languages, which can affect their responses to survey questions and interview prompts (Marian, 2024).

To minimize language-related response bias and given the widespread use of Mandarin and Simplified Chinese in the CRD (more than 60% of Chinese speakers in the CRD reported Mandarin as their mother tongue and language spoken most often at home (Statistics Canada, 2021)), data were collected in these languages to ensure participants' comfort and response accuracy.

Quantitative Data Collection

I used the Environmental Identity Scale (EID) to quantitatively measure participants' identification with the natural environment. Originally developed by Clayton (2003) and revised in 2021 to accommodate cross-cultural contexts, this scale has been validated for reliability in specific settings (Clayton et al., 2021). I translated the scale into Simplified Chinese and cross-verified with a Traditional Chinese version used in the 2021 study to ensure linguistic accuracy and cultural relevance for the CRD's Chinese immigrant population.

I distributed surveys in both online and paper form. I disseminated online surveys via WeChat and specific Facebook groups, facilitating community member access and increasing participation. I distributed paper surveys at community centers and during events organized by Chinese cultural associations, providing an alternative for those without reliable internet access or who preferred traditional methods, particularly older groups. I offered assistance during distribution events to help participants understand and complete the surveys, ensuring data collection was as inclusive and comprehensive as possible.

Qualitative Data Collection

The qualitative component involved semi-structured interviews with a subset of survey participants representing different combinations of age, gender, and length of residence in the CRD. These interviews aimed to explore the personal and contextual factors influencing participants' environmental identity more deeply. Conducted in Mandarin to minimize language barriers, the interviews allowed participants to express their experiences and views comfortably and accurately.

I held interviews in quiet, neutral settings such as private rooms in community centers or public libraries to ensure privacy and minimize distractions, enabling participants to share personal and sometimes sensitive information. Each interview lasted 45 to 60 minutes, allowing enough time to explore complex topics. The semi-structured interview format provided flexibility, allowing the interviewer to delve deeper into specific areas of interest or relevance based on participants' responses (Little, 2013). Before each interview I informed participants

about the study's purpose and their rights, including confidentiality and voluntary participation, ensuring they were fully aware and comfortable with the process.

Data Analysis

The data analysis for this study consists of both quantitative and qualitative approaches to comprehensively examine the environmental identity of first-generation Chinese immigrants in the Capital Regional District (CRD). The analysis is structured to test the hypotheses derived from the literature review and to ensure that the methods used align with the specific hypotheses.

Hypotheses

Based on the literature review, I propose the following hypotheses:

Hypothesis 1: First-generation Chinese immigrants living in the CRD have a lower environmental identity compared to the Canadian public due to originating from countries with comparatively lower levels of environmental protection and more severe environmental issues.

Hypothesis 2: The longer the residence time in Canada, the higher the environmental identity score among first-generation Chinese immigrants.

Hypothesis 3a: Younger age at the time of immigration to Canada correlates with higher environmental identity scores among first-generation Chinese immigrants.

Hypothesis 3b: Older age at the time of immigration correlates with higher environmental identity scores among first-generation Chinese immigrants.

Hypothesis 4: Greater exposure to natural environments is associated with higher environmental identity among first-generation Chinese immigrants living in the CRD.

Quantitative Analysis

The quantitative portion of the study employed both descriptive and inferential statistical analyses to process the data. The use of descriptive and inferential statistics provides a structured approach to interpreting complex data in environmental psychology research. As Gifford (2016) noted in "Research Methods for Environmental Psychology," these statistical tools help researchers summarize data, test hypotheses, and ensure the scientific validity and reliability of results. According to Cohen (1988), these methods enable researchers to identify and interpret patterns within a given data set, providing insights into how environmental and cultural factors influence individuals' environmental identity. In addition to examining individual data, I categorized participants into three groups based on their age at immigration: 18-24, 25-44, and 45 and above, following the standards of Statistics Canada, to uncover group patterns.

Descriptive Statistics. To summarize the mean environmental identity scores, standard deviations, and counts for different age groups and lengths of residence, descriptive statistics in this research is specifically used at testing Hypotheses 3a, 3b, and 2 by calculating the mean environmental identity scores for different age groups (18-24, 25-44, 45+) and lengths of residence in Canada (0-2 years, 3-5 years, 6-10 years, more than 10 years). This helped identify general trends and variations in environmental identity among the study participants.

Means and Standard Deviations. Calculating the mean scores and standard deviations for each age group on the Environmental Identity Scale (EID), as described by Gifford (2016), helps assess the performance and differences in environmental identity across different groups.

Frequency and Distribution. Presenting the frequency and distribution of responses for each survey item, following Trochim's (2020) methodology, provides a visual representation of the data's distribution characteristics.

Inferential Statistics. Inferential statistics use methods such as correlation analysis, regression analysis, and analysis of variance (ANOVA) to draw general conclusions from sample data, allowing me to statistically evaluate relationships and influences between variables (St & Wold, 1989).

Correlation Analysis. I used Pearson's correlation coefficient, as guided by Field (2013), to examine the relationship between the length of residence in Canada and each item on the Environmental Identity Scale. By using this analysis, I aim to test Hypothesis 2, with Pearson correlation coefficients calculated between the length of residence and each environmental identity item to determine if longer residence correlates with higher environmental identity scores.

Regression Analysis. Following Cohen et al. (2013) I used regression analysis to test Hypotheses 3a and 3b, employing multiple regression with environmental identity scores as the dependent variable and age at immigration and years of residence as independent variables. This approach allowed for assessing the individual and combined effects of these factors on environmental identity.

Analysis of Variance (ANOVA). I implemented ANOVA techniques, as described by Kirk (2013), to determine if there are significant differences in environmental identity scores across different age groups, testing Hypotheses 3a and 3b. I used ANOVA to compare mean

environmental identity scores across the three age groups (18-24, 25-44, 45+), identifying whether age at immigration significantly influences environmental identity.

Post Hoc Tests (Tukey's HSD Test). I used Tukey's Honest Significant Difference (HSD) test by Howell (2012), to determine which age groups differ significantly. This test method allows for multiple comparisons while controlling for overall error rates, further clarifying specific group differences identified by ANOVA.

I conducted a comparative analysis to compare the environmental identity scores of first-generation Chinese immigrants with those of other populations from existing literature. This analysis aimed to test Hypothesis 1 by comparing the mean environmental identity scores of Chinese immigrants with scores from various populations reported in previous studies, determining if Chinese immigrants have lower environmental identity compared to the general Canadian public and other international samples.

Qualitative Analysis

To explore the influence of exposure to natural environments on environmental identity, specifically testing Hypothesis 4, I analyzed qualitative data from interviews and open-ended survey responses to understand how interactions with natural environments influence environmental identity. I identified themes and patterns related to exposure to nature and environmental behaviors, providing a richer context to the quantitative findings. By employing these diverse methods, I aimed to provide a comprehensive understanding of the factors influencing environmental identity among first-generation Chinese immigrants in the CRD.

I analysed qualitative data obtained from semi-structured interviews using Braun and Clarke's six-phase thematic analysis process (Braun & Clarke, 2023). This iterative process involved familiarizing with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing a report. I transcribed each interview verbatim, translated into English using Otter.ai, and then reviewed by me to ensure the accuracy of the translations, preparing them for coding.

I undertook initial coding manually, focusing on identifying significant statements and observations related to environmental identity and cultural adaptation experiences. I then grouped the codes into potential themes that captured patterns within the dataset. I refined the themes and related back to the research questions, ensuring they were meaningful and grounded in the data.

This thematic analysis identified key dimensions of participants' environmental identity, illustrating how cultural and immigration-related factors interweave to shape their environmental perspectives. The qualitative findings provided depth and context to the quantitative results, offering a comprehensive narrative that enriched the understanding of participants' lived experiences.

Ethical Considerations

This research adhered strictly to the ethical guidelines approved by the Royal Roads University Ethics Review Board. Before participation, all interviewees were required to sign an informed consent form that detailed the study's purpose, procedures, potential risks, and benefits. The consent form ensured participants had the right to withdraw from the study at any time

without penalty. Confidentiality was maintained by anonymizing participant data and securely storing all research materials. I kept personal information separate from survey responses and interview transcripts to ensure that individual responses could not be traced back to participants. These measures protected participants' rights and privacy, creating an ethical research environment.

Results

In this section, I present the findings derived from quantitative and qualitative research methods to understand the environmental identity of immigrants from Mainland China in the CRD. The quantitative analysis focuses on EID scores and examines their correlations with variables such as age at immigration, length of residence in Canada, and demographic factors. The qualitative component employs semi-structured interviews to delve into personal experiences, cultural backgrounds, and acculturation processes that influence these immigrants' environmental perspectives and practices.

Quantitative Findings

Sample Size and Power

The initial sample size for this study was designed to be 100 participants. However, due to various constraints, the final number of completed responses was 80. Despite this reduction, a sample size of 80 is still sufficient to achieve robust statistical power. According to Cohen (1988), a sample size of 80 can detect medium to large effect sizes with adequate power (0.80) at a significance level of 0.05. Therefore, the findings from the analysis can be considered statistically reliable and valid for drawing meaningful conclusions about the environmental identities of the target population.

Descriptive Statistics

Table 2 summarizes the mean environmental identity scores, standard deviations, and counts for each age group. The data indicates that participants who immigrated to Canada at an

older age (45+) have the highest mean environmental identity scores, suggesting a stronger connection or awareness of environmental issues with increasing age.

Table 2: Environmental Identity Scores by Age Group

Age Group	Mean EID Score	Standard Deviation	Count
18-24	5.79	0.81	21
25-44	5.94	0.87	48
45+	6.51	0.39	11

To test Hypothesis 2 (the longer the first-generation Chinese immigrants reside in Canada, the higher their environmental identity scores), we analyzed the mean environmental identity scores based on the length of residence in Canada. The results are summarized in Table 3, indicating that recent immigrants (0-2 years) have the highest mean score, while long-term residents (more than 10 years) have the lowest mean score.

Table 3: Environmental Identity Scores by Length of Residence in Canada

Length of Residence in Canada	Mean EID Score
0-2 years	6.15
3-5 years	5.92
6-10 years	5.87
More than 10 years	5.84

The mean environmental identity scores were also analyzed for different age groups within each length of residence category, as summarized in Table 4.

Table 4: Environmental Identity Scores by Age Group and Years in Canada

Age Group	Years in Canada	Mean EID Score
18-24	0 to 2	No participants in this group

18-24	More than 10	5.67
18-24	3 to 5	6.21
18-24	6 to 10	5.36
25-44	0 to 2	5.92
25-44	More than 10	6.01
25-44	3 to 5	5.81
25-44	6 to 10	5.9
45+	0 to 2	6.56
45+	More than 10	6.07
45+	3 to 5	6.71
45+	6 to 10	6.43

These results show that within each age group, the environmental identity scores vary based on the length of residence in Canada. Particularly, immigrants aged 45+ show consistently higher environmental identity scores across all lengths of residence categories.

Table 5 displays the mean scores and standard deviations for each item on the Environmental Identity Scale, reflecting general attitudes toward nature:

Table 5: Mean Scores and Standard Deviations of Environmental Identity Scale

Items

Survey Item	Description	Mean Score	Standard Deviation
Q1	I like to spend time outdoors in natural settings.	6.49	0.8
Q2	I see myself as part of nature.	6.09	1.13
Q3	I would spend resources to protect the environment.	5.99	1.11

Q4	Nature helps me feel better when I'm stressed.	6.29	1.02
Q5	I have a lot in common with wild animals.	4.86	1.41
Q6	Sustainable living is important to me.	5.5	1.43
Q7	Everyone should learn about nature.	6.51	0.89
Q8	I prefer to live where I can see nature.	5.9	1.5
Q9	My life would be incomplete without nature.	5.79	1.3
Q10	Nature is more beautiful than art.	5.65	1.57
Q11	I feel refreshed in nature.	5.94	1.25
Q12	I consider myself a steward of natural resources.	5.84	1.22
Q13	I feel comfortable in nature.	6.14	1.08
Q14	I enjoy nature elements even in cities.	6.11	1.16

The analysis shows that Survey Item Q5 (“I have a lot in common with wild animals.”) has the lowest mean score (4.86), indicating the weakest identification among participants in this aspect. Survey Item Q7 (“Everyone should learn about nature.”) has the highest mean score (6.51), indicating the strongest identification. The highest standard deviation is found in Survey Item Q10 (“Nature is more beautiful than art.”) (1.57), indicating the greatest variability in responses.

Correlation Analysis

Table 6 displays the Pearson correlation coefficients between the length of residence in Canada and each item on the Environmental Identity Scale:

Table 6: Pearson Correlation Coefficients between Years in Canada and Environmental Identity Scale Items

Survey Item	Description	Correlation Coefficient
Q1	I like to spend time outdoors in natural settings.	0.067
Q2	I see myself as part of nature.	-0.121
Q3	I would spend resources to protect the environment.	-0.066
Q4	Nature helps me feel better when I'm stressed.	-0.104
Q5	I have a lot in common with wild animals.	-0.024
Q6	Sustainable living is important to me.	-0.163
Q7	Everyone should learn about nature.	-0.037
Q8	I prefer to live where I can see nature.	-0.173
Q9	My life would be incomplete without nature.	-0.021
Q10	Nature is more beautiful than art.	-0.052
Q11	I feel refreshed in nature.	-0.055

Q12	I consider myself a steward of natural resources.	-0.108
Q13	I feel comfortable in nature.	-0.194
Q14	I enjoy nature elements even in cities.	-0.114

The correlation analysis results indicate that a longer duration of residence in Canada does not necessarily correspond with a stronger environmental identity. Specifically, the correlation coefficients show that, except for Q1 (“I like to spend time outdoors in natural settings.”), which has a slightly positive correlation (0.067), all other items on the Environmental Identity Scale have negative correlation coefficients with the length of residence in Canada. This finding suggests that, overall, a longer duration of residence in Canada is not associated with higher environmental identity scores and may even suggest a reduction in certain aspects of environmental identification. Therefore, this result contradicts Hypothesis 2 (the longer the first-generation Chinese immigrants reside in Canada, the higher their environmental identity scores).

Regression Analysis

Table 7 summarizes the coefficients, p-values, and confidence intervals for each predictor:

Table 7: Regression Analysis Results

Variable	Coefficient	Standard Error	t-value	P-value	95% Confidence Interval
Intercept	4.9811	0.493	10.106	<0.001	4.000 - 5.963
Age	0.0277	0.011	2.531	0.013	0.006 - 0.050

Years in Canada	0.0124	0.03	0.41	683 ^{0.}	-0.121
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Age has a significant positive impact on environmental identity scores, while years of residence in Canada have no significant effect. This finding supports Hypothesis 3b (the older the first-generation Chinese immigrants are at the time of immigration, the higher their environmental identity scores) but does not support Hypothesis 2.

ANOVA Analysis

The results of the ANOVA are displayed in Table 8:

Table 8: ANOVA Analysis Results

Source	Sum of Squares	Degrees of Freedom	F-value	P-value
Age Group	5.371	2	4.116	0.02

The P-value of 0.020 indicates that there is a significant difference in environmental identity scores across different age groups.

Post-hoc Analysis

The results of Tukey's HSD test are displayed in Table 9:

Table 9: Tukey's HSD Test Results

Group Comparison	Mean Difference	P-value	Lower Limit	Upper Limit	Significance
18-24 vs 25-44	-0.148	0.8701	-0.7071	0.4114	No
18-24 vs 45+	-0.716	0.0454	-1.4194	-0.0127	Yes
25-44 vs 45+	-0.568	0.0237	-1.0583	-0.0781	Yes

The 45+ group has significantly higher environmental identity scores compared to the other two age groups (18-24 and 25-44), supporting Hypothesis 3b. There is no significant difference between the 18-24 and 25-44 age groups, which does not support Hypothesis 3a (the younger the first-generation Chinese immigrants are at the time of immigration, the higher their environmental identity scores).

In conclusion, in the quantitative portion of the study, age had a significant effect on environmental identity scores, while length of residence in Canada did not have a significant effect. The 45 and older group had significantly higher environmental identity scores than the other age groups. Also, Chinese immigrants are less likely to identify with some entries (e.g., "common with wild animals"), and are more likely to disagree on some items (e.g., "the beauty of the natural world is greater than any work of art" and "sustainable lifestyles"), which may stem from cultural differences.

Qualitative Findings

This section presents the findings from the qualitative component of the study, which involved semi-structured interviews with ten participants. These interviews were designed to provide deeper insights into the environmental identities of first-generation Chinese immigrants in the Capital Regional District (CRD), exploring their personal experiences, cultural backgrounds, and acculturation processes. The findings are organized to address the four research hypotheses and themes that emerged from the interviews.

Participant Profiles and Sampling Rationale

Initially, the study aimed to interview 6-8 participants; however, to ensure a balanced representation across different age groups, lengths of residence, and genders, a total of 10 participants were interviewed..

Demographic Characteristics of Study Participants

The demographic characteristics of the participants in this study represent a diverse cross-section of Chinese immigrants in the Capital Region, covering a range of birth decades, genders, and initial environmental settings. Participants were born between the 1940s and the 1990s, with an equal distribution of male and female participants. This diversity in age and gender facilitated the exploration of a wide range of experiences and perspectives on environmental identity and acculturation.

Most participants originated from urban areas, reflecting a common trend among Chinese immigrants, except for two who had both rural and urban life experiences before moving to Canada. The ages at which they immigrated ranged from 18 to 75, indicating that they were at different life stages and may have had various motivations and circumstances for immigrating.

Participants' length of stay in Canada varied from 2 to 25 years, with a similar range of residence in the CRD. They traveled to Canada through diverse pathways, including family reunification, work, and study, each bringing a unique set of initial connections and integration experiences into local cultural and environmental practices. This diverse demographic background provides a rich context for studying how different life experiences influence immigrants' environmental perceptions and practices.

Table 10. Demographic Characteristics of Study Participants

No .	Decade of Birth	Gender	Environmental Settings Before Moving to Canada	Age at Immigration	Pathway to Canada	Years in Canada	Years in CRD
1	1980s	Female	Urban	32	Family Reunification	5	5
2	1980s	Male	Urban	22	Work	16	16
3	1950s	Female	Rural	45	Work	25	25
4	1990s	Male	Urban	22	Study	10	9
5	1980s	Male	Urban	33	Work	2	2
6	1970s	Male	Rural	23	Study	20	9
7	1990s	Female	Urban	31	Study	3	3
8	1940s	Female	Rural & Urban	75	Family Reunification	7	7
9	1960s	Male	Rural & Urban	34	Work	12	10
10	1990s	Male	Urban	18	Study	11	11

Environmental Awareness and Comparison with Canada

Hypothesis 1: Due to coming from a country with lower environmental protection standards and more severe environmental issues, first-generation Chinese immigrants in the CRD have lower environmental identity scores compared to the Canadian public.

Most participants (Participants 1, 2, 3, 4, 6, 7, 8, 9, 10) observed that the environmental awareness in Canada is significantly higher than in China. They noted that Canadian society places a strong emphasis on environmental protection, which influenced their perceptions and behaviors.

For example, Participant 1 stated, "As soon as I arrived in Canada, I noticed the difference in environmental awareness and felt the need to change myself to better integrate here." Participant 2 added, "In Shanghai, we rarely had the opportunity to interact with nature. It was only after coming to Canada that I realized the importance of environmental consciousness." Participant 3 believed, "Canadians have a higher environmental awareness than Chinese, but China's

environmental awareness development is constrained by its era and economic development." Participant 4 mentioned the dimmer streetlights in Canada designed to reduce impact on wildlife as a piece of evidence that the environmental consciousness was higher: "At first, I found it inconvenient, but later I understood it was to protect wildlife habitats. I've never experienced this kind of thing in China, especially in the city." Participant 9 talked about the environmental concepts he had been taught, citing Mao Zedong's idea that "fighting with the sky brings great joy, fighting with the earth brings great joy, fighting with people brings great joy" to illustrate that he had once viewed nature as a "competitor," an object to be conquered, and an object to be fought. He used to think of nature as a "competitor", an object to be conquered. After coming to Canada, however, he felt a sense of awe and love for nature.

Influence of Length of Residence on Environmental Identity

Hypothesis 2: The longer first-generation Chinese immigrants reside in Canada, the higher their environmental identity scores.

Several participants (Participants 1, 2, 5, 6, 7, 8) indicated that their environmental awareness increased the longer they lived in Canada. This increase was attributed to exposure to Canadian environmental practices and the influence of local community behaviors. For instance, Participant 5 remarked, "The longer I stayed in Canada, the more I got to experience its beautiful nature, which motivated me to adopt more environmentally friendly behaviors." Participant 7 echoed this sentiment, saying, "Living here longer made me more aware of environmental issues and encouraged me to participate in local environmental activities." Participant 6 noted, "The

length of residence in Canada indeed influenced my environmental awareness changes, primarily due to the impact of local people and the beautiful environment."

However, some participants also mentioned that the length of residence did not necessarily equate to the level of acculturation. Participant 3 took himself and his spouse as an example. They came to Canada at the same time, but she always went out to enjoy nature and actively participated in environmental protection activities in the community. She could also seek help from law enforcement agencies when others violated her environmental rights. However, her spouse, who could not speak English, still maintained his original lifestyle from China and rarely got close to or appreciated nature, let alone participated in environmental protection activities.

Participant 2 also mentioned that although he had lived in Canada for 16 years, due to language barriers, he felt no confidence in participating in some environmental activities that promoted "sustainable development" or "protecting the environment", which limited his acquisition of environmental information and the development of pro-environmental behavior. Respondent 5 believed that economic income level had the greatest impact on his environmental identity score, and the increase in the length of residence did not represent a more stable economic situation. When there is a conflict between the environment and the convenience of life, he would definitely give priority to the convenience of life. He believes that environmental awareness and behavior are a luxury.

These narratives highlight the complexity of how length of residence interacts with other factors such as language proficiency, economic stability, and personal interest in nature, which can all influence environmental identity. While some participants developed a stronger environmental

identity over time, others faced barriers that limited their environmental engagement regardless of how long they had lived in Canada. This suggests that simply living in Canada longer does not guarantee higher environmental identity scores, as individual circumstances play a significant role.

Impact of Age at Immigration on Environmental Identity

Hypothesis 3a: The younger the first-generation Chinese immigrants are at the time of immigration, the higher their environmental identity scores.

Hypothesis 3b: The older the first-generation Chinese immigrants are at the time of immigration, the higher their environmental identity scores.

The interviews revealed mixed influences of age at immigration. Some younger participants (Participants 4, 10) noted that their youth and adaptability helped them quickly integrate into Canadian environmental values. Conversely, older participants (Participants 3, 8, 9) emphasized that their maturity and life experiences enabled them to appreciate and adopt Canadian environmental practices deeply.

For example, Participant 3, who immigrated at the age of 45, shared, "Going back to school and working with elderly Canadians taught me a lot about environmental practices." Participant 8 described the environment of Canada (especially the CRD area) and China as "no comparison". She said that she was shocked by the beautiful natural environment of Victoria when she first came to Victoria. The several Chinese cities she has lived in have their own environmental problems: from sandstorms in northwest China to the lack of green space and environmental pollution in a super-large city like Shanghai. Participant 10, who immigrated as a teenager, said, "My studies in

Canada, especially courses related to the environment, significantly shaped my environmental identity."

Interaction with Nature and Environmental Identity

Hypothesis 4: The more first-generation Chinese immigrants interact with the natural environment, the higher their environmental identity scores.

Interview findings: Almost all participants (Participants 1, 2, 3, 4, 5, 6, 7, 8, 9, 10) reported that increased interaction with nature in Canada positively influenced their environmental identity. Activities such as hiking, gardening, and participating in environmental groups were common among participants who expressed strong environmental identities.

For instance, Participant 3 described her love for gardening: "Growing my own vegetables and sharing them with others brings me so much joy. It's a way to connect with nature." In addition to this, she recounted the changes in interacting with nature under different mindsets and expectations: she used to work as a farmer in her youth, with a lot of access to nature, but at that time she longed for material things from nature (e.g., food, and its counterpart, money), but now, in her activities with nature, she feels that she is happy just to be in nature, and she experiences spiritual fulfillment. Participant 7 discussed her family's outdoor activities, stating, "We spend a lot of time hiking and exploring nature. It has deepened my appreciation for the environment."

Notably, participants highlighted the profound impact that interaction with nature had on their environmental identity, particularly in the context of their experiences during the COVID-19 pandemic. Participants 5 and 7, who were new immigrants to Canada during the pandemic, shared how China's lockdown policies affected their connection to the natural environment.

Participant 5 reflected, “During the lockdown, I was forced to stay indoors, completely cut off from nature. While I understand that the policy was necessary for protecting public health, the feeling of being disconnected from the natural world was incredibly challenging. It made me realize just how important nature is to my well-being.”

Similarly, Participant 7, who had recently become a mother before the pandemic, expressed her frustration: “I wanted my children to grow up with plenty of exposure to nature, but the lockdown put an abrupt stop to that. The restrictions made me feel trapped, and it intensified my longing for the natural environment. I became even more determined to ensure that, once it was safe, my children would have the opportunity to connect with nature.”

Reasons for Changes in Environmental Identity

When discussing the reasons for changes in their environmental identity, most participants believed that the beautiful ecological environment of Canada or the CRD inspired their desire to protect it. For example, Participant 4 noted, "The beautiful environment here makes me reluctant to destroy it, whereas before, in China, since the environment was already bad, I didn't care about damaging it further." Participant 7 also mentioned, "Here, nature is everywhere, unlike before, where 'nature' meant 'tourism,' requiring a trip to a distant scenic spot to experience it."

The environmental behaviors and social norms of the host country also prompted many participants to change. Participant 1 said, "When I came to this country, I had to follow the rules of this country; I had to change immediately." Participant 2 stated, "I am Chinese, I cannot embarrass Chinese people."

Hence, the qualitative findings support several of the hypotheses:

Hypothesis 1 is partially supported. Participants acknowledged that environmental awareness is higher in Canada compared to China, aligning with the hypothesis. However, direct comparisons of environmental identity scores between the Chinese immigrants and the Canadian public were not made by interview participants.

Hypothesis 2 is not supported by the quantitative findings, as longer residence in Canada does not necessarily correspond with higher environmental identity scores and may even suggest a reduction in certain aspects of environmental identification. However, the qualitative findings indicate that many participants felt their environmental awareness increased over time as they adapted to Canadian environmental practices. This suggests that while length of residence alone does not guarantee higher environmental identity, the process of adaptation and engagement with local practices plays a critical role.

Hypothesis 3a and 3b reveal a complex interaction. The quantitative data support Hypothesis 3b, showing that older immigrants have higher environmental identity scores. The qualitative data suggest that both younger and older immigrants can develop strong environmental identities, influenced by different factors such as adaptability and life experiences.

Hypothesis 4 is strongly supported by both quantitative and qualitative findings. Increased interaction with nature in Canada is associated with higher environmental identity scores, as participants reported that activities like hiking, gardening, and participating in environmental groups positively influenced their environmental identity.

Summary

By integrating quantitative and qualitative data, the study revealed several important findings. Chinese first-generation immigrants perceive Canada as significantly more environmentally conscious than their home country. While the quantitative findings did not show a significant correlation between longer residency and higher environmental identity scores, the qualitative data indicated a more nuanced view. Some participants felt that their environmental identity increased with longer residency due to exposure to Canadian environmental practices and community behaviors. However, others believed that factors such as cultural adaptation, language proficiency, and economic stability were more critical in influencing their environmental identity. This discrepancy highlights the complex relationship between length of residency and environmental identity.

The study also found that age at the time of immigration had a significant positive impact on environmental identity. Both quantitative and qualitative findings demonstrated that older immigrants at the time of immigration tended to have higher environmental identity scores and were more aware of and adopted Canadian environmental practices.

Furthermore, increased interaction with the natural environment positively affected environmental identity. Participants who engaged more with nature through activities such as gardening and hiking indicated a stronger connection to the environment.

These combined findings provide important insights into the environmental identity of Chinese first-generation immigrants in Canada, highlighting the complex interplay between cultural background, length of residency, age at immigration, and interaction with nature. These

insights can inform future policy and research aimed at supporting immigrant integration and environmental sustainability.

Discussion

The outcomes of this research have provided insight into the environmental identity of first-generation Chinese immigrants in the CRD. By integrating both quantitative and qualitative data, we can understand how these immigrants perceive their environmental identity in a Canadian context and the factors influencing their environmental behaviors. This chapter connects these observations to existing literature, discussing whether our findings confirm, contradict, or add new insights to previous research.

Comparative Environmental Identity

Both quantitative and qualitative data suggest that these immigrants perceive Canadian environmental awareness to be higher than that in China. For instance, the qualitative interviews reveal that many immigrants view Canadians as more conscientious and proactive in environmental protection, which aligns with research by Mohai et al. (2010) highlighting the high

levels of environmental awareness among Canadians. In contrast, studies such as those by Lee (2005) suggest lower levels of environmental awareness in China, supporting the observed differences in environmental identity and behavior between the two countries.

Interestingly, when comparing the environmental identity (EID) scores of Chinese immigrants to those reported in the results from Clayton et al. (2021) for other countries and regions, several patterns emerge:

Table 11. Comparative Environmental Identity Scores by Country/Region

Country/Region	Average EID Score	Standard Deviation	Sample Size
USA (Sample collected via Amazon Mechanical Turk (MTurk))	5.28	1.19	220
USA (Zoo and Nature Recreation Site Visitors)	6.02	0.86	484
USA (Chicago High School Students)	4.91	0.99	45
Russia (University Students)	5.73	0.76	310
Switzerland (University Students)	5.36	0.83	343
Taiwan (Undergraduates)	4.81	1.06	91
Peru (Diverse Sample)	6.13	0.7	224
Chinese Immigrants in the CRD (18-24 years old)	5.79	0.81	21
Chinese Immigrants in the CRD (25-44 years old)	5.94	0.87	48

Chinese Immigrants in the CRD (45+ years old)	6.51	0.39	11
Chinese Immigrants in the CRD (Overall)	5.93	0.87	80

Note. Adapted from *Cross-Cultural Validation of A Revised Environmental Identity Scale* (Clayton et al., 2021).

The overall average EID score for Chinese immigrants in the CRD is 5.93, which is higher than the scores for the U.S. MTurk sample (5.28) and Chicago high school students (4.91), but slightly lower than for visitors to U.S. zoos and natural recreation sites (6.02). Compared to university students in Russia (5.73) and Switzerland (5.36), Chinese immigrants in the CRD from my research data scored higher. The highest score was in the Peruvian sample (6.13), while the lowest was in Taiwanese undergraduates (4.81).

In my research, Chinese immigrants in the CRD, aged 18-24 scored 5.79, lower than those aged 25-44 (5.94) and significantly lower than those aged 45+ (6.51). The 45+ age group's score of 6.51 is notably higher than all other national and regional samples.

The overall standard deviation for Chinese immigrants in this research (0.87) is similar to that of Swiss (0.83) and Russian (0.76) university students, indicating a relatively concentrated score distribution. The 45+ age group of Chinese immigrants in this research has the lowest standard deviation (0.39), suggesting a high consistency within this group. The high EID scores of Chinese immigrants in the CRD, particularly among the older age groups, raise important questions about the origins of their environmental identity. This comparative analysis indicates that these scores are not merely a reflection of their original environmental identity from China

but are likely enhanced by their experiences in Canada. The qualitative data supports this explanation, as many immigrants reported that their environmental awareness and behaviors improved after moving to Canada. This phenomenon aligns with Berry's (2006) theory of cultural adaptation, which posits that prolonged exposure to a new cultural environment leads to deeper cultural assimilation.

Furthermore, the relatively low standard deviation among the Chinese immigrants, particularly the 45+ age group, suggests a strong shared identity within this group. This could be attributed to several factors. Firstly, the shared cultural heritage and philosophy, which includes traditional Chinese views on nature and harmony, may predispose these immigrants to a collective environmental consciousness. Secondly, the experience of migration itself may create a sense of solidarity and shared identity among immigrants as they adapt to their new environment. This shared experience can lead to a stronger, more uniform adoption of environmental values within the group (Jetten et al., 2015).

Length of Residence

When studying the relationship between the length of residence in Canada and environmental identity, the results of qualitative and quantitative studies conflict to a certain extent, because the results of quantitative studies showed that the first generation of Chinese immigrants who had lived in Canada for 0-2 years had higher environmental identity scores, and the environmental identity scores did not increase with the increase of residence time, and even decreased; while the results of qualitative studies showed that some respondents generally believed that their environmental awareness increased accordingly with the increase of residence time;

another part of the respondents believed that the length of residence was not the main factor affecting their environmental identity, but the degree of cultural adaptation represented by economic level and language ability.

Shorter Residence Time, Higher Environmental Identity?

Chinese immigrants who have been in Canada for the shortest period (0-2 years) exhibit the highest environmental identity scores. This observation can be explained by several possible factors:

Upon arriving in Canada, new immigrants often experience a strong sense of enthusiasm and appreciation for their new environment. The natural landscapes and outdoor activities in Canada significantly enhance their environmental identity. Early positive experiences in the new country, such as visiting national parks, participating in outdoor activities, or witnessing wildlife, further strengthen their positive perceptions of the new environment (Bartram, 2011; Helliwell et al., 2018). Research by Peters et al. (2016) indicates that interactions with natural environments play a crucial role in developing place attachment for immigrants in host countries. Place attachment is closely related to environmental identity (Clayton, 2012) and is believed to promote the development of environmental identity (Vaske & Kobrin, 2001; Stedman, 2002). Moreover, immigrants often report higher life satisfaction in wealthier and more livable countries, such as Canada, which may further enhance their positive perceptions of the new environment (Helliwell et al., 2018).

As the new immigrants moved to Canada during the COVID-19 pandemic, the impact of the pandemic and associated lockdowns in China adds another layer to this understanding. Pouso

et al. (2021) highlight the psychological benefits of maintaining contact with nature during lockdowns, noting that access to natural environments helped mitigate the negative mental health impacts of these restrictions. The deprivation of nature during the lockdown likely intensified the participants' desire to reconnect with nature upon arriving in Canada, where they had greater access to natural spaces. This heightened longing for nature could explain the elevated environmental identity scores observed among recent immigrants. Similarly, Bratman et al. (2019) discuss the broader mental health benefits of nature exposure, emphasizing how crucial it is for psychological well-being. The lockdown experiences of these participants, who were cut off from nature, align with these findings, reinforcing the importance of natural environments in their lives and contributing to their strong environmental identity upon relocating to Canada.

Stapleton (2015) has indicated that environmental identity can be developed through social interactions. As the CRD offers numerous educational programs and promotional activities focused on environmental protection and sustainability (CRD, 2024), new immigrants encounter these programs and activities more frequently compared to their quite limited opportunities in China (Tian & Wang, 2015; Winter et al., 2020), which further enhance their environmental identity. Additionally, the stark environmental differences between Canada and their home country, China, make new immigrants more aware of environmental issues, thereby strengthening their environmental identity (Sapeha, 2015; Wahoush, 2009). Social comparison theory (Clark et al., 2008) supports this finding, as new immigrants often compare the host country with their home country, gaining positive psychological reinforcement. In this study, comparing Canada with

China and recognizing the superiority of Canada's environment enhances their environmental identity.

New immigrants typically have a strong desire to integrate into their new society, and adopting environmental values and behaviors is one way to align with Canadian cultural norms. Additionally, individuals who choose to immigrate to Canada may already possess a higher level of environmental awareness, indicating a self-selection bias. These phenomena are reflected in cross-cultural adaptation and migration motivation studies (Lou & Beaujot, 2005; Monteiro & Haan, 2021). Furthermore, highly educated immigrants are more likely to acquire resources and adapt to the new environment, which also contributes to higher initial environmental identity scores (Berry, 1997; Castro & Murray, 2010).

Over time, the initial novelty of the new environment for immigrants may diminish, and their environmental identity scores might level off. This trend is also observed in migration adaptation studies (Malenfant, 2004; Wu et al., 2012). As time passes, the reference group for immigrants may shift from their home country to other immigrant groups or even members of the dominant social group (Mara & Landesmann, 2013), which could also impact their environmental identity scores.

Higher Cultural Adaptation, Higher Environmental Identity?

Cultural adaptation plays a crucial role in shaping the environmental identity of first-generation Chinese immigrants in the CRD. The extent of acculturation—defined as the process by which immigrants adopt the cultural traits or social patterns of another group—significantly influences their environmental attitudes and behaviors.

Studies such as Deng et al. (2006) have demonstrated that acculturation impacts environmental values and attitudes. Specifically, Chinese immigrants with higher levels of acculturation are more likely to adopt environmental attitudes similar to those of the host society. In the context of my findings, participants who reported higher levels of cultural adaptation also indicated greater environmental awareness and engagement in environmental activities. This is consistent with the observation by Deng et al. that high-acculturated Chinese in Canada exhibit environmental values closely aligned with those of Anglo-Canadians, particularly in terms of biospheric values and certain subscales of the New Environmental Paradigm (NEP).

Berry's (2005) model of acculturation posits that the more immigrants engage with the host culture while maintaining their cultural heritage, the more likely they are to integrate successfully and adopt new environmental values. This integration often results in increased environmental awareness and pro-environmental behaviors. My qualitative data supports this model, as participants who actively participated in community activities and engaged with local environmental practices developed a stronger environmental identity. This aligns with Berry's view that successful acculturation involves both engagement with the host society and retention of one's cultural identity.

Barriers to acculturation, such as language proficiency and economic stability, can hinder the development of a strong environmental identity. My findings highlight that participants who faced language barriers had difficulties in participating in environmental activities and accessing environmental information, which limited their engagement and pro-environmental behavior. This observation aligns with the cultural learning approach, which underscores the need for acquiring

culture-specific skills, including language, to navigate and adapt to a new cultural milieu effectively (Sam & Berry, 2010). Similarly, economic constraints limited environmental engagement, as some participants prioritized immediate life conveniences over environmental considerations, viewing environmentalism as a luxury rather than a necessity.

Recent research suggests that environmental concern is more influenced by the level of acculturation than by ethnicity alone. For instance, Tram (2023) found that Vietnamese immigrants in New Zealand exhibited greater pro-environmental behaviors due to their acculturation to the local environmental practices, despite similar levels of environmental concern when compared to their counterparts in Vietnam. This aligns with my findings, where participants who had higher levels of cultural adaptation reported greater environmental awareness and participation in environmental activities. These participants often cited local community influences and exposure to Canadian environmental practices as key factors in their enhanced environmental identity. This suggests that cultural adaptation can be a stronger determinant of environmental identity than the length of residence alone.

In conclusion, the qualitative data underscore the importance of cultural adaptation in shaping environmental identity among first-generation Chinese immigrants. Those who adapt more fully to Canadian cultural norms and engage actively with local environmental practices tend to develop stronger environmental identities. However, this process is complex and influenced by multiple factors, including language proficiency, economic stability, and personal interest in nature. This nuanced understanding highlights that length of residence alone is not a sufficient predictor

of environmental identity; rather, the level of cultural adaptation and engagement with the host society are critical determinants.

Age at Immigration

The age at immigration emerged as a significant factor influencing environmental identity. Kempton and Holland(2003) and Dewey (2020) highlighted the importance of early life experiences and social relationships in shaping environmental identity. My findings support this idea from another perspective—because many Chinese immigrants lack contact with nature as children or adolescents and have an "environmental deficit," they accumulate a greater desire for a better environment and nature as they grow older, and thus have a higher level of environmental identity. This phenomenon is reflected in the work of Sun and Zhao (2024), who mention that "immigrants who have experienced the negative consequences of environmental degradation particularly emphasize the importance of environmentalism" (Pfeffer & Stycos, 2002; Squalli, 2009). This indicates that immigrants' experiences of environmental degradation in their home country can heighten their environmental consciousness post-immigration.

Additionally, Deng et al. (2006) discuss how "since 1949, particularly since the 1980s, the traditional worldview of harmony between humans and nature in China has gradually faded." This period of environmental and cultural shift was experienced by those who immigrated to Canada at the age of 45 and older. Consequently, these older immigrants, having lived through significant environmental changes in China, might feel a more profound shift in their environmental identity upon moving to Canada, where environmental values are more prominently practiced and encouraged. This is consistent with our findings that older immigrants (45+ years) score higher on

the Environmental Identity Scale (EID), with an average score of 6.51, compared to younger age groups. This supports the notion that prolonged exposure to the Canadian environmental ethos significantly enhances their environmental identity.

Moreover, the demographic profile of recent Chinese immigrants supports these findings. Since the 1990s, most immigrants from Mainland China have been "economic immigrants," including highly educated professionals, entrepreneurial elites, and university students from middle-class families (Li, 2005; Pieke, 2007). The Prosperity Hypothesis suggests that environmentalism can only be realized on a certain material basis and is unlikely to become a universal value (Scruggs & Benegal, 2012). Given that many of these immigrants come from relatively affluent backgrounds, their higher socioeconomic status could facilitate a stronger environmental identity. This aligns with Maslow's hierarchy of needs, where economic security precedes environmental concerns (Maslow, 1954). Therefore, the higher EID scores among older immigrants might also reflect their economic stability and the resultant capacity to prioritize environmental issues over basic economic needs.

Interactions with the Natural Environment

Interactions with the natural environment were highlighted in the qualitative data as crucial for enhancing environmental identity. Participants who engaged in activities such as gardening and hiking reported a stronger connection to the environment. This finding supports the place attachment theory proposed by Scannell and Gifford (2010), which suggests that increased interaction with natural environments can enhance one's emotional and cognitive connection to those places, thereby strengthening environmental identity. It also aligns with Clayton's (2012)

assertion that direct experiences with nature are essential for forming and maintaining a robust environmental identity. Particularly, in the qualitative interviews, older respondents mentioned their enjoyment of gardening activities and the satisfaction they get from them, which is consistent with the study "Gardens, Traditions among older immigrants to New Zealand" by Li et al. (2010) highlights that engaging in gardening and nature-related activities helps older Chinese immigrants forge a new sense of self and place in their adoptive country, underscoring the importance of nature in identity reconstruction.

Conclusion

This study aimed to explore the environmental identity of first-generation Chinese immigrants in the Capital Regional District CRD and how it is shaped by various factors such as age at immigration, length of residence, and interaction with the natural environment. The findings indicate that these immigrants perceive Canadian environmental awareness to be higher than that in China. Many reported increased environmental awareness and behaviors after moving to Canada, primarily influenced by their new experiences in Canada. Quantitative data show high EID scores among these immigrants, especially older individuals, when compared to those from several developed and developing countries (Clayton, 2021), suggesting that their environmental identity is shaped by their experiences and adaptation to Canadian environmental practices and values.

Limitations

While this study provides valuable insights into the environmental identity of first-generation Chinese immigrants in the Capital Region (CRD), several limitations must be acknowledged.

Sample size and representativeness

The sample size of 80 participants, while adequate for exploration, may not fully represent the broader Chinese immigrant population in the CRD. The purposive and snowball sampling methods employed may introduce selection bias, potentially skewing the results toward individuals who are more concerned about environmental issues (Patton, 2002).

Self-report bias

Data collected through interviews and surveys rely heavily on self-reports, which may be subject to social desirability bias. Participants may exaggerate their environmental behaviors or downplay behaviors that are inconsistent with socially acceptable environmental practices (Fisher, 1993).

Geographic scope

This study focused only on the CRD, which has unique environmental characteristics and policies and may not be generalizable to other regions in Canada or other countries. The specific environmental context of the CRD may influence the findings in ways that are not applicable elsewhere (Yin, 2017).

Cultural nuances

This study attempted to capture complex cultural and environmental identities, which can be challenging given the diverse experiences of Chinese immigrants. Cultural nuances and individual differences may not be fully captured, leading to oversimplification of the relationship between immigration and environmental identity (Berry, 1997).

Temporal factors

Environmental identity may be influenced by temporal factors, such as the length of time since immigration and specific environmental events experienced during this period. The cross-sectional nature of this study does not allow for tracking changes in environmental identity over time, limiting the ability to draw conclusions about long-term trends and developments (Rindfleisch et al., 2008).

Language barriers

Although I chose Mandarin, the official language of Mainland China as the language I used in my interviews in order to allow all participants to express themselves comfortably and accurately, and to reduce the impact of different languages on people's thinking patterns, some Cantonese speakers from mainland China who are not good at speaking Mandarin may have been excluded from my study due to differences in Mandarin proficiency.

Complex interactions

This study explored the interactions between multiple factors, including immigration age, length of residence, and interactions with the natural environment. These interactions are complex and multifaceted, and the research design may not fully capture all variables and their interrelationships (Teddlie & Tashakkori, 2009).

By acknowledging these limitations, future research can better address these gaps and build on the findings of this study to provide a more comprehensive understanding of the environmental identities of Chinese immigrants in different contexts.

Recommendations

Based on the findings and limitations of this study, several recommendations can be made to further understand and enhance the environmental identity of first-generation Chinese immigrants in the Capital Regional District CRD and similar contexts.

Utilize High Environmental Identity of Recent Immigrants

Leverage the high environmental identity scores of recent immigrants by organizing targeted environmental activities. These activities can include orientation sessions that introduce new immigrants to local environmental practices and community engagement opportunities.

Providing early exposure to environmental stewardship can reinforce their initial enthusiasm and foster long-term environmental commitment.

Enhance Environmental Education Programs

Develop environmental education programs tailored to the specific needs and backgrounds of Chinese immigrants. These programs should provide information on local environmental policies, practices, and the importance of environmental stewardship. Integrating cultural elements from immigrants' home countries can make these programs more relatable and effective.

Promote Community Engagement

Encourage participation in local environmental groups and activities to strengthen immigrants' connections to their new environment. Community gardening, clean-up drives, and nature-based recreational activities can provide immigrants with hands-on experiences that foster a sense of environmental responsibility and belonging. Special initiatives targeting new immigrants can help them quickly integrate into the community.

Develop Multilingual Resources

To overcome language barriers, it is essential to develop and distribute multilingual educational materials and resources. These should include information on recycling, waste management, and other environmental practices in both English and Chinese. Providing translation services at environmental events and meetings can also facilitate greater participation from non-English speaking immigrants.

Foster Intergenerational Learning

Programs that encourage intergenerational learning can be beneficial, as older immigrants often have different perspectives and experiences with the environment compared to younger immigrants. Facilitating dialogue and shared activities between different age groups can help younger immigrants learn from the experiences of their elders, while also introducing older immigrants to new environmental practices.

Conduct Longitudinal Studies

To better understand the development of environmental identity over time, longitudinal studies should be conducted. These studies can track changes in environmental attitudes and behaviors among immigrants from their arrival in Canada through various stages of their acculturation process. Such data would provide deeper insights into how environmental identity evolves and what factors most significantly influence this evolution.

Targeted Initiatives for Different Economic Levels

Recognize the economic diversity among immigrants and design programs that cater to different economic levels. For instance, offering sliding scale fees for environmental programs, or creating volunteer opportunities that do not require financial contributions, can enable broader participation. Providing equipment and materials for environmental activities can also remove barriers for economically disadvantaged immigrants.

Develop policies and programs that accommodate immigrants with varying economic backgrounds. Providing financial support or subsidies for participation in environmental activities can ensure that economic constraints do not hinder engagement. Initiatives such as free or low-

cost access to nature parks, community gardens, and environmental workshops can help make environmental involvement more accessible.

By implementing these recommendations, stakeholders can better support the environmental identity and engagement of first-generation Chinese immigrants, fostering a more inclusive and sustainable community.

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Appendix i

Environmental Identity Scale (Clayton, 2003)

- _____ 1. I spend a lot of time in natural settings (woods, mountains, desert, lakes, ocean).
- _____ 2. Engaging in environmental behaviors is important to me.
- _____ 3. I think of myself as a part of nature, not separate from it.
- _____ 4. If I had enough time or money, I would certainly devote some of it to working for environmental causes.
- _____ 5. When I am upset or stressed, I can feel better by spending some time outdoors "communing with nature".
- _____ 6. Living near wildlife is important to me; I would not want to live in a city all the time.
- _____ 7. I have a lot in common with environmentalists as a group.
- _____ 8. I believe that some of today's social problems could be cured by returning to a more rural lifestyle in which people live in harmony with the land.
- _____ 9. I feel that I have a lot in common with other species.
- _____ 10. I like to garden.
- _____ 11. Being a part of the ecosystem is an important part of who I am.
- _____ 12. I feel that I have roots to a particular geographical location that had a significant impact on my development.
- _____ 13. Behaving responsibly toward the earth -- living a sustainable lifestyle -- is

part of my moral code.

_____ 14. Learning about the natural world should be an important part of every child's upbringing.

_____ 15. In general, being part of the natural world is an important part of my selfimage.

_____ 16. I would rather live in a small room or house with a nice view than a bigger room or house with a view of other buildings.

_____ 17. I really enjoy camping and hiking outdoors.

_____ 18. Sometimes I feel like parts of nature -- certain trees, or storms, or mountains -- have a personality of their own.

_____ 19. I would feel that an important part of my life was missing if I was not able to get out and enjoy nature from time to time.

_____ 20. I take pride in the fact that I could survive outdoors on my own for a few days.

_____ 21. I have never seen a work of art that is as beautiful as a work of nature, like a sunset or a mountain range.

_____ 22.. My own interests usually seem to coincide with the position advocated by environmentalists.

_____ 23. I feel that I receive spiritual sustenance from experiences with nature.

_____ 24. I keep mementos from the outdoors in my room, like shells or rocks or feathers.

Appendix ii

Survey

At what age did you move to Canada? _____

How many years have you been in Canada? _____

Revised Environmental Identity Scale (EID-R)

Please indicate the extent to which each of the following statements describes you by using the appropriate number from the scale below.

1	2	3	4	5	6	7
Not at all			neither true			
completely						
true of me			nor untrue			true of
me						

_____ 1. I like to spend time outdoors in natural settings (such as woods, mountains, rivers, fields, local parks, lake or beach, or a leafy yard or garden)

_____ 2. I think of myself as a part of nature, not separate from it.

_____ 3. If I had enough resources such as time or money, I would spend some of them to protect the natural environment.

_____ 4. When I am upset or stressed, I can feel better by spending some time outdoors surrounded by nature.

- _____ 5. I feel that I have a lot in common with wild animals.
- _____ 6. Behaving responsibly toward nature – living a sustainable lifestyle – is important to who I am.
- _____ 7. Learning about the natural world should be part of everyone’s upbringing.
- _____ 8. If I could choose, I would prefer to live where I can have a view of the natural environment, such as trees or fields.
- _____ 9. An important part of my life would be missing if I was not able to get outside and enjoy nature from time to time.
- _____ 10. I think elements of the natural world are more beautiful than any work of art.
- _____ 11. I feel refreshed when I spend time in nature.
- _____ 12. I consider myself a steward of our natural resources.
- _____ 13. I feel comfortable out in nature.
- _____ 14. I enjoy encountering elements of nature, like trees or grass, even when I am in a city setting.