Challenges and Opportunities for Promoting Pro-climate Behaviours in Medium-Sized Atlantic Canadian City

by

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Abstract

This study explores the barriers and motivators influencing pro-climate transportation choices in Fredericton, New Brunswick, using the theory of planned behaviour (Ajzen, 1991) and the multilevel perspective within socio-technical transition theory (Geels, 2002). Findings indicate that positive attitudes toward climate change do not always translate into sustainable transport behaviour due to infrastructure limitations, financial constraints, and perceived inconvenience. Subjective norms had minimal impact due to a lack of visible social support, community endorsement, and policy-backed incentives. Key motivators included reliable public transit, cost savings, health benefits, and employer incentives. Notably, all student respondents expressed intentions to purchase a car once financially feasible, highlighting the need for early interventions. Addressing these gaps through improved infrastructure, policy changes, and targeted incentives can help align intentions with behaviour. This research emphasizes a localized, multi-faceted approach that integrates behavioural insights with socio-technical transitions, providing a pathway toward achieving net-zero emissions in the transportation sector.

Dedication

This thesis is dedicated to Dr. David Foord, whose expertise, encouragement, and unwavering support have been a guiding force throughout this journey. His insights and patience have shaped my thinking and strengthened this research in ways I could not have imagined.

I also dedicate this work to Alex Dandridge, whose thoughtful discussions and valuable feedback have been instrumental in refining my ideas. Her encouragement and willingness to engage deeply with my research have been truly motivating.

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List of Symbols, Nomenclature, or Abbreviations

MLP: Multi-Level Perspective

PBC: Perceived Behavioural Control

STT: Socio-Technical Transitions

TPB: Theory of Planned Behaviour

1. Introduction

Understanding socio-technical transitions and behavioural change interventions is crucial in trying to reach a more sustainable world and fight big issues like climate change. Socio-technical transitions involve changes in the ways in which society works. Socio-technical transitions (STT) theory explores how technological, institutional, and social systems co-evolve over time to enable large-scale shifts, such as the transition to low-carbon mobility. It emphasizes that changes in behaviour, technology, infrastructure, and policy are deeply interconnected. Within the STT literature, the Multi-Level Perspective (MLP) is a key framework that explains transitions as the result of interactions across niche innovations, socio-technical regimes, and broader landscape pressures (Geels, 2005). In this study, MLP is used to complement the Theory of Planned Behaviour (TPB) by examining how systemic structures enable or constrain individual pro-climate transportation behaviours. It involves new technologies, new laws, new habits, new markets, new cultural meanings, and new infrastructure. These transitions are complex and multi-faceted because they involve a large number of groups such as governments, businesses, scientists, and the public (Geels, 2002; Smith, Stirling, & Berkhout, 2005).

Behavioural change interventions consist of strategies aimed at influencing how individuals and communities act to achieve outcomes such as improved health or reduced environmental impact. These interventions can include educational campaigns, incentives, new policies, environmental redesigns, and efforts to shift attitudes, habits, and social norms toward more sustainable ways of living (Michie, van Stralen, & West, 2011; Hauslbauer et al., 2022). In this context, "sustainable" refers specifically to

transportation options that reduce greenhouse gas emissions, minimize resource and energy consumption, and improve accessibility and equity across populations.

One of the most prominent areas of pro-climate behavioural intervention is transportation. Behavioural shifts from private vehicle use toward public transit, cycling, and walking are associated with significant reductions in carbon emissions and contribute to healthier, more liveable urban environments. These shifts are often supported by a combination of infrastructure improvements—such as bike lanes, sidewalks, and expanded transit access—and public campaigns that emphasize the environmental, economic, and personal benefits of sustainable travel modes (Banister, 2008; Gärling & Schuitema, 2007).

While there is a growing body of research on behavioural "nudges"—subtle design features or cues that steer individuals toward pro-social or environmentally friendly decisions without restricting choice—this study does not focus on nudge theory. Although Hauslbauer et al. (2022) contribute to this literature, the present research instead draws on the TPB and broader contextual frameworks to explore the intentional, belief-driven factors underlying transportation choices.

Most of the interventions have other elements aside from infrastructure improvement and promotional activities. In fact, as Banister (2008) claimed, “variable congestion charges, route subsidies, tax incentives, and controls are all part of the range of measures within sustainable mobility policies”. For example, several congestion charges have been implemented in Central London as key policy measures to reduce traffic and emissions. These measures involve directly charging vehicles for access to specific areas, but they also include numerous exemptions and discounts designed to increase

public acceptance. Moreover, revenues generated from congestion charging are reinvested to improve public transportation, thereby creating a holistic approach toward sustainable mobility. Similarly, policies may incorporate technological innovations, such as the use of cleaner vehicle technologies, along with the facilitation of eco-driving practices.

Others have examined the combination of congestion pricing and supportive policies, such as Gärling and Schuitema (2007). They found road pricing or congestion taxes are more acceptable when combined with improvements in the infrastructure and services of public transport. This approach ensures viable alternatives for people so that they can easily reduce car dependence and subsequently promote sustainable travel behaviours.

More generally, transportation interventions contain an integrated approach, including infrastructure improvement and public campaigns, economic incentives, regulatory measures, and urban planning for density and accessibility. Subsidies and incentives offered to public transportation systems make the use of transport services cheaper and, therefore more attractive for end-users. Traffic-free zones limit car access, making designated streets or areas exclusively available to pedestrians and cyclists. Building codes and town planning that increase urban density, mixed-use developments, and proximity to public transportation have also been found to be relevant, reducing car travel demand and paving a pathway for more sustainable urban living.

To understand how big systemic and individual level changes may be realized, this paper explores how socio-technical transitions and theory of planned behaviour literature can be combined to further sustainable practices and reduce carbon emissions.

The Theory of Planned Behaviour (Ajzen, 1991) suggests that pro-climate behaviours can contribute to the achievement of net-zero emissions. In this framework, attitudes, social norms, and contextual factors influence the actions of individuals. Specifically, the intention to conduct pro-climate behaviour is mediated through attitude towards behaviour, social norms, and perceived behavioural control.

However, there remain gaps in understanding how TPB can be effectively applied in practice to realize pro-climate behaviours. There is a lack of integration of behavioural insights into applicable, practicable energy system transition models. Second, the interactive complexities between individual actions and systemic factors, such as policies and infrastructure, are often ignored in reality. Third, generalized strategies have been developed without considering specific regional cultural, economic, and environmental contexts (Berkhout, 2006; Timms, 2008). Fourth, these strategies have also not been developed for transportation sectors (Sochor et al., 2018; Utriainen & Pöllänen, 2017).

These gaps are particularly urgent to address given the need to make significant progress in the short term to achieve net-zero emissions and mitigation against climate change. Failing to integrate localized behavioural insights into viable local strategies risks keeping policymakers blind to critical barriers and opportunities that limit the effectiveness or efficiency of interventions (Banister et al., 2011; Skinner et al., 2007). Without these strategies, transition action by government and industry will be frustrated by a lack of corresponding change in behaviour (Hietanen 2014; Durand et al. 20180.

To better understand the contextual dynamics of the TPB and STT, this study focuses on pro-climate behaviour change in a Fredericton case study. The purpose of this study is to

explore the key barriers to and opportunities for fostering pro-climate transportation behaviours in Fredericton by examining how macro-level structures, emotional factors, social norms, and habitual routines influence individual choices. Rather than focusing solely on technological solutions, this research highlights the need to understand behavioural dynamics as part of the transition toward sustainable mobility.

On the assumption that behaviour change strategies are important for climate change, the central research question is: What are the key barriers to and opportunities for achieving pro-climate behaviours in the transportation sector, including macro-level, emotional and habitual factors?

To address this question, the study draws on and integrates two major frameworks: the TPB and MLP. By combining these perspectives, the research aims to bridge the gap between psychological readiness and systemic constraints, offering a more comprehensive view of what drives or inhibits pro-climate action. Fredericton is used as a case study to generate localized insights, which may be transferable to similar mid-sized cities grappling with transportation emissions and limited transit infrastructure.

The structure of the thesis is designed to align with this objective. The literature review outlines the conceptual basis of TPB and STT and identifies key gaps, particularly the need to incorporate habit, emotion, and contextual barriers into transportation behaviour analysis. The methodology section details the survey design, data collection from 57 residents across Fredericton, and the rationale for correlational analysis used to assess behavioural intention and actual transport choices. The results section presents findings on age, employment, and structural barriers, alongside analysis of attitudinal, normative, and control-based influences. The discussion situates these findings within the broader

literature and reflects on the practical and theoretical implications, including limitations and recommendations for policymakers.

2. Literature Review

2.1 Introduction

The Theory of Planned Behaviour (TPB), developed by Ajzen (1985, 1991), remains a leading framework for predicting human behaviour, particularly when actions are not fully under volitional control. Evolving from the Theory of Reasoned Action (Fishbein & Ajzen, 1975), TPB posits that behaviour is primarily predicted by behavioural intention, which is shaped by three constructs: attitude (positive or negative evaluation), subjective norms (perceived social pressure), and perceived behavioural control (PBC), which reflects the ease or difficulty of performing the behaviour based on experience and anticipated constraints. These constructs are underpinned by behavioural, normative, and control beliefs. When individuals have favourable attitudes, perceive strong normative support, and believe they have sufficient control, their intention to act—and consequently their likelihood of acting—increases (Ajzen, 2005).

TPB has demonstrated empirical validity across domains such as health, consumer behaviour, and environmental sustainability (Bamberg & Möser, 2007). It has been widely applied to behaviours like energy conservation (Abrahamse & Steg, 2011), recycling (Nigbur et al., 2010), household decarbonization (Lam et al., 2020), and sustainable transport (Lois et al., 2015). Ajzen (2005) emphasized TPB's flexibility, allowing for the inclusion of additional variables—such as emotional engagement, moral obligation, and habits—when supported by empirical evidence. These extensions have been shown to enhance TPB's explanatory power in climate-related behaviour, where decisions are shaped by both rational and affective drivers (Wall et al., 2007; Lam et al., 2020). Furthermore, structural and contextual barriers—such as infrastructure, weather,

cost, or access—often determine whether intentions translate into action. In transportation contexts, especially in car-dependent cities, perceived behavioural control must account for both internal capability and external constraints.

This study applies TPB to investigate pro-climate transportation behaviours in Fredericton, New Brunswick. By focusing on attitudes, normative influences, and perceived behavioural control, the model provides a foundation for identifying the psychological factors influencing behavioural intention. However, given the context of sustainability transitions, this research extends the TPB framework to include constructs that have demonstrated empirical relevance in climate behaviour literature—namely emotional engagement, moral norms, habit strength, and group identity. These extensions are grounded in prior TPB applications and are integrated in a way that builds upon, rather than critiques, the theory's original structure.

The study combines TPB with the STT theory to account for macro-level dynamics that shape or constrain sustainable behaviour. While TPB is effective in identifying individual-level readiness to act, STT provides a complementary lens to examine how policy, infrastructure, dominant regimes, and societal norms enable or hinder behavioural change. The combination of TPB and STT reflects the increasing recognition in sustainability research that behavioural change is a product of both psychological motivation and systemic feasibility. Together, TPB and STT offer a framework for understanding how individual intention interacts with socio-technical systems. This dual-theoretical approach enables a more complete understanding of the factors driving or impeding pro-climate transport behaviour. It also informs the

development of targeted interventions that address both internal drivers and structural barriers, advancing current approaches to sustainable mobility and climate action.

2.2 **Socio-Technical Transitions and the Multi-Level Perspective**

STT theory provides a broad framework for understanding how systemic shifts in technology, behaviour, and institutions occur over time to support sustainability goals. This body of literature explores how change is influenced by the co-evolution of social practices, infrastructures, markets, policies, and cultural meaning. One of the most widely used approaches within STT is the MLP, developed by Geels (2002, 2005), which conceptualizes transitions as dynamic processes occurring across three interrelated levels: niche innovations (small-scale experimental practices), socio-technical regimes (dominant systems and practices), and the socio-technical landscape (wider economic, cultural, and environmental conditions).

At the niche level, radical innovations—such as electric vehicles, bike-sharing systems, or mobility-as-a-service platforms—emerge in protected spaces where experimentation is possible. These niches are critical for learning and development but are often fragile and disconnected from dominant systems. The regime level refers to the dominant rules, institutions, and infrastructures that stabilize existing practices—such as automobile dependence, zoning laws, and funding priorities that favour car infrastructure. These regimes are often resistant to change due to lock-in, sunk costs, and political inertia. The landscape level includes macro-level influences such as climate change, economic shifts, or public demand for sustainability, which exert external pressure on regimes and can open windows for transition.

According to the MLP, meaningful transitions occur when landscape-level pressures weaken the stability of existing regimes, while niche innovations simultaneously gain sufficient momentum to challenge and eventually reshape dominant systems (Geels, 2011; Smith et al., 2005). However, the transition process is non-linear, often involving periods of instability, contestation, and gradual reconfiguration rather than sudden change. Importantly, the MLP highlights that individual behavioural change alone is insufficient to drive systemic transition unless supported by broader structural changes in infrastructure, markets, policies, and cultural norms.

In the context of transportation, the MLP has been applied to understand how systems shift from car dominance toward multi-modal, low-carbon futures. This includes research on policy-driven transitions (e.g., low-emission zones), infrastructure innovation (e.g., cycling networks), and socio-cultural reconfiguration (e.g., normalizing public transit use). Studies have shown that technical solutions alone are insufficient if social acceptance, institutional coordination, and policy integration are lacking (Sovacool & Hess, 2017). As a result, the MLP provides an essential complement to individual-level theories like TPB, offering insight into the broader structural and institutional dynamics that shape—and often constrain—behavioural change.

STT has also increasingly integrated justice and equity considerations, recognizing that transitions must not only be sustainable but also fair and inclusive. Sovacool (2017) emphasizes that energy and transport transitions affect different communities unequally, and that inclusive governance, equitable access, and public trust are critical to long-term success.

By emphasizing path-dependence, power structures, and the interplay between innovation and resistance, STT contributes a macro-social understanding of why behaviour change sometimes fails even when intention is present. This makes it especially useful when paired with TPB, which explains the psychological dimensions of decision-making. Together, these frameworks allow researchers to examine both the internal motivations and the external constraints involved in sustainability transitions.

2.3 Theory of Planned Behaviour

Behavioural change interventions can modify both individual and group behaviours towards the accomplishment of certain goals, like reducing their impact on the environment. They may be carried out through educational campaigns, incentives, the establishment of new policies, and environmental modification. Their aim is the alteration of attitudes, beliefs, and practices toward more sustainable ones (Yuriev et al., 2020). These interventions have been applied in the promotion of public transit, cycling, walking, and electric vehicles, with a view to reducing carbon emissions and further developing sustainable urban environments (Lois et al., 2015; Marsden et al., 2020).

The theory of planned behaviour (TPB, Ajzen, 1985) provides a widely used basis for understanding and realizing change in human behaviour in various contexts. Attitudes reflect an individual's positive or negative evaluation in relation to performing the respective behaviour. It includes subjective norms, which refer to the perceived social pressure to either perform or avoid the behaviour. Perceived behavioural control describes how easy or difficult a person thinks it will be to perform the behaviour, based

on their past experiences and any challenges they expect to face (Ajzen, 1991). While there has been widespread dissemination of TPB, there are a number of limitations.

Habitual Behaviour and Past Action in TPB

Although the TPB emphasizes deliberate and intentional action, it also acknowledges that past behaviour influences current decision-making. Ajzen (2002) recognized that repeated behaviours shape the belief systems that inform attitudes, subjective norms, and PBC. Through frequent repetition, certain behaviours become habitual, making the associated beliefs more accessible and influential during intention formation—even when actions are performed with limited conscious deliberation.

Habitual behaviours are often triggered by contextual cues and executed automatically (Verplanken & Aarts, 1999). This is particularly relevant for transportation behaviours, which are commonly embedded in daily routines. For example, commuting by car can become so ingrained that even favourable attitudes toward public transit or cycling may not result in behavioural change. In such cases, habit moderates the relationship between intention and action, weakening the predictive validity of TPB.

Empirical research confirms this dynamic. Lois et al. (2015) found that individuals with strong intentions to cycle still defaulted to car use due to established habits. While TPB constructs predicted intention, the presence of habitual behaviour significantly diminished the translation of intention into action. Similarly, Bamberg et al. (2011) demonstrated that interventions designed to disrupt routine—such as new transit subsidies or route changes—were more effective than efforts focused solely on intention. Upham et al. (2020) further argue that excluding habit from TPB models risks

overstating intention's influence, especially in contexts where behaviour is repetitive, convenient, and low-effort.

Contextual and Structural Factors in TPB

A distinguishing feature of the TPB is its ability to bridge psychological motivation with real-world conditions through the construct of PBC. Ajzen (1991) explicitly defined PBC as encompassing both internal factors (e.g., skills, self-efficacy, and confidence) and external constraints (e.g., access, time, infrastructure, cost). This makes TPB uniquely positioned among psychological theories to integrate structural and environmental influences without abandoning its cognitive-behavioural foundation. As such, critiques that TPB is "individualistic" or blind to context often overlook the theoretical latitude built into the PBC construct itself.

In environmental and transportation research, this attribute of TPB has become increasingly important. Numerous scholars have demonstrated that external, system-level conditions often shape or constrain individuals' sense of behavioural control, and in turn, the likelihood that intention will translate into action. For instance, Marsden et al. (2020) emphasized that the presence or absence of reliable infrastructure, such as well-connected bus routes, safe bike lanes, or pedestrian paths, plays a central role in shaping perceived control over low-carbon transport modes. Their findings suggest that PBC in transportation is not merely about confidence or motivation but is also an indirect measure of infrastructural support.

Similarly, Li et al. (2020) argue that in mobility systems, PBC must be interpreted as both a subjective assessment of one's ability and a proxy for the structural feasibility of the behaviour. In their study, individuals who felt positively toward public transit still

failed to adopt it when service frequency was poor, or stops were inaccessible—revealing a gap between positive intention and action attributable to external barriers. In such cases, PBC is shaped by system design, and therefore reflects not only what individuals believe they can do, but what the system allows them to do.

Quantitative evidence supports this dynamic. Rezaei et al. (2022) reported that while PBC was moderately correlated with behavioural intention ($r = 0.272$), its direct correlation with actual public transport use was weaker ($r = 0.243$), highlighting how perceived control may be high in theory but undermined by real-world limitations. These findings underscore that TPB is best understood not as blind to context, but as a model that requires context-sensitive operationalization, particularly in sustainability studies where structural constraints are common.

Attitudes in TPB

In the Theory of Planned Behaviour, attitudes refer to an individual's overall evaluation of a particular behaviour, shaped by underlying beliefs about the expected outcomes and their desirability (Ajzen, 1991). In sustainability-related domains such as transportation, attitudes often reflect perceptions of environmental impact, personal benefit, convenience, or enjoyment associated with a specific travel mode. For example, a person may hold a positive attitude toward cycling if they believe it improves health, reduces emissions, and is cost-effective. Research consistently shows that favourable attitudes significantly increase the likelihood of forming behavioural intentions (Eriksson et al., 2008; Bamberg & Möser, 2007). However, in practice, positive attitudes alone are not always sufficient for behaviour change, particularly when structural or habitual barriers

are present—highlighting the need to examine how attitudes interact with other TPB constructs.

Perceived Behavioural Control (PBC)

Perceived behavioural in the context of sustainable transport, PBC may involve beliefs about whether one can access safe bike lanes, afford public transit, or manage scheduling needs without a personal vehicle. Several studies have shown that PBC is a strong predictor of both intention and behaviour, particularly when external barriers are significant (Li et al., 2020; Marsden et al., 2020). Importantly, PBC reflects not just motivation but also structural feasibility—if individuals perceive high difficulty due to poor infrastructure or lack of options, their likelihood of adopting pro-climate transport behaviours diminishes, regardless of their attitudes or social norms.

Subjective Norms in the Theory of Planned Behaviour

TPB defines subjective norms as the perceived social pressure to perform or avoid a behaviour (Ajzen, 1991). Traditionally, this referred to injunctive norms—beliefs about whether important others, such as family, peers, or colleagues, approve or disapprove of the behaviour. However, later applications of TPB have broadened this construct to also include descriptive norms, which reflect perceptions of what others actually do (Ajzen, 2005).

In environmental and transportation contexts, subjective norms are shaped not only by personal relationships but also by broader social and community expectations. Individuals are more likely to adopt sustainable behaviours—such as walking, cycling, or using public transit—when they perceive these behaviours as both socially endorsed

and commonly practiced within their community. For example, seeing neighbours frequently use public transit or bike to work can reinforce the idea that such behaviours are socially expected and acceptable, even if direct social pressure is not expressed.

Several studies have shown that strong subjective norms can increase the likelihood of pro-environmental action, especially when individuals believe that those around them support and engage in such behaviours. Lois et al. (2015) found that in the transportation domain, perceived social support for low-carbon travel modes influenced individuals' intention to switch modes, particularly when these behaviours were visible and perceived as normative. Similarly, Hauslbauer et al. (2022) reported that subjective norms had a stronger correlation with intention to use sustainable transport ($r \approx 0.60$ to 0.80) than attitudes alone.

Behavioural Intentions

Behavioural intention is the central predictor of actual behaviour in TPB, representing the motivational readiness to perform a given action (Ajzen, 1991). It is shaped by attitudes, subjective norms, and perceived behavioural control, and is considered the most immediate antecedent of action. In sustainable transportation research, intention may be expressed as a stated willingness to walk more, cycle, or use public transit in the near future. High intention typically increases the likelihood of behaviour—but only if environmental conditions support the intended action. For example, Rezaimoghadam et al. (2022) found strong correlations between intention and attitudes ($r = 0.520$), yet a weaker correlation between intention and actual public transit use ($r = 0.337$), pointing to an intention–behaviour gap. This reinforces the idea that while intention is a

necessary predictor, it is not always sufficient for behaviour unless supported by favourable structural conditions and habit-disrupting interventions.

Multi-Stage Behaviour and the Intention–Behaviour Gap in TPB

TPB assumes a progression from beliefs to intentions and finally to behaviour, but Ajzen (1991, 2005) clarified that this process is probabilistic rather than deterministic. In many domains—including sustainable transportation—intention does not always lead to action. This discrepancy, commonly referred to as the intention–behaviour gap, is particularly evident in behaviours that unfold over time, require multiple decisions, or involve logistical and environmental constraints.

Research in pro-environmental behaviour highlights the dynamic nature of this gap. Lam et al. (2020) found that individuals with strong intentions to decarbonize their homes often failed to act due to cost, complexity, or lack of immediate reinforcement. Similarly, Marsden et al. (2020) observed that even when attitudes and intentions toward sustainable transport were positive, external disruptions such as weather, scheduling, or service unreliability often interrupted behavioural consistency. These findings underscore that intention is a necessary but not sufficient condition for behaviour change.

To address this, scholars have expanded TPB to include stage-based models. Bamberg (2007) proposed that behaviours unfold through distinct phases—such as predecision, planning, action, and maintenance—each shaped by different motivational or contextual factors. For instance, attitudes may be most influential in the early decision phase, while PBC becomes more critical during execution. Hunecke et al. (2007) added that each

phase brings its own barriers, from habitual resistance to the need for reinforcement and feedback.

In transportation, this multi-stage process is particularly evident. A person may intend to take the bus, feel social support for it, and perceive it as feasible—but still fail to act due to scheduling mismatches, confusing routes, or a single negative experience. These micro-barriers interrupt the intention–action link and illustrate how even strong motivation can falter under real-world conditions.

3. Theoretical Framework

This study builds on these extensions by applying TPB to pro-climate transportation behaviour in Fredericton. Drawing on prior literature, it incorporates well-established additions to the model, including emotion-based evaluations, perceived group norms, habitual travel behaviour, beliefs about system usability, and the multi-stage nature of behaviour formation. All of these are measured using structured survey items designed to capture the psychological and contextual factors influencing sustainable mobility choices. In doing so, the study maintains theoretical continuity with TPB while reflecting the complexity of real-world decision-making in a mid-sized Canadian city.

While TPB accounts for motivational intention and perceived behavioural control, it does not fully address the broader structural, policy, or institutional factors that shape transportation systems. These include infrastructure availability, regulatory inertia, and urban planning norms—factors that operate beyond the scope of individual agency. To complement this limitation, the study draws conceptually on the MLP. The MLP provides a meso-level framework for understanding how technologies, practices, and institutions evolve together, shaping or constraining individual behaviour. In transportation, this includes how long-standing car dependency and fragmented transit infrastructural gaps create systemic conditions that influence whether pro-climate intentions can be enacted.

3.1 Combining TPB and STT for Behavioural Transitions

This study adopts a combination of conceptual frameworks that draws on the TPB and STT to understand sustainable transportation behaviours. TPB provides a well-established model for explaining intention through psychological constructs—attitude, subjective norms, and perceived behavioural control (Ajzen, 1991, 2005). However, TPB alone does not fully account for systemic factors that influence whether pro-environmental intentions result in action.

MLP a framework within STT, complements TPB by explaining how broader systems—such as policy regimes, infrastructure, and societal norms—enable or constrain behavioural change (Geels, 2005; Smith et al., 2005). Recent sustainability literature increasingly supports this type of theoretical integration, where individual-level behavioural drivers are examined alongside institutional and technological conditions (Sovacool & Hess, 2017; Köhler et al., 2019). The intention–behaviour gap, long discussed in TPB research (Bamberg, 2007; Lam et al., 2020), becomes more analytically meaningful when examined through MLP's concepts of regime lock-in, niche constraints, and landscape pressures (Geels et al., 2016).

Together, TPB and MLP provide a layered explanation of both motivational readiness and structural feasibility. This allows behavioural gaps to be understood not simply as personal limitations but as outcomes of system-level misalignments. TPB explains why individuals may be motivated to act, while STT explains whether the system enables such action. This combined framework advances transition research by acknowledging that achieving low-carbon mobility requires alignment between belief systems and supportive socio-technical environments.

4. Research Methodology

This study adopted a survey approach, with a qualitative research technique to investigate pro-climate transportation behaviours, intentions and the barriers to adopting to the behaviours in Fredericton, New Brunswick. The research, grounded in the STT and TPB frameworks, seeks to answer the question: What are the key barriers and opportunities for fostering pro-climate behaviours in the transportation sector?

The methodology of this study was developed to align closely with the TPB literature and ensure that the research questions directly address the limitations of MLP and TPB in explaining pro-climate transportation behaviours (Ahmed, Catchpole, & Edirisinghe, 2020; Wall, Devine-Wright, & Mill, 2007). The literature review revealed that STT and MLP frameworks have yet to develop or combine a robust understanding of pro-climate behaviour change at the individual or user level. It also showed that while TPB successfully models behavioural intention through attitudes, subjective norms, and perceived behavioural control, it does not fully account for user emotional, social identity and moral considerations, as well as structural and habitual barriers that prevent intention from translating into behaviour (Li & Zhang, 2023). To bridge these gaps, the study combines TPB with MLP, to address infrastructure, policy, and economic constraints into user behavioural analysis (Hu, Wu, & Chen, 2021). This integration ensures that the research does not solely focus on individual motivations but also captures systemic influences shaping transportation choices. Moreover, by linking the research question, theoretical framework, and empirical methodology, this study ensures that the findings provide comprehensive insights into the real-world constraints of sustainable transportation adoption. The combination of TPB's psychological focus with

STT's systemic approach allows for a more nuanced understanding of transportation behaviour, filling the gaps identified in existing research.

The study was also designed to include correlation analysis to examine the relationships between TPB constructs and actual transportation behaviours. This statistical approach allows for a deeper understanding of whether attitudes, subjective norms, and perceived behavioural control translate into sustainable transport choices, addressing the widely acknowledged intention-behaviour gap in TPB research (Wang, Zhang, & Wong, 2022).

The survey (presented in Appendix A, along with the results) was carefully designed to operationalize both TPB and STT and to examine the interaction between personal intentions, social influence on intention, and structural factors affecting the intentions and behaviours in transportation methods (Ahmed et al., 2020; Wall, Devine-Wright, & Mill, 2007). Questions on attitudes assessed participants' perceptions of sustainable transportation, including its benefits and drawbacks, to determine whether positive environmental attitudes correlate with actual behaviour. Subjective norms were examined through questions on social influences, such as how family, peers, and societal expectations affect transportation choices. Perceived behavioural control was assessed by exploring practical constraints, such as transit accessibility, infrastructure quality, and affordability, allowing the study to determine whether individuals feel empowered or restricted in making sustainable transportation decisions. In addition to qualitative responses, survey data were quantitatively analyzed to determine the correlation between TPB variables and actual transportation behaviour, further strengthening the study's ability to identify behavioural patterns and test TPB's predictive power in real-world settings.

To further investigate the habitual and emotional dimensions of transportation choices, often overlooked in TPB, additional questions were developed. Participants were asked about their daily mobility routines and whether habits, comfort, or safety concerns influenced their travel decisions. Questions regarding motivators and barriers to sustainable transportation captured emotional and habitual influences that might explain why individuals persist in car usage despite pro-climate attitudes. These questions were particularly relevant in Fredericton, where factors such as harsh weather conditions, transit efficiency, and infrastructure limitations could create structural disincentives for sustainable transport adoption. By incorporating correlation analysis, the study assesses whether these factors significantly impact transportation choices and how they interact with TPB constructs to explain variations in behaviour.

In Fredericton, habitual car use poses a significant barrier to adopting sustainable transportation due to long distances, limited infrastructure, and entrenched commuting routines. Even those with positive attitudes and social support often default to driving, underscoring the need to consider behavioural history in intention analysis. This study incorporates habit into its TPB framework by measuring travel frequency, routine strength, and perceived difficulty in changing modes, thereby offering a more accurate picture of behavioural inertia. Aligned with Ajzen's (2005) guidance, the model treats habit as a background factor that stabilizes beliefs and resists change—especially in repetitive contexts like commuting. Additionally, the study integrates both subjective and structural dimensions of PBC using survey data to assess infrastructure access, service reliability, safety, and cost. By contextualizing PBC within Fredericton's seasonal and infrastructural realities, the research operationalizes TPB in a way that

reflects the real-world constraints on sustainable mobility. This strengthens both the predictive capacity of TPB and its applicability in urban sustainability transitions, particularly when paired with STT to address system-level inertia.

This study examines the intention–behaviour gap in Fredericton's evolving transportation system, where strong pro-climate intentions are often disrupted by contextual barriers such as long distances, unreliable transit, seasonal access, and infrastructure gaps. To capture this complexity, the survey includes items that assess behavioural follow-through and identify specific points where intentions break down. This aligns with Ajzen's (2005) view that volitional capacity must be considered alongside situational constraints, as TPB does not assume that intention alone guarantees action. By identifying where and why intentions fail, the study informs targeted interventions—like improving service reliability or disrupting habitual car use—that address both structural and emotional barriers. Treating intention as part of a staged, interruptible process enhances TPB's explanatory power for complex, context-dependent behaviours like transportation. This approach also justifies the integration of TPB with STT, which explains how systemic conditions—such as policy inertia, infrastructure design, and cultural norms—shape whether individual intentions can be realized, offering a more holistic view of sustainability-oriented behaviour change.

The study also accounted for socioeconomic factors based on employment status, whether they're a student or full-time employee, and demographic variations, which are age factors, by ensuring a diverse sampling. This was particularly important since younger respondents were found to rely more on public transportation, whereas older individuals preferred personal vehicles, demonstrating how age and employment shape

mobility choices due to external barriers. Correlation analysis was used to determine whether these demographic variations significantly influenced transportation behaviour, allowing the study to observe how factors like age, employment status, and accessibility shape pro-climate transportation decisions.

Data collection was conducted through door-to-door surveys with 57 residents across the neighbourhoods in Fredericton. Each survey took approximately 12 minutes. Neighbourhoods were selected to reflect Fredericton's socio-economic and infrastructure diversity. The sampling method ensured representation from various demographic age groups, including students, full-time employees, and retirees. This diversity allowed for a comprehensive examination of the factors influencing transportation choices (Ahmed, Catchpole, & Edirisinghe, 2020; Wall, Devine-Wright, & Mill, 2007). This approach allowed the study to capture a broad range of perspectives on sustainable transportation choices in Fredericton. By targeting individuals from different areas, ages and employment status, the research aimed to uncover variations in how personal beliefs, social influences, and external barriers shape transportation behaviour (Ahmed, Catchpole, & Edirisinghe, 2020; Nordfjærn, Jørgensen, & Rundmo, 2014; Li & Zhang, 2023). By deliberately including a range of participants, the study was designed to comprehensively understande factors shaping pro-climate transportation behaviours (Fishbein & Ajzen, 1975).

This study employed a deductive methodological approach, consistent with its aim of applying and testing established theoretical constructs from the TPB and STT in the context of sustainable transportation in Fredericton. Rather than generating theories from open-ended data, the research design began with a clearly defined conceptual

framework. Survey questions were constructed explicitly to operationalize TPB variables—attitudes, subjective norms, and perceived behavioural control—alongside STT-informed factors such as infrastructure availability, policy limitations, and regime-level constraints.

This deductive structure guided both the data collection and the interpretation of results. For example, the survey included closed-ended Likert-scale items measuring participants' beliefs about sustainable transportation, perceived social expectations, and structural enablers or barriers to behavioural follow-through. Responses were then analyzed in relation to the theoretical predictions of TPB and STT, allowing the study to examine whether real-world mobility behaviours aligned with the constructs.

Although patterns and themes were identified in the responses, they were not drawn inductively from unstructured narratives, but rather assessed in relation to theory. This approach aligns with Ajzen's (2005) guidance to empirically adapt TPB constructs to specific domains, enabling a focused investigation into whether individual intention—shaped by internal beliefs—translates into action within an environment marked by infrastructure gaps and habitual car use.

By applying a deductive framework, this study contributes to the empirical testing of TPB and its theoretical extensions, while also demonstrating how systemic constraints highlighted by STT influence individual-level behavioural intention. This methodological alignment strengthens the internal coherence between the research questions, theoretical framework, and data collection tools, ensuring that the findings are both practically relevant and theoretically grounded.

Use of Artificial Intelligence Tools

During the writing and revision process of this thesis, I used ChatGPT-4-turbo (OpenAI, April 2025) to support academic writing tasks. The tool was used to help organize my thoughts, improve clarity in literature synthesis, and frame theoretical explanations more precisely—particularly for complex topics such as the TPB and STT. It also supported grammar, structure, and citation placement while drafting the methodology and findings sections. However, the use of AI was limited to language support and academic phrasing. All research design decisions, data collection, correlation analysis, and theoretical interpretations were done independently. The AI tool did not generate original content or analyze data—it was only used to assist in articulating academic content more clearly.

5. Results and Discussion

5.1 Age of Survey Subjects

The interviews documented responses from 57 participants across six age groups (as shown in Figure 1) to ensure diverse representation in the analysis of pro-climate transportation behaviours. The largest age groups were 25-34 years old (33.3%) and 35-44 years old (29.8%), making up the majority of respondents. Smaller but notable portions included groups aged 18-24 years old (10.5%), 45-54 years old (10.5%), and 55-64 years old (14.0%). The 65+ group (1.8%) had the fewest respondents. These proportions are reflected in the findings, where age-related variations in attitudes, subjective norms, and behavioural control toward sustainable transport choices were analyzed.

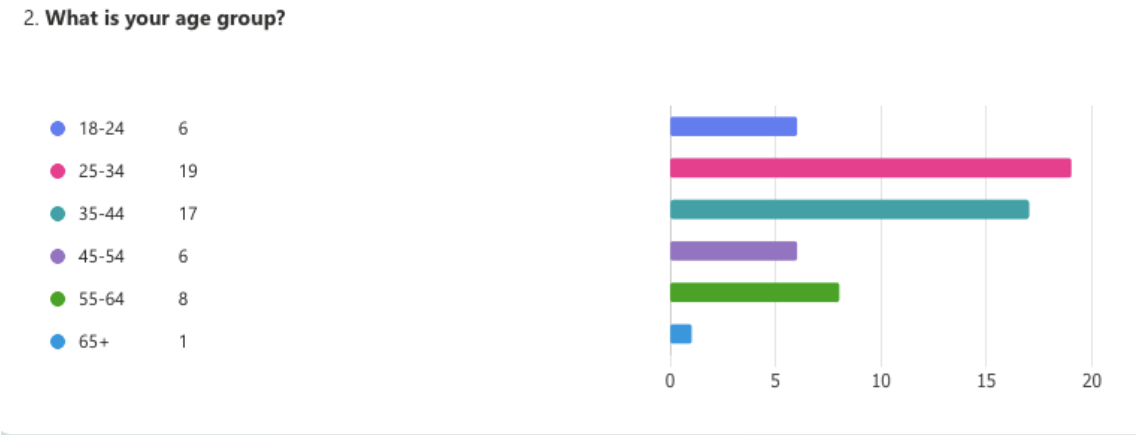

Figure 1: Age Groups

Figure 2 below is a set of questions in a Likert scale to measure attitudes and subjective norms of TPB. The first two questions in this figure determine the attitude or intention towards pro-climate behaviour in transportation.

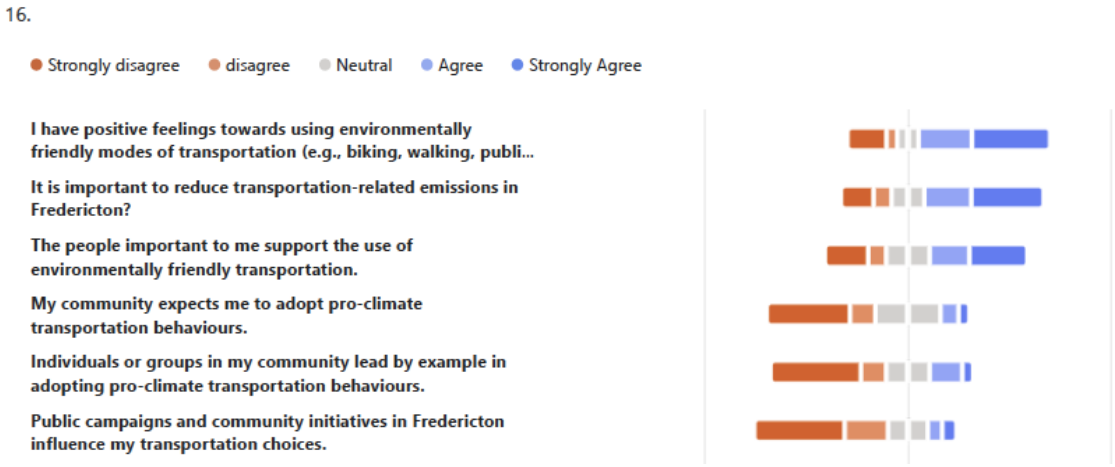

Figure 1: Survey Questions Measuring Attitudes and Subjective Norms

5.2 Attitudes Toward Pro-Climate Transportation by Age Group

The survey questions on attitudes examined how people in Fredericton feel about using eco-friendly transportation like biking, walking, or public transit, and how important they think it is to reduce emissions from transportation. It asked questions to understand if people's positive intentions about the environment match their willingness to use sustainable/pro-climate transportation. This helps identify what encourages or prevents them from choosing these options, so better solutions and policies can be created.

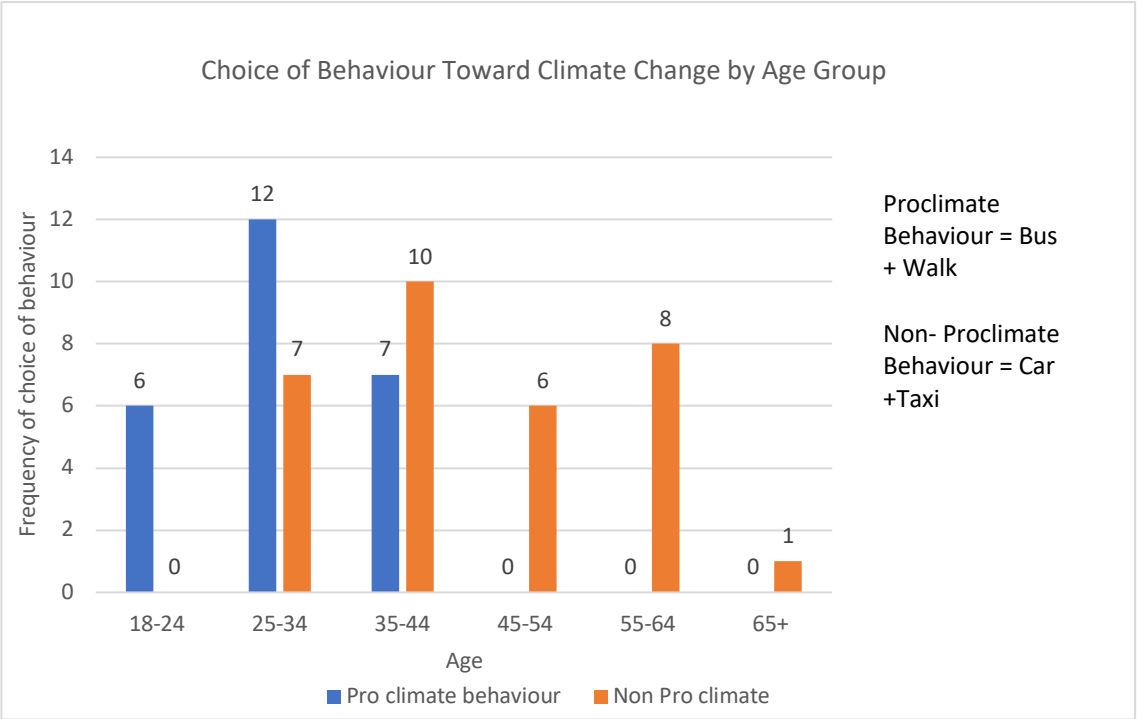

Figure 2: Choice of Behaviour Toward Climate Change by Age Group

Figure 3 illustrates how transportation choices vary across age cohorts in Fredericton. Pro-climate behaviours—defined as walking and bus use—are most prevalent among the ages 18-24, with a total of 6 respondents, all of who use the pro-climate mode of transportation and the 25–34 age group, with 12 individuals reporting sustainable travel modes compared to 7 who rely on cars or taxis. This likely reflects students or younger professionals with fewer financial resources or limited access to private vehicles. In contrast, the 35–44 group shows a behavioural reversal, with 10 individuals using non-pro-climate transport compared to 7 who chose sustainable options. This shift continues more dramatically in the 45–54 and 55–64 age groups, where no participants reported using pro-climate transport. Instead, all respondents in these age groups rely on cars or taxis, possibly due to external barriers.

Figure 4 illustrates attitudes toward pro-climate transportation across different age groups. The percentages represent the proportion of respondents within each age group who agreed, disagreed, or remained neutral regarding pro-climate transportation attitudes.

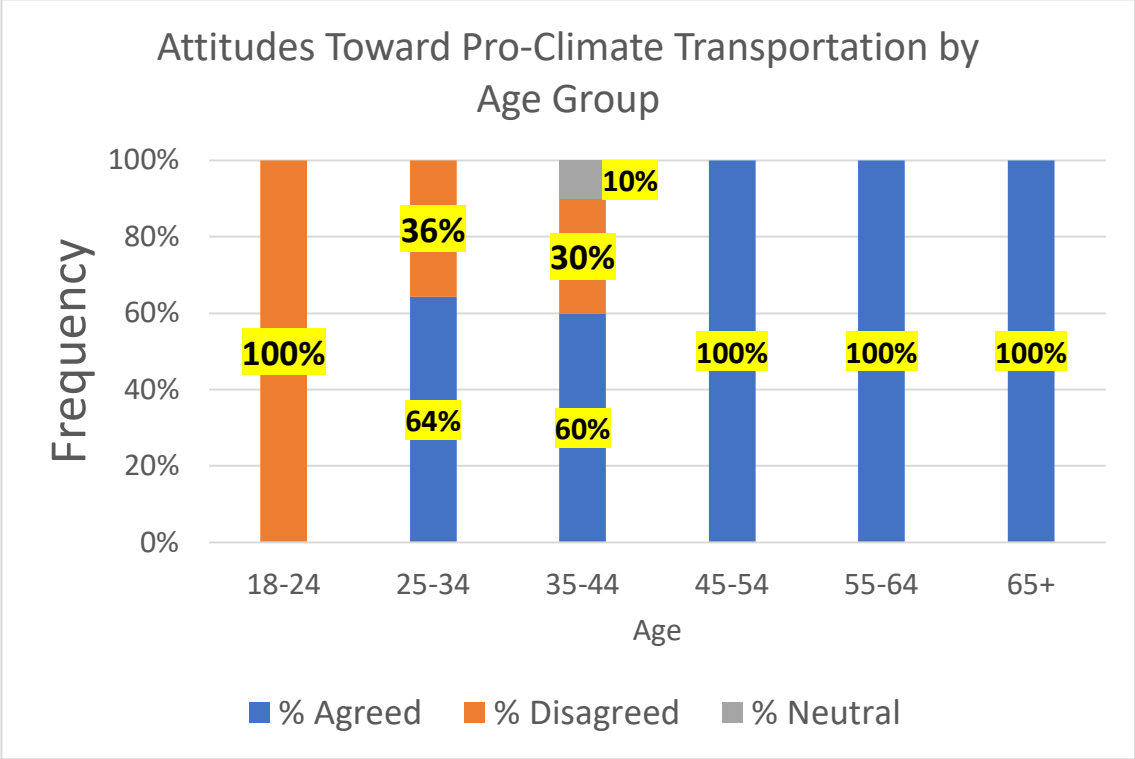

Figure 3: Attitudes Toward Pro-Climate Transportation by Age Group

In this study, Q16 marked the beginning of the Likert-scale questions and corresponded to the TPB construct of attitude. The first two questions, which measure attitudes, are rated on a 5-point scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Among the 18–24 age group, the majority selected either “Strongly Disagree” or “Disagree,” indicating a generally negative or indifferent attitude toward the environmental benefits of sustainable transportation. This finding is particularly

noteworthy as it highlights a disconnect between attitude and behaviour: although students in this age group frequently relied on public transit, their usage did not stem from pro-environmental beliefs, but rather from necessity. This contrast reflects an intention–behaviour gap that underscores the importance of considering external constraints and habitual usage when interpreting TPB constructs in context.

Positive Attitudes Toward Pro-Climate Transportation

For the 18-24 age group, 100% disagreed, meaning that all 6 respondents in this category reported negative attitudes toward pro-climate transportation. In the 25-34 age group, 64% agreed, meaning that 12 out of 19 respondents had a positive attitude toward pro-climate transport. Meanwhile, 36% disagreed, with 7 respondents expressing negative attitudes. For the 35-44 age group, 60% agreed (10 out of 17 respondents supporting pro-climate transportation) and 30% disagreed (5 respondents), and 10% remained neutral (2 respondents). The older age groups (45-54, 55-64, and 65+) all had 100% agreement, meaning all respondents in these categories supported pro-climate transportation. This indicates that every individual in these age groups (6 in 45-54, 8 in 55-64, and 1 in 65+) had a favourable attitude.

These positive attitudes align with the TPB, which suggests that favourable attitudes often correspond to higher behavioural intentions. Older participants, likely settled in their careers and more financially stable, recognize the environmental and health benefits of pro-climate transportation. The survey did not include open-ended questions or items exploring motivations behind participants' views, and therefore, any interpretation of why older respondents showed more positive responses remains outside the empirical scope of the data.

Despite their favourable attitudes, these participants reported practical barriers that limited behavioural follow-through. These responses indicate that older participants recognize the environmental concerns of sustainable transportation in theory. However, their support remains largely conceptual rather than practical.

However, despite these positive attitudes, practical barriers still limit action. Many older respondents cited time constraints, health issues, and infrastructure concerns as obstacles. These responses, followed by the barriers to achieving positive behaviour, illustrate that while older individuals may support pro-climate transportation, structural and personal limitations often make sustainable options impractical.

This demonstrates an intention-behaviour gap, where positive attitudes do not necessarily lead to action due to external barriers, reinforcing the need for improved transportation accessibility, infrastructure, and flexible scheduling to accommodate diverse commuter needs.

Negative Attitudes and Barriers

Negative attitudes were more common among younger respondents, particularly those aged 18-24, who unanimously expressed disagreement (100%) with pro-climate transportation options. All 6 respondents in that age bracket use the bus. A majority of younger people in Fredericton happen to be students who also are bus riders and older people are working professionals who are car users. Similarly, the 25-34 age group showed a significant proportion (36%) of disagreement, with 64% agreeing. The negative attitudes observed among younger respondents likely reflect structural barriers such as infrequent service, poor route coverage, and unreliable scheduling. While the

survey did not include open-ended questions, several participants voluntarily shared additional comments during the brief interviews. To respect participants' time, the survey was designed to last approximately 12 minutes and conducted at their doorstep. These insights indicate that while younger individuals may support sustainable transportation in theory, their actual experiences with public transit shape their negative perceptions.

Many younger respondents are students or early-career professionals, making them more dependent on public transportation and more aware of its shortcomings. Their dissatisfaction highlights an intention-behaviour gap, where external limitations prevent individuals from choosing pro-climate transport, despite its environmental benefits. Addressing infrastructure, frequency, and affordability issues may help bridge this gap and increase adoption rates among younger commuters.

Neutral Attitudes

Neutral attitudes toward pro-climate transportation were relatively uncommon, primarily appearing among respondents in the 35-44 age group. This suggests that most participants had clear opinions, either positive or negative, about sustainable transportation. The neutral responses likely reflect uncertainty or a lack of strong external influences rather than indifference. For instance, one respondent in this group, who is employed full-time and owns a car, agreed that reducing emissions is important but noted that "lack of infrastructure" and "time constraints" made sustainable options inconvenient. Similarly, a student in the same age range who primarily uses the bus marked "neutral" on whether their community expects them to adopt pro-climate behaviours, indicating they do not feel strong social pressure to do so. These findings

suggest that neutral attitudes may arise when structural barriers make sustainable choices seem impractical, even if individuals recognize their benefits.

The findings highlight a clear polarization in attitudes, with older groups showing unanimous positive support and younger groups expressing greater dissatisfaction. Based on the above verbally documented concerns and reasons we can see that practical factors like convenience, infrastructure, and financial stability significantly influence these attitudes. Addressing public transport reliability, expanding sustainable options, and targeting interventions for younger demographics can bridge the gap between attitudes and actionable pro-climate behaviours. These results underline the importance of integrating practical solutions with behavioural insights to encourage sustainable transportation choices across all age groups.

Correlation

To analyze the relationship between attitudes toward pro-climate transportation and actual travel behaviour, a Pearson correlation analysis was conducted using Excel. Two Likert-scale questions were used to assess attitude: (1) “I have positive feelings towards using environmentally friendly modes of transportation (e.g., biking, walking, public transport)” and (2) “It is important to reduce transportation-related emissions in Fredericton.” Each respondent’s answers to these two questions (scored from 1 = Strongly Disagree to 5 = Strongly Agree) were averaged to create a single composite attitude score per participant. Transportation behaviour was then coded into a binary variable, where personal car or taxi users were assigned a value of 1 (non-pro-climate

behaviour), and those who walked, biked, or used public transit were assigned a 2 (pro-climate behaviour). These two sets of values—attitude scores and transportation behaviour codes—were then compared using Excel's =CORREL() function. The resulting Pearson correlation coefficient was -0.571, indicating a moderate negative correlation. This suggests that participants with stronger pro-climate attitudes were actually less likely to engage in sustainable transport behaviour, highlighting the presence of an intention–behaviour gap influenced by external barriers such as convenience, infrastructure, and routine.

While individuals may recognize the environmental benefits of using public transit, biking, or walking, practical barriers such as unreliable service, perceived inconvenience, or longer travel times may prevent them from making sustainable choices. This aligns with previous findings by Heath and Gifford (2002), which showed that environmental concern had only a weak correlation ($r \approx 0.10$ to 0.30) with actual public transit use. Hauslbauer et al. (2022) found that environmental concern had no direct correlation ($r \approx 0.00$ to 0.15) with transit ticket subscriptions but had an indirect effect through subjective norms and attitudes. These findings reinforce that while TPB captures the influence of attitudes, it may overestimate their direct impact in contexts where practical constraints dominate behavioural decisions (Bamberg, 2007; Daziano & Bolduc, 2013; Zhang et al., 2013).

The findings highlight the need to extend TPB by integrating socio-technical and contextual theories to better explain sustainable transport behaviours. While TPB assumes a direct influence of attitudes on intention and behaviour, this study, along with previous research, suggests that external factors such as infrastructure, financial

incentives, and convenience may be more influential in determining actual transportation choices. The moderate correlations observed in this study reinforce the argument that structural barriers often outweigh attitudinal influences, necessitating a broader approach that incorporates both behavioural and systemic interventions. By recognizing these limitations, future research and policy efforts can focus on addressing external constraints, making sustainable transportation options more practical and accessible for individuals who already hold pro-climate attitudes.

Why is it meaningful for the study?

Assessing the correlation between pro-climate attitudes and transportation choices is meaningful within the TPB which posits that positive attitudes should predict pro-environmental intentions and behaviours. In this study, a Pearson correlation of -0.571 was found between attitudes and sustainable transportation, indicating a moderate negative relationship. This suggests that despite expressing positive attitudes, many participants still relied on personal vehicles. Such findings support critiques of TPB that argue it underestimates the role of situational constraints—like infrastructure limitations, convenience, or longer travel times—in shaping behaviour. The data highlights an intention–behaviour gap, where favourable attitudes are not consistently translated into action due to structural barriers. These results point to the importance of integrating TPB with socio-technical frameworks, as recommended by Li et al. (2020), to account for external factors and improve the predictive power of behavioural models in sustainability contexts.

5.3 Subjective Norms and Social Influence Towards Pro-Climate Transportation

The questions from 3-6 in Q16 (Figure 2) measure the subjective norms in TPB, which is the social influence over someone's behaviour towards transportation choices.

Figure 5 illustrates perceptions of social pressure/influence to adopt pro-climate transportation across different age groups. The percentages represent the proportion of respondents within each age group who agreed, disagreed, or remained neutral regarding feelings of social pressure/influence.

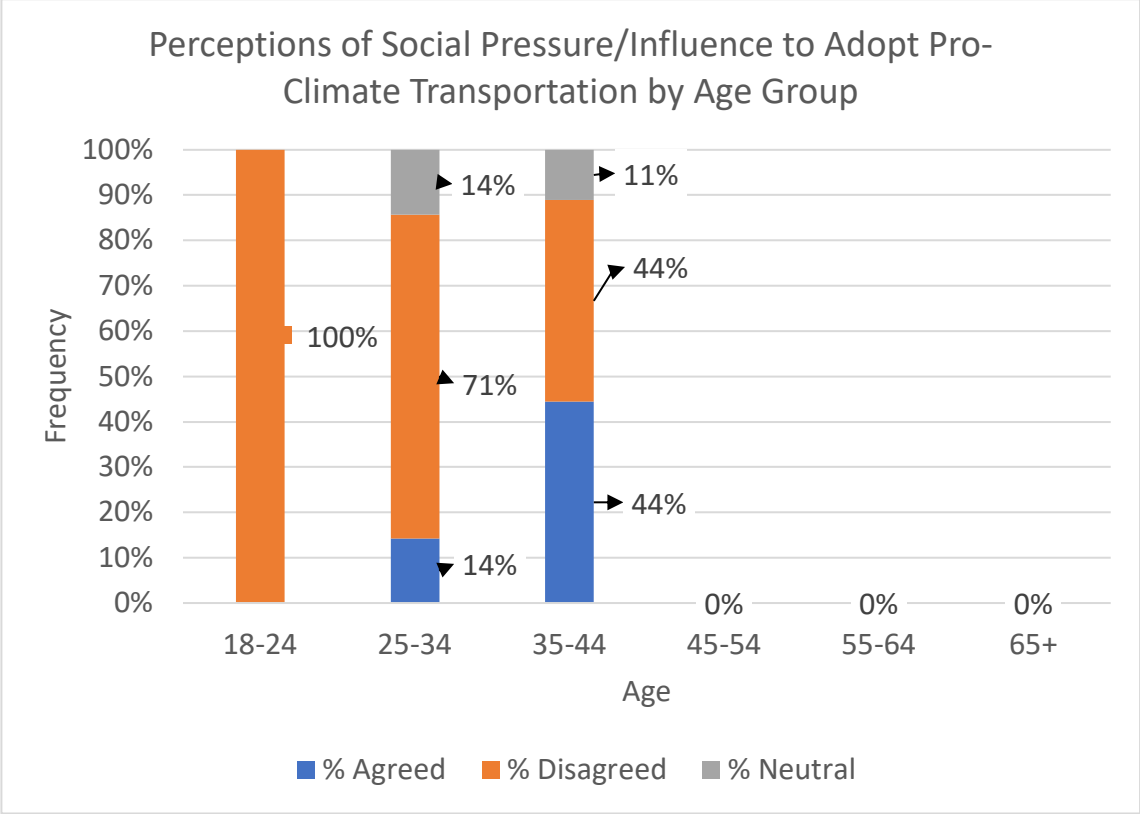

Figure 4: Perceptions of Social Pressure/Influence to Adopt Pro-Climate Transportation by Age Group

For the 18-24 age group, 100% disagreed, meaning that all 6 respondents reported feeling no social pressure to adopt pro-climate transportation. In the 25-34 age group, 71% disagreed (14 out of 19 respondents felt no pressure to adopt sustainable transportation), 14% agreed (3 respondents) and 14% were neutral (3 respondents). For the 35-44 age group, responses were more divided: 44% agreed, (8 out of 17 respondents felt social pressure to adopt pro-climate transport); 44% disagreed; and 11% remained neutral (2 respondents). For the older age groups (45-54, 55-64, and 65+), all respondents skipped the question or did not feel it applied to their transportation decisions. Their omission could indicate a lack of relevance, interest, or awareness regarding the topic in their daily transportation decisions.

According to TPB, subjective norms are a standard that reflects the perceived social pressure concerning the performance or non-performance of a certain behaviour. In the results, the subjective norms about pro-climate transportation behaviours appeared to show mixed findings across the different age groups, with an evident split between the youngest respondents: the 18-34-year-olds and those aged 25-44 years. The younger age group and users of public transportation recorded less positive influence concerning experiencing social pressure toward making pro-climate transport choices. The older individuals skipped this question as they did not find it relevant to them. This indicates that none of the age groups' choice of transportation is because of social influence. This is indicative of the fact that, on the ground of some demographic groupings, the influence of situational norms on pro-climate transport is weak in people who probably feel very little to no encouragement from their community or social groups to undertake

such behaviour (Ahmed, Catchpole, & Edirisinghe, 2020; Wall, Devine-Wright, & Mill, 2007; Li & Zhang, 2023).

The findings of the TPB that find the subjective norm is often limited in its predictive power on actual behaviour for instance where there is a lack of visible community support or infrastructure (Wall, Devine-Wright, & Mill, 2007). For example, if there are no public campaigns or role models supporting the use of sustainable transportation in certain communities, individuals cannot feel any social motivation toward its adoption. The minor positive effect of subjective norms on the youths in the study could therefore be an indication of a surrounding social setting that does not strongly encourage pro-climate behaviours, where practical issues of infrastructure and convenience are concerned. According to Lois et al. (2015), similar shortcomings can be seen with TPB in that subjective norms cannot facilitate change in behaviour fully if the environmental or community structures for support are missing.

In contrast, the strong subjective norms among the respondents in the 25-44-year-old age bracket show that at least some groups selectively support sustainable practices. This, therefore, implies that social influence in encouraging pro-climate transport mode choices is highly dependent on the community and support structures being present and accessible. This is further supported by studies such as those by Lam et al. (2020) and Sovacool et al. (2023), where subjective norms are stronger in the case of visible social endorsement, and the behaviour aligns with values and infrastructure.

However, the low levels of overall perceived social pressure among the respondents suggest that the subjective norms themselves cannot result in sustainable transportation behaviour in the presence of other barriers related to convenience and reliability of

private and public transportation. The results are consistent with various criticisms on TPB's component of subjective norms in that it tends to miss both the structural and the situational factors affecting social influence on behaviour.

In other words, TPB argues that subjective norms may influence the behavioural intention, but the survey results show the limitation of social expectations in shaping pro-climate transport behaviours, especially for younger individuals and those who do not have strong community support. This indicates that in applying TPB to forecast sustainable transportation behaviours in realistic settings, there should be incorporation of broader social and structural influences.

Correlation

To assess the influence of subjective norms on transportation behaviour, a Pearson correlation analysis was conducted using four survey items related to social and community influence. These items asked participants to rate their agreement on a 5-point Likert scale with statements such as: “The people important to me support the use of environmentally friendly transportation,” “My community expects me to adopt pro-climate transportation behaviours,” “Individuals or groups in my community lead by example in adopting pro-climate transportation behaviours,” and “Public campaigns and community initiatives in Fredericton influence my transportation choices.” The responses for each participant were averaged to create a composite subjective norm score (ranging from 1 to 5), where higher scores indicated stronger perceived social and community support for sustainable transport.

Transportation behaviour was coded as a binary variable: participants who primarily walked, biked, or used public transport were coded as 2 (pro-climate transport), while those who used personal cars or taxis were coded as 1 (non-pro-climate transport). Pearson's correlation was then used in Excel to calculate the relationship between the subjective norm average scores and transportation choices.

The resulting correlation coefficient was -0.24, indicating a weak negative relationship between subjective norms and the use of sustainable transport. This suggests that even when individuals perceive social support for pro-climate behaviour, it does not significantly translate into the adoption of environmentally friendly transportation modes. In some cases, higher social influence was still associated with private car usage, revealing a disconnect between perceived norms and actual behaviour. This supports critiques within the TPB literature that argue subjective norms often have limited predictive power in contexts where structural barriers—such as poor transit infrastructure or long travel distances—dominate decision-making (Ajzen, 1991; Lois et al., 2015).

This weak correlation highlights a key limitation of the TPB's subjective norm component, which—although theoretically intended to shape intention—often fails to strongly predict behaviour when external constraints are present. As emphasized in the literature (Ajzen, 1991; Lois et al., 2015; Marsden et al., 2020), subjective norms alone may be insufficient to drive behavioural change when infrastructure, accessibility, and convenience pose significant barriers. Although individuals may feel supported or encouraged by peers and the broader community, the lack of reliable transit, seasonal constraints, or ingrained routines often outweigh these social pressures in practice.

These findings reinforce the need to view subjective norms not as isolated predictors, but as context-dependent drivers that must be interpreted alongside structural and systemic conditions—consistent with the integration of TPB and socio-technical transitions (STT) theory in this study. While TPB captures the psychological readiness to act, STT reveals how regime-level inertia, infrastructure, and institutional factors can suppress the behavioural impact of even strong social norms. In this case, the weak negative correlation suggests that social influence exists but lacks the strength to overcome Fredericton's current transportation limitations, reinforcing the importance of combining individual and structural perspectives when designing interventions for sustainable mobility.

Why is correlation important for the study?

The weak correlation observed between subjective norms and sustainable transportation behaviour in Fredericton underscores a key limitation of the TPB: while TPB assumes that perceived social support should strengthen behavioural intention, this influence appears insufficient when structural and contextual barriers dominate. In this study, even participants who perceived pro-climate support from their communities or social circles were not significantly more likely to engage in sustainable travel behaviours such as walking, biking, or using public transit. This suggests that social norms alone may not be decisive drivers of behavioural change in contexts where infrastructure is limited or habits like car use are deeply ingrained.

These findings echo critiques within TPB literature that highlight the limited predictive power of subjective norms in settings where environmental and situational constraints—such as inconvenient transit options, weather, or infrequent service—overshadow the influence of social encouragement (Lois et al., 2015; Marsden et al., 2020). Correlation analysis here confirms that while social support may exist, it does not significantly translate into action due to the overriding influence of external barriers. This reinforces the need to integrate TPB with socio-technical transition frameworks, which provide a more holistic lens by accounting for structural influences such as infrastructure, policy support, and urban planning.

Therefore, the significance of this correlation lies in its diagnostic value: it shows that pro-climate behavioural change in Fredericton cannot rely on social influence alone. Sustainable transportation strategies must be multi-dimensional, combining behaviour-based interventions with systemic reforms in infrastructure and policy. These insights support broader calls in the literature to embed behavioural science within structural transitions, rather than treating intention or social pressure as standalone predictors of pro-environmental action (Ajzen, 1991; Sovacool et al., 2023).

5.4 Perceived Behavioural Control

PBC, in this case, the ability to engage in pro-climate transportation behaviours. In the context of Fredericton, this construct is shaped by external barriers, many of which align with broader socio-technical and infrastructural challenges identified in the MLP and TPB frameworks. These barriers are visually represented in the following graphs.

This section addresses the perceived behaviour of survey subjects relative to a wide variety of transportation constraints.

Figure 7 illustrates the structural barriers reported by Fredericton residents in their daily commute to primary destinations such as work, school, and grocery stores. The figure categorizes respondents based on their current transportation mode—car users versus those using buses or walking, corresponding to non-pro-climate and pro-climate behaviours respectively. The purpose of this breakdown is to identify the most frequent barriers that prevent individuals from performing their intended sustainable behaviours, even when they have positive attitudes or intentions.

The graph offers a descriptive overview of the top contextual and infrastructural challenges that disrupt behavioural follow-through, a critical gap highlighted in the TPB. It visually demonstrates how common limitations such as time, weather, and infrastructure affect both user groups, but with varying intensities. By identifying these barriers in a comparative format, the graph supports a deeper understanding of why positive attitudes do not always translate into pro-climate actions and informs future interventions that target the most pressing constraints.

To realize this deeper understanding, the survey captured the survey captured the self-reported transportation mode of each respondent—whether they primarily used a car/taxi or sustainable modes like buses, or walking. In Figure 6, we can see the number of car/taxi users and bus/walk users. Each respondent was also asked to select the top barriers that impacted their daily commute to their primary destination (e.g., workplace, school, or essential services). The barriers included options such as financial constraints, time constraints, weather conditions, infrastructure limitations, health or physical limitations, safety concerns, infrequent bus service, and distance.

By aggregating the responses, the number of car users and bus/walk users reporting each specific barrier was calculated. This allowed the analysis to not only identify which barriers were most commonly reported but also to distinguish whether different transportation groups (car users vs. sustainable transport users) faced different types of challenges.

This analysis highlights two critical barriers. First, it enabled the study to identify the top barriers systematically, providing empirical evidence of the most significant obstacles to sustainable commuting in Fredericton. Second, it revealed how these barriers were directly interfering with individuals' ability to act on their pro-climate intentions—thus offering insight into where interventions (e.g., infrastructure improvement, policy support) would be most needed to close the intention-behaviour gap. In essence, the barriers graph transforms individual daily commuting challenges into collective behavioural patterns, directly connecting systemic transportation shortcomings to the suppression of pro-climate behaviour.

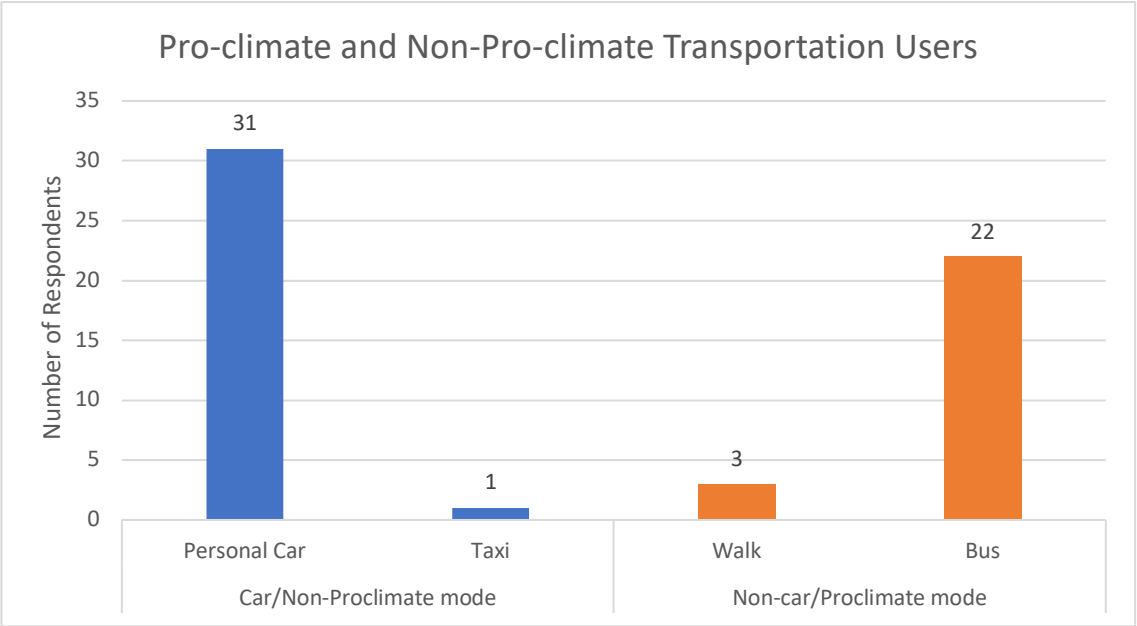

Figure 5 : Pro-climate and Non-Pro-climate Transportation Users

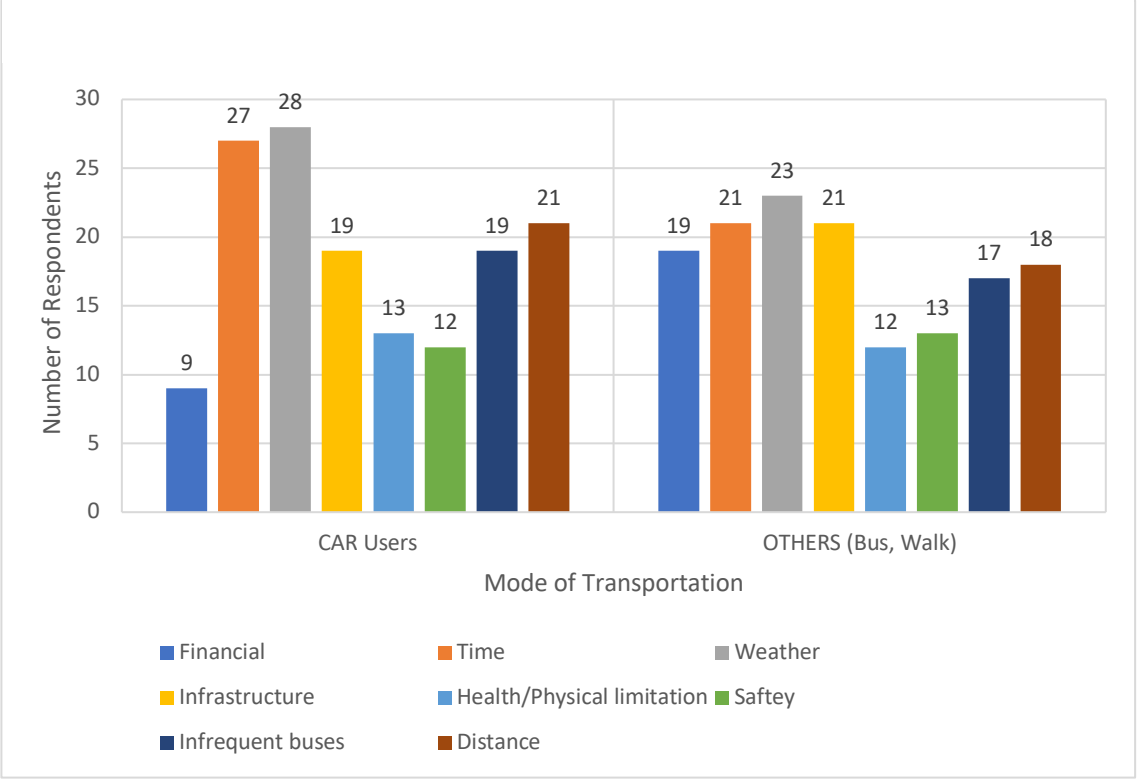

Figure 6: Barriers To Pro-Climate Behavioural Change

The graph illustrates the most commonly cited barriers to adopting pro-climate transportation behaviours in Fredericton, separated by mode of transport. Among both

car users and those who use sustainable modes such as walking or public transit, the top four barriers identified were time, weather, distance, and infrastructure. For car users, weather (28 respondents) and time (27) were the most frequently reported obstacles, followed closely by distance (21) and infrastructure (19). This pattern was mirrored among users of public transit and active transport, with weather (23), time (21), infrastructure (21), and distance (18) emerging as leading constraints. These results emphasize that, regardless of current transportation mode, systemic challenges such as seasonal conditions, long travel distances, limited infrastructure, and time inefficiencies significantly undermine individuals' ability to act on their pro-climate intentions. This supports the argument that PBC in TPB must be interpreted in tandem with external factors captured by the MLP within STT framework, particularly when assessing behaviour in mid-sized, car-dependent cities like Fredericton.

5.5 Motivators for Adopting Pro-Climate Transportation Methods

Figure 8 was constructed to identify and compare the key motivators that influence pro-climate transportation behaviour among two distinct groups: car users/non-pro-climate transportation users and non-car users/pro-climate transportation users. Each participant in the survey was asked to select motivators that encouraged them to consider or adopt sustainable transport options in their daily commute to primary destinations like work, groceries or school.

The chart aggregates the total number of respondents from each group who selected specific motivators, such as cost savings, public transportation reliability, infrastructure

quality, incentives, and health. These motivators were drawn from the literature on the TPB, particularly its constructs of PBC, subjective norms, and attitudes.

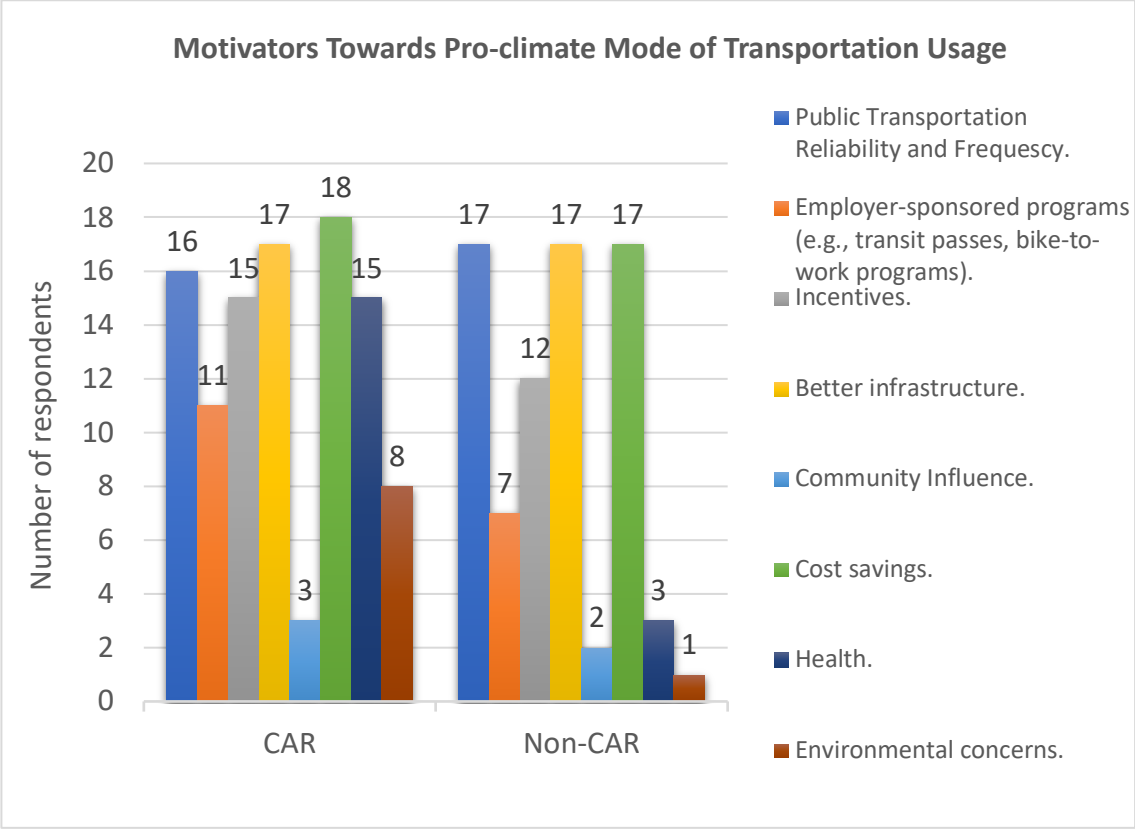

Figure 7: Motivators Towards Pro-Climate Mode of Transportation Usage

By comparing responses between car and non-car users, the graph helps reveal which practical or psychological factors are most persuasive for each group. This supports the study's goal of identifying targeted interventions (e.g., improving transit reliability for non-car users or emphasizing cost savings for car users) to increase the adoption of sustainable transport in Fredericton.

Among car users, the top motivators for adopting pro-climate transportation were cost savings (18 respondents), better infrastructure (17 respondents), and public transportation reliability (16 respondents). These results emphasize that practical considerations strongly influence behaviour. According to the TPB such motivators

align with the PBC construct, which reflects individuals' beliefs about their ability to perform a behaviour given existing constraints. For car users, financial incentives and structural improvements play a crucial role in making sustainable alternatives more feasible. This suggests that even those who currently rely on private vehicles may be willing to shift behaviour if external conditions—like affordable, reliable, and accessible transit—are improved. The relatively high selection of health (15 respondents) also reflects positive attitudes, another core TPB component, indicating that car users may recognize the benefits of sustainable transport but face practical barriers to action.

For non-car users, the most frequently selected motivators were public transportation reliability (17 respondents), better infrastructure (17 respondents), and cost savings (17 respondents)—mirroring the top three for car users but with even distribution. This reinforces the significance of structural factors in shaping and sustaining pro-climate behaviour. The consistent emphasis on reliable transit among non-car users indicates that their current use of sustainable modes is contingent on transit systems functioning efficiently. These results further validate the importance of PBC in the TPB framework; even individuals already engaged in sustainable practices require ongoing structural support to maintain them. Additionally, health (3 respondents) and environmental concerns (1 respondent) were notably low among non-car users, suggesting that for this group, external enablers matter more than personal attitudes or ethical motivations.

Overall, the comparison highlights that structural and financial motivators outweigh social and moral ones across both user groups. This reinforces critiques of TPB that point to its limitations in addressing real-world constraints. While TPB captures internal motivation through attitudes and norms, these findings illustrate that sustainable

transportation behaviour hinges more on system-level changes than individual belief systems. Therefore, policy interventions aiming to shift or sustain behaviour must prioritize improvements in transit reliability, affordability, and infrastructure—especially for younger and lower-income populations, who are more likely to rely on public modes of transport.

The least motivating factors across both car and non-car users were community influence and environmental concerns, followed by employer-sponsored programs. This trend is significant within the TPB particularly in how it relates to subjective norms—the perceived social pressure to perform or not perform a behaviour.

For car users, community influence was chosen by only 3 respondents, and environmental concerns by 8 respondents, indicating that social expectations or moral responsibility were not strong enough to outweigh the convenience and routine of private vehicle use. According to TPB, subjective norms can shape intentions, but when PBC is low—due to inadequate infrastructure or unreliable public transit—even strong norms may not lead to behavioural change. In this case, the low selection of socially or ethically driven motivators shows that normative pressure alone is insufficient in shifting entrenched car dependency.

Among non-car users, environmental concerns (1 respondent) and community influence (2 respondents) were again the lowest. Despite already practicing sustainable behaviours, these individuals did not attribute their choices to ethical or social motivations. This suggests their behaviour is driven by necessity or practicality, not normative alignment. In TPB terms, their attitudes and PBC—such as cost savings or reliable transit—likely play a stronger role than subjective norms.

These results reinforce existing literature critiques of TPB (Heath & Gifford, 2002; Lois et al., 2015), which argue that subjective norms tend to be weak predictors of behaviour, particularly when not supported by enabling environments or direct personal benefits. In essence, while TPB posits that social influence can shape intentions, this study shows that real-world transport decisions are more influenced by material and logistical factors, highlighting a limitation in the model's explanatory power when structural barriers dominate.

Figure 3 presents car usage patterns across different age groups. It highlights that a majority of respondents aged 18–34, many of whom are students, are predominantly non-car users. This study establishes a connection between age, employment status (student vs. full-time worker), and car usage, demonstrating how these factors are interrelated in shaping transportation behaviour.

Among older respondents, health was selected as a key motivator for non-car transportation, suggesting that walking is considered. However, practical barriers—such as distance, infrastructure, and time constraints—largely prevent walking from being a viable mode for reaching primary destinations. Conversely, younger current bus users did not prioritize health as a motivator, instead using public transit out of necessity rather than personal health concerns.

This finding creates an opportunity for long-term intervention: by improving external conditions like transit reliability and infrastructure, it is possible to encourage younger individuals to sustain pro-climate transportation behaviours into adulthood. As they age, and as health becomes a more personal priority. As older individuals have positive attitudes toward pro-climate action, the younger people’s pro-climate transportation

behaviour could be reinforced to have them continue using pro-climate modes of transportation as they age. This approach aligns with the TPB combined with MLP literature, where behaviour is controlled or can be changed by the external changes which makes the intended behaviour possible to practice.

6. Conclusion

This research offers a deep analysis of forces that drive and inhibit pro-climate transport modes in Fredericton within the framing of MLP and TPB. By eliciting attitudes, subjective norms, and perceived behavioural control, this research has presented drivers and deterrents in the local context that shape sustainable transport choices.

Overall, findings show both strengths and limitations of TPB: aspects where the theory is able to explain variance in behaviour well, and where it faces contexts, structure, and situational influence (Wall, Devine-Wright, & Mill, 2007). While TPB does suggest that positive attitudes toward a behaviour should foster intentions to act, this present study illustrates that positive attitudes in and of themselves do not lead to pro-climate transportation choices. The moderate negative correlation underlines an important point: namely, that the adoption of sustainable transportation is substantially obstructed by more structural and practical barriers, such as lack of public transit opportunities, time, and convenience, which override even strong environmental values. This points to a limitation of TPB: the inability of the theory to take into account external conditions impeding attitude translation into action (Heath & Gifford, 2006; Lois et al., 2015).

TPB posits that subjective norms, or perceived social pressure, significantly shape intentions. However, this research shows that social influence alone tended to have minor effects on sustainable transport behaviour among young respondents due to a lack of strong community support in pro-climate choices. The weak correlation of pro-climate social influence with sustainable transportation behaviour suggests that subjective norms are less effective when there is a predominance of structural and situational barriers, such as convenience and habit (Wall, Devine-Wright, & Mill, 2007).

This means that TPB will, in isolation, tend to overestimate the power of social influence in contexts where a strong cultural emphasis on sustainability is lacking.

Several of the MLP external barriers faced by the respondents, such as time, bad weather, infrastructural hindrances, safety concerns, and financial constraints, hamper the sense of control over their transportation decisions. Although TPB does involve PBC as a factor affecting both intentions and behaviour, it has been demonstrated that TPB lacks proper representation of how external conditions, such as the quality or financial accessibility of infrastructure, can affect PBC as put forward by Ajzen (1991). For this reason, the study thus identifies the need for TPB to combine with MLP in fully grasping the realities that influence sustainable behaviour in Fredericton.

Besides attitude, subjective norms, and PBC, motivators such as reliable public transit, cost savings, incentives, and infrastructure, are shown in this study to be major drivers for sustainable transportation. The findings are in tune with the general literature that there is a need to expand the TPB framework by incorporating structural and contextual motivators if it is to be practically applied in real-life situations (Lam et al., 2020; Li et al., 2020). The present study points to a direction in which TPB could be further elaborated: to the larger socio-economic and infrastructural context in which behaviour takes place.

All student respondents indicated that they would purchase a car once financially able, and the majority of these students were between the ages of 18 and 34. In contrast, most older respondents, who were also employed, were already car owners and regular users. The finding points to the need for targeted interventions that can retain present levels of public transit use among younger age groups as they achieve the financial capability to

afford an automobile. Knowing what is likely to sustain the commitment to sustainable options by younger people may allow more durability in the pro-climate behaviour across age groups.

While this affirms the relevance of TPB to understand pro-climate transportation behaviour, it also underlines significant gaps in the theory equally. TPB offers a good starting point for analyses of the individual attitude, norm, and perceived control, but little consideration is paid to various structural and contextual influences that demonstrably drive behaviour in real-world settings. The results here suggest that TPB can be extended with additional predictors: infrastructure quality, economic incentives, and community-based initiatives that impede or facilitate sustainable behaviour. The future applications of TPB might be many times more holistic in attending to these external factors, which can anticipate and encourage viable transportation options. In this regard, the present research contributes to the existing literature in identifying both the strengths and weaknesses of TPB with respect to sustainable transport behaviour in Fredericton.

This study focused on age and employment status as they provided the most relevant insights into transportation choices in Fredericton. Preliminary observations during data collection and prior literature (e.g., Lois et al., 2015; Nordfjærn et al., 2014) suggested that age significantly influenced both mobility patterns and pro-climate behavioural intentions. Gender and income were not included, as they did not appear to meaningfully affect intention to use public transit or cars. For example, students—regardless of gender or income—relied on buses out of necessity but planned to buy a car when possible. Older or employed individuals were more likely to drive but expressed support for

sustainable transport. Even where gender differences in employment existed, transportation modes and intentions were similar, suggesting that gender-specific interventions would not address shared structural barriers.

The specific type of car used was not measured in this study; only the distinction between car use and non-car modes (e.g., bus, walk, bike) was used to categorize behaviour as either pro-climate or non-pro-climate. Additionally, future transportation preferences were not directly assessed in the survey. However, observational trends indicated that older participants tended to express more positive attitudes toward sustainable transport, while younger individuals were more likely to currently use public transit. When viewed through the lens of STT, this suggests that if structural barriers are addressed—such as transit frequency, reliability, and infrastructure—these younger users may continue sustainable behaviours into adulthood. For long-term behavioural shifts to occur, the current barriers and motivators must be strategically addressed. Over time, if public transit can meet the same needs as personal vehicle use, individuals' intentions will be more likely to align with their pro-climate attitudes, supporting a more sustainable transport system.

The findings reveal that habitual patterns play a significant role in shaping transportation choices in Fredericton. While younger participants currently rely on public transportation due to practical necessity, many expressed intentions to shift to car use once financially feasible—indicating that without structural improvements, pro-climate habits are unlikely to persist over time. This aligns with the TPB extension literature, which suggests that repeated behaviour, especially in transportation, becomes habitual and can override even strong pro-environmental intentions (Ajzen, 2002; Verplanken &

Aarts, 1999). In contrast, older individuals who have established routines around personal vehicle use are more likely to continue those behaviours, regardless of their positive attitudes toward sustainable transport. This reflects the moderating effect of habit on the intention–behaviour relationship, as shown in previous studies (Lois et al., 2015; Bamberg et al., 2011), and reinforces the importance of disrupting established habits through structural interventions to enable lasting behaviour change.

In conclusion, this study highlights the need for integrating behavioural insights with practical interventions, like policy support, infrastructure improvement, to bridge the gap between intention and actual action. These findings support the calls for seamless integration that aligns individual motivations with supportive structural changes to ultimately enable Fredericton and other similar regions across the province to move closer toward their net-zero transportation emissions targets.

7. Policy Implications

Policy and Infrastructure Implications

The results highlight that practical barriers, such as unreliable public transit, limited infrastructure, and seasonal constraints, are the dominant factors preventing the translation of pro-climate attitudes into sustainable transportation behaviour. This implies that infrastructure improvements (e.g., increased bus frequency, extended route coverage, enhanced winter maintenance for active transport modes) are necessary to sustain and grow pro-climate transportation behaviours, especially among younger populations who currently use public transit out of necessity. Without addressing these barriers, current pro-sustainable habits among youth are likely to erode as financial means allow a shift to car ownership. These findings support calls in the literature (Lam et al., 2020; Li et al., 2020) for integrated infrastructure and behavioural interventions rather than relying solely on attitudinal change.

Behavioural Intervention Implications

The study confirms that positive attitudes toward sustainable transportation alone are insufficient to drive behavioural change without supportive conditions. This suggests a need for targeted behavioural interventions that work alongside structural improvements—such as social marketing campaigns emphasizing the convenience and reliability of sustainable modes, incentive programs for transit users, and employer-supported commuting programs. Emphasizing ease, savings, and social recognition for sustainable transport use could help reinforce pro-climate habits before car ownership becomes feasible for younger populations.

Theoretical Implications for TPB and STT

The results reinforce the view that TPB must be expanded to account for habit and structural barriers when applied to sustainability contexts. Habit strength clearly moderates the relationship between intention and action, supporting arguments made by Ajzen (2002) and Verplanken & Aarts (1999) that frequent, contextualized behaviours can override rational intentions. Moreover, the findings support the combination of MLP theory with TPB: while individual motivation is crucial, systemic factors such as infrastructure quality, regulatory norms, and dominant transportation cultures ultimately determine behavioural feasibility. Future models of sustainable behaviour must therefore embed psychological intention within broader socio-technical landscapes.

Implications for Local Stakeholders

For policymakers and city planners in Fredericton, the study underscores that investments in public transit and active transport infrastructure are not merely environmental imperatives but behavioural necessities to lock in pro-climate habits among emerging cohorts. Without such interventions, the city risks reinforcing car dependency as younger residents transition into higher-income life stages. Targeted policy support during key life transitions (e.g., graduation, new employment) can help sustain sustainable transportation choices long-term.

Generalizability and Cautions

While the study offers valuable localized insights, the findings must be interpreted cautiously in broader contexts. The focus on Fredericton—a mid-sized, low-density, car-oriented Canadian city—means that infrastructure, cultural norms, and practical constraints differ from those of larger urban centres. However, the broader patterns

observed regarding habit formation, intention-behaviour gaps, and the moderating role of structural barriers align with global sustainability transition research, suggesting that the findings have transferable relevance for similarly structured cities aiming for net-zero transportation goals.

8. Limitations of the Study

This study presents several limitations that may affect the generalizability and depth of its findings. First, the data collection was geographically limited to Fredericton and focused on more accessible, populated areas. As a result, the findings may not fully capture the transportation behaviours or barriers faced in rural, low-density, or underserved parts of the city. Second, the study relied solely on a structured survey with closed-ended questions, without incorporating open-ended responses or follow-up interviews. This limited the ability to explore emotional, moral, or contextual factors in greater depth—dimensions that are increasingly recognized as important in pro-climate behaviour research. Third, while the study included basic correlational analysis, it remains qualitative and descriptive overall, and does not apply advanced statistical modelling, which could offer stronger explanatory power. Finally, the sampling method used was informal and based on accessibility, without following a defined or randomized approach. This limits the representativeness of the sample and may introduce bias, particularly if certain demographics were more available or willing to respond. Future studies could address these issues by incorporating mixed-method designs, broader geographic sampling, and more structured recruitment procedures.

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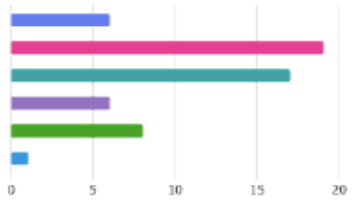
Appendix 1: Interview Questions and Results

Below are the questions and results of the Microsoft form of the interview guide.

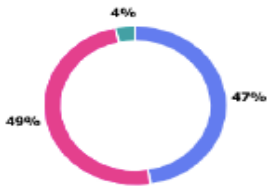
2. **What is your age group?**

18-24	6
25-34	19
35-44	17
45-54	6
55-64	8
65+	1



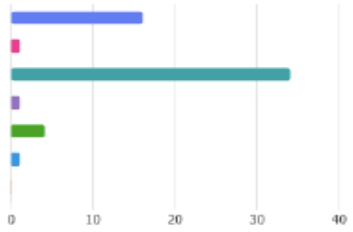
3. **What is your gender?**

Woman	27
Man	28
Non-binary	2
Prefer not to say	0



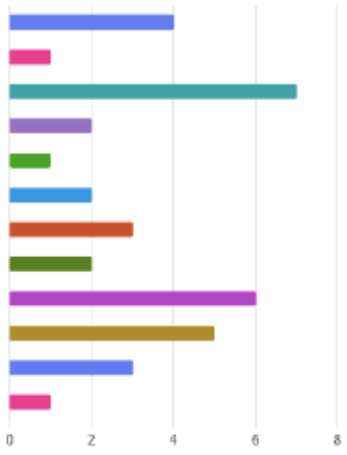
4. **What is your current employment status?**

Employed full-time	16
Employed part-time	1
Student	34
Unemployed	1
Retired	4
Self-employed	1
Other	0



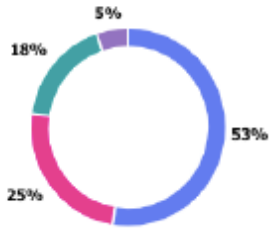
5. **Which ward in Fredericton do you live in?**

1	4
2	1
3	7
4	2
5	1
6	2
7	3
8	2
9	6
10	5
11	3
12	1



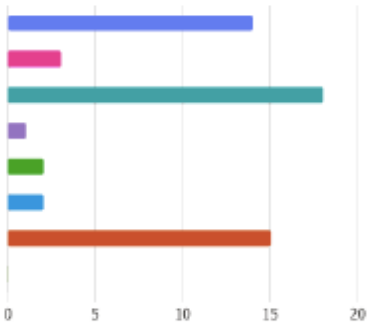
6. **What is your highest level of education?**

Graduate degree	30
Bachelor's	14
College or associate degree	10
High school diploma or equivalent	3



7. **Which population group or visible minority do you identify with?**

Black: African, African Canadian, Afro-Caribbean descent	14
East Asian: Chinese, Japanese, Korean, Taiwanese descent	3
South Asian: Bangladeshi, Indian, Indo-Caribbean, Pakistani, Sri Lankan, or other Sout...	18
Southeast Asian: Cambodian, Filipino, Indonesian, Thai, Vietnamese, or other...	1
Latin American: Hispanic or Latin American descent	2
Middle Eastern: Arab, Persian, West Asian descent (Afghan, Egyptian, Iranian, Kurdish,...	2
White: European descent	15
Other	0



8. **Do you identify as First Nations, Inuk/Inuit and/or Métis?**

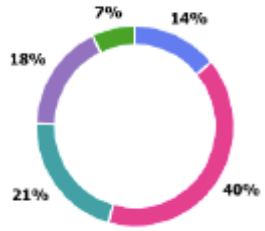
Yes	3
No	53
Prefer not to say	1

9. **Do you own a personal vehicle?**

Yes	33
No	24

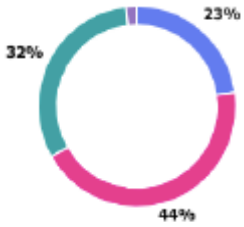
10. **What is your average monthly transportation cost?**

Less than $50	8
$50-$100	23
$100-$200	12
$200-$300	10
More than $300	4



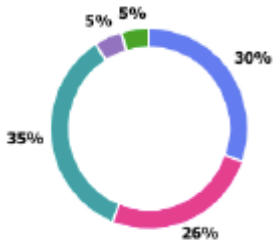
11. **What is the approximate distance you travel each day for your primary activities (e.g., work, school)?**

Less than 5 km	13
5-10 km	25
10-20 km	18
20-30 km	1
More than 30 km	0



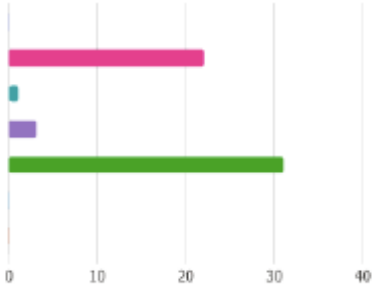
12. **What are your primary daily destinations (e.g., work, school, grocery store)?**

Work	40
School	34
Grocery Store	46
Recreation/Sports	6
Other	6



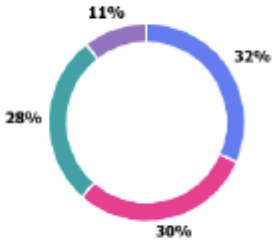
13. **What type of transportation do you primarily use for your daily commute?**

Bicycle	0
Bus	22
Taxi	1
Walk	3
Personal Car	31
Carpooling	0
Other	0



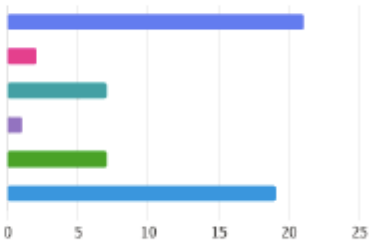
14. **How long does your daily commute usually take (one way)?**

Less than 15 minutes	18
15 - 30 minutes	17
30 - 45 minutes	16
45 - 60 minutes	6
More than 60 minutes	0

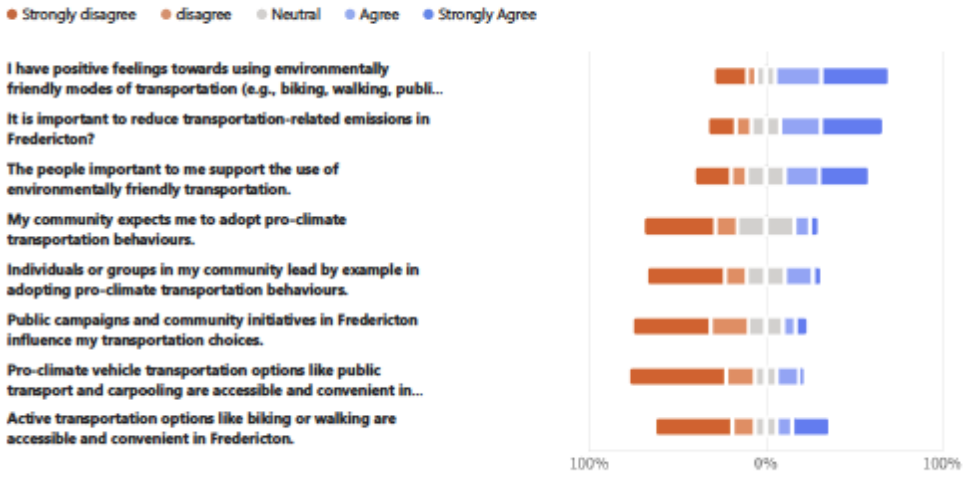


15. **How often do you use public transportation?**

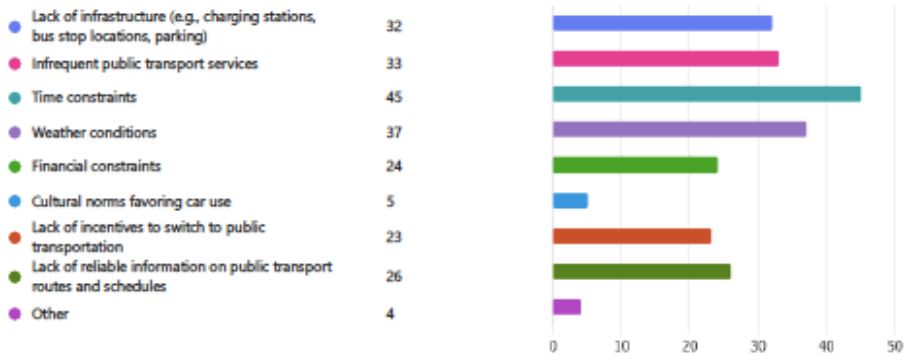
Daily	21
Once a week	2
Few times a month	7
Seasonal (Summers/Winters)	1
A few times a week	7
Never	19



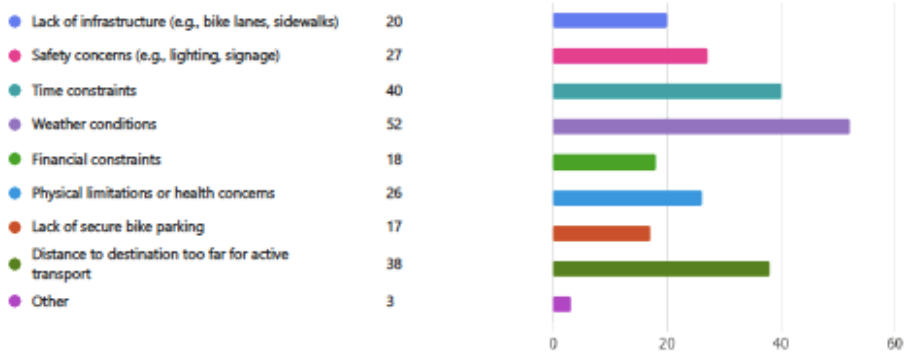
16.



17. **What challenges do you face when trying to use pro-climate vehicle transportation options (i.e. public transport, carpooling, driving EVs)?** *(Select all that apply)*

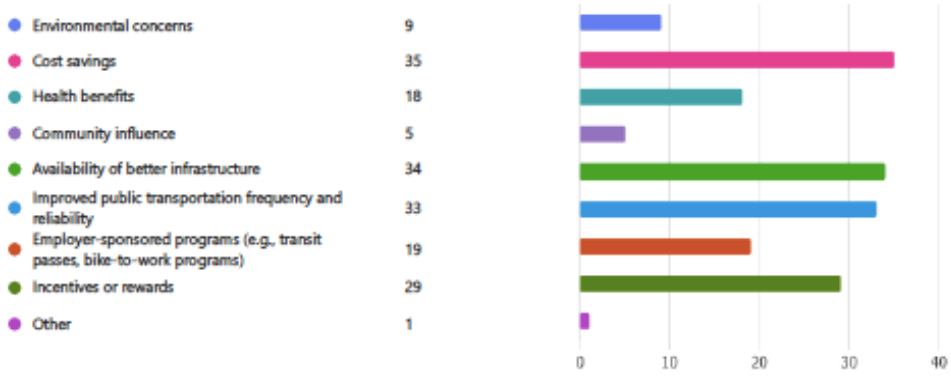


18. **What challenges do you face when trying to use active transportation options (i.e. walking, biking, scooters)?** *(Select all that apply)*



19. **Agree/Disagree**

20. **What would motivate you to use more environmentally friendly transportation methods?** *(Select all that apply)*



21. (Public transportation users) Would you adapt and continue using public transportation or would you buy a car once you have enough money?

Curriculum Vitae

Candidate's Full Name: Jeevitha Palani

Universities Attended (with dates and degrees obtained):

Bachelor of Arts (Psychology, Sociology, Economics), 2014-2017, Christ University, India.

Master of Arts in Applied Economics, 2017-2019, Christ University, India

MBA, University of New Brunswick, 2023-2025, Fredericton, NB, Canada.

Publications: (none)

Conference Presentations: Christ University research conference.