Commuting and Transportation as it Relates to the Environment

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## Introduction

The study of commuters' methods of transportation, their place of residence in relation to their place of work, and the effect that the commuting process has on work and life satisfaction are important to understand in developing policy to reconcile carbon-intensive urban life with the changing climate. In this paper I will examine how different methods of commuting affect aspects of commuter's lives and the effects of commuting on the environment. I will also look at how the built environment functions to facilitate or inhibit safe and effective commuting, and by what methods commuting is encouraged or discouraged. Time spent with family versus time spent at work, time spent commuting that could otherwise be spent elsewhere, different methods of commuting and their respective effects on the worker and the environment, and work-life balance as it relates to commuting are all examples of variables to be measured, compared, and contrasted. The reasons for a lack of action regarding commutes are myriad, but I will look specifically at a lack of political will combined with a preference towards a growth economy to explain the current conditions that influence commuting.

Most simply, commuting is the act of transporting oneself and/or others from one location to another. It is important in defining commuting to outline how it relates to other aspects of life. For the purposes of this paper, commuting is the act of moving between one's home and one's workplace. Commuting will thus be impacted by both the location of one's home and work, which are in turn impacted by urban development and sprawl.

## Commuting in North America and Historical Contextualization

Research dating back to at least the 1950s examines commuting in North America. An article written by J. H. Thompson in 1956 focuses on the commutes of industrial workers and compiles information from multiple other sources from this time to create a fuller picture of how industrialization has both created and affected commutes. Thompson describes the concept of a *labour market area,* 'a geographical area surrounding a central city (or cities which are only a few miles apart) in which there is a concentration of labour demand, and in which workers can change jobs without changing their residence' (71). Labour market area is a useful term for understanding where labour power transports itself geographically in relation to the location of the homes of workers and helps us to understand why people commute between different metropolitan areas by outlining where and what work is available. The concept of a labour market area today can be easily understood as any location in which an abundance of labour opportunities exists. Thompson's work provides an excellent foundation for the study of commuting in North America.

Contemporaneously, one can imagine suburbs constructed outside of city limits that are cheaper to rent and own than housing within the city. Thompson provides useful definitions for three factors that contribute to commuting patterns: area factors, plant/industry factors, and personal factors. Thompson defines area factors as those "various social, economic, and geographic characteristics of the region or community… among these are availability and character of jobs, distribution of population, city size, transportation conditions, and nature and cost of housing" (71). Plant/industry factors are defined as "characteristics of particular establishments and include type of industry, size and rate of growth of plant, plant location, wage level, working conditions, and hiring policies" (71-72). Finally, "personal factors relate to the individual employee and include age, sex, martial status, degree of skill, length of employment

[and] home ownership" (72). Each of these factors should be considered when attempting to understand commuting from a sociological lens and should inform urban design and planning. Area factors are often why people move from one location to another, and positive area factors can be attractive for workers who are looking to relocate. Plant factors, especially the location of industry, unsurprisingly has a great effect on commuting; workers will be more likely to spend more time commuting when compensation is higher. Personal factors are those that relate to the worker as an individual. It should be understood that these factors are all intimately connected, and none of them should be thought to exist in a vacuum. Authors Erika Sandow and Kerstin Westin exemplify the relationship between personal and area factors in their 2010 article: "living in the same place for a long period [allows] people [to] accumulate place-specific human capital that is not easily transferable to other places," important to "an individual's working life, income possibilities, and leisure activities" (89).

Matthew Paterson in 2008 wrote about how "urban space… has been systematically reconstructed to make allowance for the space required to move people about in cars," and that "this has become a self-reproducing trend" that has made owning a car a necessity in North American cities (260). Cars in North America have been an agent of capitalism because they are vital to both the transportation and the consumption of goods. Additionally, the proliferation of vehicles spurred along other industries "including road building, oil and petrochemicals, [and] steel" (264).

There is an important comparison to be drawn between European systems of transportation, which are typically more inclusive to bicycling and walking, and North American systems of transportation that rely much more heavily on personal vehicles. An issue especially prevalent in Western countries is car dependency. As pointed out by Derek Burk in 2017, a

combination of factors including a lack of infrastructure and political will have resulted in a "mutually reinforcing 'system of automobility'" (1209), that is, a strong reliance on cars and public transit for getting around in North America. Burk argues that the creation of driving infrastructure invites driving, and that the same is true for biking. He points out that because of sprawl in the United States, driving has become a necessity to travel from home to work, and to run errands. Placing this kind of importance on driving and vehicle ownership effectively eliminates the possibility for transportation alternatives. North American proclivities towards convenience and autonomy create a unique ideology that traditionally has little room for alternatives to personal vehicles. Changing this mindset in North America is important but can only be done if policy changes are implemented that make it easier to exist without a personal vehicle.

An interesting result of the self-perpetuating automotive system, Burk outlines, is the "[the American attachment] to their cars and the practice of driving in ways tied up with identity, status, and… habit" (1210); a clear consequence of this being that the needs of an entire class of people that goes without access to personal vehicles are largely disregarded because they do not profit the automobile industry directly through the purchase and maintenance of cars. Vehicles are much more than just a means of transportation in North America; the acts of commuting and traveling have been commodified and the means of transportation consequently became a status symbol. North American car culture encourages the development and sale of larger and more powerful vehicles each year as well as the expensive and inefficient infrastructure that is essential to the functioning to these vehicles. The automotive industry has made itself indispensable in North America; the illusion of choice exists in the different brands, accessories, and types of cars that are available to consumers. It is not enough to get from point A to point B,

it must be done in the newest, most stylish, or largest vehicle possible. Burk writes that, in North America, “actors in the highly concentrated automobile, oil, and rubber industries engaged in campaigns to undermine mass transit from the 1920s onward” (1214). This was done to serve an agenda of growth, wherein power achieved and sustained through capital drove infrastructure projects to serve the wealthy. For example, the construction of highways and roads can serve landowners who seek to construct housing away from urban centers, requiring residents to drive into the city for work and errands. This is especially true for areas inaccessible by public transit where a vehicle is all but essential for daily life.

More contemporarily, John Lorinc in 2018 examined a Quebec-based insurance firm that attempted to lessen their company’s carbon emissions resulting from their ~45,000 employees commuting to and from work every day. To this end, the company provided a number of alternatives to single-passenger vehicles such as “discounts on subscriptions for… car-sharing service[s]… a 20 per cent subsidy for employees who buy passes for the subway, bus, and commuter rail networks” (Lorinc, 34). The company additionally provided shower and locker services, as well as secure bike parking areas and specific parking areas for car-pooling. While the initiatives put forth by the company cost about $1 million, Lorinc notes that this move was “actually a bottom-line win… [as] the investment allows Desjardins to reduce the amount it pays for carbon offset credits… [and] defer the construction of a multi-million-dollar… parking facility” (Lorinc, 34). It is shown clearly here that environmentally friendly business practices can not only serve their primary purpose of lowering carbon emissions, but they can also save companies millions of dollars. This is, as co-leader of the sustainable development unit Yves Normandin points out, a “no-brainer” (Lorinc, 35).

In cases where a vehicle is necessary, ride sharing programs are a good idea that can help to curb the use of single-occupant car trips. This is called in Lorinc's 2018 article mobility as a service, abbreviated as MaaS, and ensures that consumers who require access should be able to use a car. Firms such as Uber, while flawed in a number of ways, are a step in the right direction to ensuring vehicle access without necessitating vehicle ownership. For a person who requires a car a few times a month, it makes little sense to spend thousands of dollars on the purchase and maintenance of a vehicle when a subscription model or a pay-per-trip model can be adopted.

As effective as implementing climate-friendly policies in business can be, they are no substitute for curbing growth overall and committing to sustainable living and working. As important as it is that we celebrate moves in the right direction, we must remember that adaptation within capitalism to climate change is just that: adaptation. Mitigation strategies, or those that attempt to curb the advance of climate change, should be given precedence over adaptation because, eventually, we will be unable to adapt to the effects of runaway climate breakdown.

**Commuting in Europe**

Alois Stutzer and Bruno Frey in 2008 indicated that, in the European Union, the average commuting time is 37.5 minutes. This is compared to 48.8 minutes in the United States, showing that commuting remains prevalent in Europe but commuting times are generally shorter (342). The researchers pay special attention to *equilibrium*, which "predicts that [monetary], as well as mental, costs of commuting are compensated for on the labour and housing market" (Stutzer & Frey, 346), meaning that those with longer commutes are likelier to have cheaper housing and vice versa. They go on to highlight that this equilibrium is difficult to achieve in economies tied closely to travelling; those who strongly dislike commuting "are worse off than people who do

not mind commuting in our spatial economy" (349) and commuting will have a disproportionately negative effect on these people. For example, one who has a distaste for commuting will have to either pay more for housing closer to work or endure a commute they do not enjoy. The two researchers also examined the effect that method of commuting has on satisfaction and found that those workers that are able to forego the more stressful parts of commuting (i.e., traffic) are happier generally.

Europe, when compared to North America, is much less a victim of car culture. Generally, commuting by public transit, bike, and on foot are much more accepted and even expected in some of the largest European cities. A study conducted by Lars Olsson et al. (2013) at the University of Karlstad, Sweden zeroed in on the more negative aspects of commuting and found that "long work commutes in congested automobile traffic cause residual stress in the workplace… [and that] stress due to work commutes by public transit increases with the complexity of the commute" (256). The study found that "slow commute modes (walking and biking) … result in more satisfaction than car and public transit" (Olsson et al., 258). The authors go on to indicate that the quality and duration of one's work commute has a "substantial influence on overall happiness" (259); as noted by Pritchard et al. "being generally satisfied with life is positively associated with higher odds of also being satisfied with commuting" (2021; 1012).

Sometimes, however, biking or walking is impractical because of distance or ability. In these cases, the employment of other transportation strategies such as buses and trains are at the forefront of consumer travel. Turner in 2017 gave a number of examples of European cities such as Eindhoven and Helmond in the Netherlands and Charleroi and Namur in Belgium that have converted their "electric buses [which] are much cheaper to run than internal combustion engine

ones and require far less maintenance, with the added advantage of producing no local pollution" (65). Local pollution is a term to look out for here, as the construction of these buses still requires the extraction and transport of raw materials. Still, electric buses are a much cleaner option because of their one-and-done resource cost, barring any serious repairs. Paired with their near-total lack of emissions, a reduction in noise pollution, and reduced levels of traffic, electric buses are becoming an increasingly viable alternative to single-occupant vehicles. Inner-city rail systems such as electric streetcars and trams are another solution that should be given due consideration. They allow for transportation throughout the city without the need for roads, freeing up space for other uses. It is important to note, however, that they require the creation and upkeep of more infrastructure than do buses, whose transport pathways already exist in the form of roads.

**Sociological and Environmental Implications of Transportation and Commuting**

The sociological implications of this examination of commuting are thus: people are generally happier when their commutes are shorter and when they can commute on foot or by bike; and commuting this way is far healthier for both commuters and the environment. As written by Pritchard et al. in 2021, "active modes [of commuting] are generally more positively related to travel satisfaction…" (997). Pritchard et al. go on to mention that workers generally do not want to eliminate travel time entirely, and that the positive utility provided by commuting often balances out the time spent commuting. This is especially true for those who commute on foot or by bicycle (997).

Matthew Paterson expends great effort in making clear that "capital accumulation requires the success of particular industries… and the way in which the state is structurally required to intervene to… promote key industries" (260). The automotive industry can function

as *the* example of this point: cities have been reorganized to suit vehicle infrastructure, and consumption patterns have been shaped around constant access to everything. The use of taxes to maintain vehicle infrastructure is exemplary of the hold that the automotive industry has on states. The destructive power of climate change is indifferent to humanity's economic and social analyses, however. Adaptations simply must be made if we are to mitigate damage that climate breakdown will cause. Lance Turner in 2017 gave an outline of the relative levels of emissions in Europe from different types of transportation: the European Environment Agency states that "emissions from all passenger rail (with an average of 156 passengers per train) in Europe are around 14g of $CO_2$ per passenger kilometre" (Turner, 64). This is compared with a car carrying four passengers, at 55g, a bus with 12.7 passengers at 68g. and an aircraft carrying 88 passengers at 285g. Turner notes that, of course, these numbers will vary based on type of vehicle, but it is clear that passenger trains are much more efficient than other modes of transportation, most obviously planes. Stuart F. Brown in 2010 examined the impact that high-speed rail has had in Europe and parts of Asia and criticized the US for its lack of rail infrastructure in favour of airplanes and highways. In Spain, Brown points out, a "Madrid-to-Barcelona express train runs at an average speed of 150 miles per hour… [and that] airline traffic between the two cities has dropped by 40 percent" (56) since the implementation of the rail line. He contrasts this highly efficient rail system with America's Acela train connecting Boston and Washington, D.C. at an average of 70 miles per hour. This is because, Brown points out, the infrastructure is not capable of safely supporting higher speeds. The Acela train is capable of traveling at 150 miles per hour but is bottlenecked by a lack of will in making rail a viable transportation method in America.

**Political Will and Environmental Effects with respect to Transportation**

As Matthew Paterson outlined in 2000, “cars are widely acknowledged as a main cause of many aspects of environmental degradation… [producing] 23 per cent of the $CO_2$ emitted into the atmosphere” (258). This is a substantial amount, and it is important to note that this number does not take into account the emissions put out by the process of building roadways, extracting raw materials to build cars, the price of destroying nature to make way for vehicle infrastructure, and the waste created when cars break down or are no longer able to operate. Areas with high levels of car exhaust emissions are associated with “a wide range of health problems… [including] brain damage, respiratory problems and infections, lung cancer, emphysema, headaches, aggravation in those with heart disease, low birth weights, leukemia and stress (from noise levels)” (Paterson, 259). Further on the point of resource extraction, Paterson notes that “in the US, car production consumes 13 per cent of all the steel, 16 per cent of the aluminium, 69 per cent of the lead, 36 per cent of the iron, 36 per cent of the platinum, and 58 per cent of the rubber” (260). These are resources that could be used to create more equitable and environmentally friendly forms of transportation (or better yet: left in the ground) but are instead funnelled into profit-generating low-occupancy vehicles with highly damaging effects on the environment.

Turner in 2017 noted that, in countries with large distances between metropolitan areas and relatively smaller populations, there will be an increased cost-per-taxpayer if rail infrastructure is to be installed. This makes high-speed rail a “difficult sell,” according to Turner. Nevertheless, rail is simply one of the most energy-efficient possibilities for mass transportation. Turner writes that this is due to “the use of electric trains... being able to derive power from renewable energy sources rather than… diesel engines…” (64). As technological progression continues to move towards cleaner and cheaper electrical power, rail will become a stronger

contender for inter-city and inter-country travel. This also frees rail from the cost of fossil fuels. Turner spends some time as well focusing on the practicality of electric buses. Though they still require the use of vehicle infrastructure to travel between destinations, electric buses will similarly become much cheaper to operate and travel by as technology continues to progress. Travel within cities will be especially affected by this change; it may be impractical to build rail infrastructure throughout cities, there already exists the infrastructure to support vehicle travel. A more comprehensive network of buses may be the key to reducing inner-city traffic and reducing emissions otherwise caused by cars.

Paterson outlines four main factors that accompanied the promotion of cars by states. "The first of these has been road building… the second is the progressive neglect and downgrading of public-transport and non-motorized forms of transport. Thirdly… various fiscal measures which… subsidize car use relative to other forms of transport. Finally, there are occasional instances of collusion between states and car companies designed to remove competitor modes of transport to the car" (266). Paterson takes a closer look at each of these: motorway building, which began en masse with Germany and Italy as axis powers in World War II to assist primarily with military operations, was soon seen nearly everywhere in the Western World. In the United Kingdom, "3,500 miles [resulting from] the government adopting the plans of the British Roads Federation very closely" (Paterson, 267). In the US, "the highway Aid Act of 1956 created a system whereby the bulk of car-related taxes went into a Highway Trust Fund which could only be used for highway construction" (Paterson, 267). The neglect and decay of other modes of transportation began, like motorway construction, in WWII. The reason given for this is that the mass construction of roads gave consumers little incentive to travel by rail, and so the infrastructure went relatively unused and began to decay. It is worth noting as well in relation

to roadways and railroads that there is “a complaint [of a lack of] a ‘level playing field’ between road and rail…” In the UK, “rail investments [had] to show profits, while the costs of road construction are simply written off by the state” (Paterson, 267). This unequal investment and uneven standard to which each industry is held respectively has done immense damage to both the infrastructure and reputation of rail transport: it is stereotypically slow, marred with delays, expensive, and less convenient than driving. Third, subsidies given to the automotive industry has to do mostly with the price of oil. “Despite high petrol taxation in many countries, the net effect of relevant fiscal policies is usually regarded to be favourable to the car…” (Paterson, 267). This is to say, that though the price of oil is usually relatively high, it is paid for at least in part by the state to facilitate its consumption.

The concern about collusion is one more sinister than I had initially thought but should be given due attention. Paterson outlines, “in many cities in the US, the companies were direct in their approach. In a[n] infamous case, National City Lines, a bus company formed in the early 1930s by General Motors, Standard Oil of California and Firestone Tire Company, systematically bought up and dismantled tram lines, ostensibly with the purpose of replacing them with buses, but ultimately to reduce competition for the cars which provided them with far higher profits… in all, by 1949 they replaced ‘100 electric transit systems with GM buses in forty-five cities.’ By the late 1950s, over 90 per cent of the US’s tram network had been dismantled” (267-268). While GM was tried and convicted for conspiracy for their efforts, the damage had been done and the public had made efforts to adjust to the changing infrastructure in the US, a point from which there was no going back.

While it may seem outside the scope of this paper, it is very important to understand contemporary political attitudes towards climate change. It is no secret that governments are

hesitant to take meaningful action against climate change, especially when it interferes with corporate profits. As Paterson points out, “companies involved in car production and related activities… have been highly involved in lobbying… to defend their interests, and… have been structurally powerful” (259). Tom Daschle in 2008 examined the political climate in the United States regarding climate change and its effects. In North America, the United States “is responsible for a quarter of the world’s global warming emissions… [and] those emissions threaten to increase the intensity and frequency of storms, destroy coastlines, and devastate communities least prepared to confront them around the world” (Daschle, 94). Daschle references the Stern Review, a 700-page report released in October 2006 that outlined the impacts of climate change on the world; the report stated that, “at a cost of about 1 percent of the global GDP… impacts of climate change can be averted” (Daschle, 95). Of course, there has been little meaningful action from Western, specifically North American politicians regarding climate change. It is difficult to understate the urgency with which this issue much be addressed. However, with “economic growth [becoming] one of the central indicators of government legitimacy in the twentieth century” (Paterson, 268), the proliferation of automobiles as an industry has been vital to serving the agenda of growth set by corporations and expected by voters. Promoting cars has “enabled state elites to ensure their own rule, because they have been able to promote the interests of structurally dominant capital, but also because it has helped to promote consumerist understandings of individual identity, helped to focus nationalist projects around particular technologies, and… to promote employment” (Paterson, 268).

**Policy Implications**

To study commuting further, it would be useful to employ a Likert scale to measure responses from low-to-high satisfaction to get a more accurate and picture of respondents’

feelings. However, a more substantial qualitative method such as using recorded interviews may be more effective in providing specific examples and feedback for policy reform. A wealth of research is important to collect and conduct so that it may inform new policy to support the changing climate and our adjustments to it.

It is important, as Burk (2017) indicates, to understand that "because the [automotive] system is self-reproducing, it cannot be displaced through isolated change in any one part" (1210). It is true that the automotive industry has incorporated itself into much of daily life: commuting, running errands, and recreation are just some of the things that are made much more difficult and time consuming in North America without access to a vehicle. The ways that people interact with the areas they live in must be dissected and reassembled to better support climate-friendly systems. The separation of the automotive industry from policymakers should thus be a goal for environmental activists as well as governments on every level.

As was shown in Lorinc's 2018 article, legislating payment for carbon emissions incentivizes companies to imagine alternatives to commuting by car. Lorinc goes further to outline the most important factors that can inhibit or promote behavioural change: parking charges and access to a vehicle in case of emergency are two examples of factors that promote behavioural change without requiring the ownership of a vehicle.

Todd Litman's 2006 article provides a more comprehensive look at potential transportation solutions. These include carsharing, smarter land use, and high-occupancy vehicle lanes, as well as others. Carsharing largely has to do with carpooling to ensure that vehicle access is widespread and convenient for those errands that require one without necessarily requiring ownership. As I indicated previously, companies like Uber and Lyft are examples of this kind of system. Smarter land use refers to "[improving] accessibility for non-drivers and

[encouraging] the development of more compact, pedestrian-friendly, transit-oriented communities, where residents need to drive less" (Litman, 72). Finally, high-occupancy vehicle lanes make use of existing automotive infrastructure to transport larger numbers of commuters than single-occupancy vehicles can.

**Conclusions**

At the time of my writing this, there are seven years, 29 days, and a few hours to limit emissions such that global temperatures do not grow past 1.5 degrees Celsius (Climate Clock). Eliminating individual travel by car is essential to achieving carbon neutrality, but this can only be accomplished effectively with sufficient infrastructure change. Cars simply must be eliminated from public use and replaced with safe and efficient means of mass transportation to have the most meaningful impact on climate change. The creation of walking and bicycle infrastructure, the densification of cities, together with the use of renewable energy will all help to achieve carbon neutrality. It is in support of this goal that this paper exists.

There is a significant contribution that can be made both to sociology and to principles of urban planning by understanding the ways that the environment is linked to labour. Necessary to implementing this is understanding how humans interact with and shape the environment in various ways. The information I have gathered over the course of this internship and in this paper shows that there is a significant link between levels of human interaction with the environment and job satisfaction, especially related to commuting.

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